



IS Assignment

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Should PlayOns Toys invest in a DBMS?

As a growing company, PlayOns Toys must adapt to become more cost effective, efficient, and productive. To achieve these goals, the company must change its methods for handling data relating to manufacturing, strategy, and logistics. As it stands, despite its rapid growth, the company is hindering its own expansion through the use of its non-centralized data management and storage systems i.e., the isolated databases, electronic and physical files that are currently in use throughout the organization. Further, if the company wishes to expand its operations beyond the borders of Europe to a globalized market, this system will undoubtedly make such aspirations impossible to achieve. What then, should be used to address this? The answer is to use a Database Management System (DBMS) using a relational database.

What is a DBMS and what use is it?

Database Management Systems (DBMS) are pieces or collections of software whose function is the storage, querying, and retrieval of data within a database. They act as a medium through which a user interacts with the database. i.e., create/retrieve/modify/delete data within the database.

DBMS's can typically be used in conjunction with a myriad of other software to perform tasks and duties that heavily rely on data, such as logistics and financial analysis within an organization.

There exist many categories of database management systems. These can be, but are not limited to:

- Distributed Database Management Systems
- Hierarchical Database Management Systems
- Relational Database Management Systems
- Network Database Management Systems
- Object Oriented Database Management Systems

Of these, the relational DBMS is considered the most popular.

“Relational database management systems (RDBMS) are the most popular data model because of its user-friendly interface.”

(“What is Database Management Systems (DBMS)?,” n.d.)

The Key Factors for an Expanding Company

Expansion to new regions may necessitate additional hires, new product offerings, or expanding the company's online presence/online sales front. In simple terms, expansion can be both risky and costly. Such a move would require an extensive financial assessment to investigate whether such ambitions are viable. As important as it is to identify the possible benefits of expanding to new markets, it is of equal importance to identify and assess the possible outcomes that could be detrimental to the overall health of the organization that expansion can create. Some of these issues could be:

- ➔ Cash Shortage due to an increase in expenses to facilitate the initial expansion.
- ➔ Increased manpower and resource requirements, such as equipment and materials.
- ➔ Compromised productivity and quality due to the overburdening of equipment and staff for increased output.
- ➔ GDPR and data-related regulations in different jurisdictions.
- ➔ Extended supply chains, which can easily become backed up without extensive planning and control.

To pre-empt these concerns, or to even make an educated and well evaluated strategy regarding expansion, a DBMS is of utmost importance. By pooling all the company's current data into a DBMS, assessments on the overall health of the company and predictions of future costs could be developed. From a regulatory perspective, a DBMS is much easier to ensure compliance with GDPR rules or other such data regulations. Part of GDPR is the safe storage of consumer data, and to be able to inform consumers of security breaches through which their data may have been made vulnerable. Failure to comply with such regulations can result in significant fines, which it is obviously in the company's interest to avoid. Another example can be seen with the extended supply chains, management, and organization of logistical data such as those regarding warehouse inventory and shipping manifests can greatly benefit from the faster and consistent data retrieval within an electronic, cloud-based DBMS.

(“Advantages and disadvantages of expanding a business | Euler Hermes,” n.d.)

Utility of DBMS's

Individual DBMS's can be developed for each specialized unit within an organization or combined into a larger unified database. Data contained within this unified or segmented database can be used by each of the following organization departments to achieve their specialized tasks and acquire relevant operational information. This use of the database is often mediated using an ERP, which will be discussed in the next section of this report.

Manufacturing and Production Systems	Human Resources Systems	Sales and Marketing Systems	Management Support Systems	Finance and Accounting Systems
Materials Acquisition/Receiving Shipping Process / Material / Quality Control Equipment / Labour / Robotics	Personnel Records ATS (Applicant Tracking Systems) Position and Role vacancies	Sales Order Processing Credit Authorization	Basic operational summaries and reports Modelling Data pulling from internal and external sources for unstructured problem solving.	Pay roll Ledger Cash Management Accounts Payable Receivable Cheque Processing

(Xiaoling Liu)

Advantages of a DBMS

1. Improved Sharing of Data across the company.
2. Improved data security, which helps the company comply with data regulations.
3. Improved use of data for analysis and management.
4. Reduction in inconsistent data across company records.
5. Improved data queries for varying uses.
6. Improved business strategy through analysing data within the companies records to create predictions.
7. Improved productivity, as being able to quickly edit, remove, update, or query company records means that more energy can be spent on other tasks.

Disadvantages of a DBMS

1. Increase in costs due to potentially expensive software and infrastructure.
2. Management Complexity.
3. Keeping records and data up to date.
4. Staff Training.
5. Frequent upgrade/replacement/maintenance cycles.

("What is DBMS? Advantages and Disadvantages of Database Management System(DBMS)," n.d.)

Alternatives to a DBMS

While in the aforementioned introduction to DBMS as a concept suggested that a cloud-based DBMS solution could yield great benefits, let us identify possible alternatives that may readily be available to the company without significant additional cost. For example, let PlayOns Toys utilise a text-file based record keeping system, which it currently does to some extent. Despite the immediate concern regarding the physical infrastructure such as server rooms and computers that would be needed to use the system throughout the company, what other concerns may be vital to consider?

File Based System	
Queries A file-based system would be incredibly inconvenient and difficult to query for specific information. E.g., It is very difficult to view the number of Product A that Factory 1 has shipped to the Dublin Warehouse. Additionally, information could be incorrectly input i.e., an employee types in "Dbilin" when entering an additional shipping manifest into the file system.	Updating Adding, Deleting, or Updating a record or the organisation of records is not readily available. For example, trying to add a new "Yearly bonus" field to every Employee record is a time consuming and error prone process.
Multiple Users Multiple Users may be editing the same file simultaneously, which can lead to data inconsistency and overwriting updates made by one user or the other.	Crashes If a crash occurs while a record is being updated by an employee, the data within the file could become inconsistent. It is also more difficult to revert changes that have been made in error.
Physically Separated Data In the event that data stored within two separate files must be utilised together to find out information, for example, what is	Security How is access to the files and data controlled? Many roles within the company would require overlapping information,

the average age of male employees working in Factory A? For such analysis to take place, the records for both Factories and All employees would have to be merged, which would be very time consuming as a manual process.	which may contain sensitive information that they should not have access to. Additionally, text files can easily
<p>Efficiency</p> <p>As the company grows in scale, a file-based system would quickly become a hinderance to productivity. As files become larger and more and more personnel try to access and edit them, software can slow down and then slow down the rate at which employees compete their other tasks.</p>	<p>Developing Needs</p> <p>As the company expands its products, services, or operations, it may gather new requirements for its file system. Unfortunately, a file-based system would be incapable of extension and increase in scale. Should the company decide to use a new online web vendor for its services, it would be very unlikely to find a service that could work with the existing file system, and to develop a vendor in-house would incur additional expenses.</p>

Considering all the downsides to a file-based system, any benefits that it could possibly have, are massively out-weighted by the difficulties with which it will present. As such, it is obvious that a sophisticated DBMS solution is required for the PlayOns Toys Company. However, this moves us on to the next port-of-call in this report: what DBMS should be implemented and how much is the company willing to spend?

Are there any Open-Source Solutions Available?

While the transition to a more sophisticated DBMS will incur necessary investment costs, there are a variety of solutions available to the company to make use of which can significantly reduce the overall cost of the transition. There exists a plethora of open-source solutions that the company could utilise. However, there also exists the possibility of a proprietary solution, which would incur a significant increase in upfront costs.

Proprietary solutions can often receive more support from their vendors than an open source, can be more reliable, and are often developed with integrations and other complementary services for a company. Unfortunately, due to this, users of proprietary software become dependent upon the vendor themselves to maintain pace in developing in the digital environment.

Open-source solutions also have their own benefits and liabilities. One of their benefits is that the user of open-source solutions can customize their own solutions that fit their unique needs. Custom solutions can also be proof-of-concept-ed and more easily tested before being fully invested into them. Obviously, there is the major benefit of lower up-front cost than proprietary solutions. Unfortunately, there are also disadvantages to open-source, such as the required talent and skill to build, deploy, maintain, and further develop on the open-source code.

("Open source vs. proprietary database management," n.d.)

Considering that the company is still quite small, has rather specialized needs, and has lower available capital, open source may be the best solution for PlayOns Toys. As such there are plenty of open-source DBMSs available. One of the most popular open-source DBMS's is MySQL. It currently boasts a significant 5 million users. Among these are major telecoms and technology companies such as YouTube, Facebook, and Twitter.

MySQL can run on a vast list of operating systems including the three most popular of Mac, Windows, and Linux. Along with client/server systems, MySQL can also operate within an embedded system. Additionally, it operates under a GNU General Public License, meaning that any users can freely modify and use the program to suit their needs. To protect the free nature of MySQL, this license prevents any entity from patenting their modified version of the program. If this is not something the company wishes to utilise there is a commercially licensed version available. Of these licenses, MySQL Enterprise Edition costs \$5,000, and includes the MySQL Workbench Enterprise Edition.

Using MySQL Workbench (Community or Enterprise edition), a developer can "visually design, model, generate, and manage databases". It allows the development of entity relation models, forward/backwards engineering. It provides visual tools for developing SQL queries in its SQL editor. Enterprise has tools available for server configurations, backups, and auditing the database, as well as a toolset empowering the developer to view KPIs (Key Performance Indicators). While the Enterprise Edition provides an extensive list of features, the community edition remains cost effective by remaining completely free.

("MySQL :: MySQL 8.0 Reference Manual :: 1.2.1 What is MySQL?," n.d.; "MySQL :: MySQL Products," n.d.; "MySQL :: MySQL Workbench," n.d.)

Should PlayOns Toys invest in its own fully fledged Enterprise Resource Planning system (ERP)?

In the previous section, Utility of DBMS's, the use of a DBMS was highlighted with respect to the departmental units within an organization. It was said that an ERP mediates the practical functionality of a database.

What is an ERP System?

Enterprise Resource Planning is the management of a company's main processes and activities, with an ERP System acting as a software medium through which to do so. Using a DBMS-managed database, an ERP system can allow a company to have real-time information accessible on all core-operations.

("How to Build an ERP System From Scratch and Do It the Right Way," n.d.)

Without an ERP system, accessing, updating, and deleting data from the database would require employees to access the database directly to input relevant info, i.e., an employee approving a delivery arrival to a warehouse. In the case of a unified database, there would be no real way to stop an employee from accessing the information within a database that is sensitive in nature, or irrelevant to them. Even departmentally segmented databases would do little to alleviate this problem, and they would in turn lead to data inconsistency between databases.

An ERP system helps to deal with this issue. In principle, it allows employees to access information they should be able to access, without having access to the entire database itself. With ERP such as Acumatica, users of the software can each be given "dashboards" suited to their role and job activities. In addition, ERP systems can supply reporting tools to give at-a-glance overviews plus more detailed reports if needed. These dashboards can be customised by the organization to suit their needs and requirements. ("Acumatica Dashboards," n.d.)

Open-source vs Out-of-box vs Premium

Generally, there are two main categories of ERP, out-of-box and custom. Out-of-box (OOB) systems are pieces or collections of software pre-built. While typically sold by companies, there exist many open-source solutions for an ERP, for example ERPNext. OOB systems can come with additional modules, that may or may not be sold separately, which can be added to the system for increased functionality, e.g., higher detail reporting. An example of an OOB system is Acumatica or ERPNext.

A custom solution on the other hand, is typically built by or specially for (through a contractor) a company. Custom ERP's have great benefits since they can be specially tailored for the specific needs of a company. This means that redundant features don't need to be included, but also, because the software can be tailored to the company's current workflow, it would be easier to integrate into said workflow and require less training than an OOB system, where there may be changes to a worker's workflow. Custom solutions have one major drawback, however, in that they require a company either to put the development of the software out to contract, which may not yield satisfactory results, or the company must invest into an in-house development and IT team. Such a team would consist of multiple technicians, software developers, infrastructure, and equipment etc. To maintain the software, that team must exist for the lifetime of the software.

Before looking at Open Source, it is useful to compare custom ERP system to a premium OOB ERP system. The cost of licensing an ERP system from a company, often has lower upfront costs than the upfront costs of developing a custom solution. For example, Acumatica has a perpetual license available for roughly \$30,000, with an additional 18% of that cost being paid every subsequent year. ("Acumatica," 2018) Considering the cost of developing a custom solution can run upwards of \$430,000 for multiple modules using an in-house team, it may seem like a foregone conclusion to recommend a premium ERP system. This, however, is short-sighted thinking as it can often be cheaper in the long-term to develop a custom solution. Unfortunately, premium OOB systems often have hidden costs, as certain features/modules of the software may incur additional charges and costs. They also may not function in the method that a company requires, i.e., such as a worker's workflow.

("How Much Does It Cost to Develop an ERP Software," n.d.)

("Weighing the Pros and Cons of an Open Source ERP vs Enterprise ERP," 2019)

Therefore, the question become a debate between an open-source ERP solution vs a custom solution. Much like the custom solution, the open-source ERP will still require a significant amount of technical skill to set up, which will have associated costs, although not as much as a custom solution. On the other hand, an open-source ERP may not be fully compatible with a company's workflow.

The solution can be found in a hybrid model, using an open-source ERP as a base from which to develop further should the system be inadequate. Such an ERP would have to have publicly available source-code operating under a license that permits alteration for a company to make use of. A recommendation can be ADempiere, which operates under the GNLv2 (GNU) license. This ERP can be implemented as a cloud base ERP, with publicly accessible source code, and has multiple modules available by default, including Sales, Manufacturing, Procurement, Human Resources, Logistics, Construction, Project Management, POS. ADempiere can be hosted on an AWS using PostgreSQL for free, but does require additional developer support to run using MySQL.

("Weighing the Pros and Cons of an Open Source ERP vs Enterprise ERP," 2019)
("Adempiere ERP | iSquare Systems," 2018)
("GNU General Public License v2.0 - GNU Project - Free Software Foundation," n.d.)
(Boecking, 2012) ("Adempiere ERP," n.d.)

How will the ERP system work for PlayOns Toys?

Whatever ERP system PlayOns Toys chooses to utilise, it fundamentally has to work using a database. The database will hold information pertaining to the various parts of the organization, i.e., those previously mentioned in the Utility of DBMS's section: Manufacturing and Production, Sales and Marketing, Finance and Accounting, Human Resources, and Management. While it is not feasible for this report to design a high-level database concept for the entire organization, sample databases can be made for some of those organizational units. The designs of these databases could follow the designs laid out in the entity relationship diagrams included in the appendix. Accompanying these will be descriptions as to how they are structured. For this report the chosen units of the organization are the Human Resources department and the Manufacturing and Production Department. To see full breakdowns of the Entity Relationship Diagrams, see appendix.

Human Resources

The ERP will provide the HR department functionality relating to staff hiring such as an ATS, staff and their dependents healthcare/insurance, staff training, job openings, management, and staff holidays. These are general tasks that a HR team may need to utilise, and so an ERP interface should be constructed to access this database, with additional access security maintained through different interfaces for each level of seniority within the department.

Manufacturing and Production

The ERP for manufacturing will have to provide an interface to assist in the operations of the Manufacturing and Production Department. As part of this, the database will have to store information pertaining to component supplies, equipment, products, operators and employees, quality assurance, inventory control, and shipping. The diagram for the database assumes that an external courier service operates the main supply lines, so the shipping information is kept rather simple, although should PlayOns expand further and develop their own logistics department, this can be developed as a module to the ERP system and the database.

Should PlayOns Toys be looking to outsource some or all their data management to "the cloud"?

Data management is anything but a simple and unimportant task. Depending on the solution chosen by the company, data management could potentially be a crippling financial responsibility. Most modern companies elect to use cloud-based solutions for their data storage, and software hosting. According to one study, companies can save up to \$3.5 million by using cloud-based systems ("Actual Vs. Projected Data Infrastructure | Persistent," 2020). Beyond this, it's important to understand how and why companies choose to follow this route.

Legacy Systems vs Cloud Based Solutions

In short, legacy systems i.e., non-cloud-based, require a large amount of equipment such as servers, cables, physical rooms, cooling systems, and energy demand. These are all costly factors and may require expansion as the company furthers its growth.

Issues with Legacy systems:

There are many issues that may arise from the use of a legacy system.

Security

One of the major issues with a legacy onsite server room is the reduced amount of security associated with them. For instance, let's say the server containing the company's entire database and ERP system is physically located at a head office in one country. In the event of a fire in that building, what will happen to all that important data? It will be completely lost. Beyond this, there are also risks of other geographic disasters, or potentially even an even more dangerous threat, a cyber-attack. With a cyber-attack, sensitive information can be stolen and used by malicious actors, which is a danger to both the company, and its employees and customers. (Bluebird, 2021)

Expansion of Needs

The next major problem relates to the scalability of onsite server infrastructure. Should the needs of the company expand, the costs of upgrading the server, adding more servers, and maintaining additional servers can become a big financial liability. These upgrades can take precious time, which as we know from the saying, time is money.

Power outages

As simple as it sounds, power outages can be a big problem for onsite servers. If a building containing the server lose power, and the company's back-up power also fails (should the company even have one), the server will be out of action for the duration of the power outage. This could mean disruption to sales, logistics, production, and other time-sensitive operations.

Infrastructure costs

Depending on the equipment, location, supply, and other economic factors, the cost of building an on-site server room can be anywhere between \$10-\$75 thousand. This would only account for the initial installation costs. Due to the rapid development of

technology, particular hardware may become obsolete or insufficient within only a handful of years, then there would be additional costs to upgrade the infrastructure.

These factors would only ever be compounded by PlayOns Toys plans of expansion. For each region, the costs of developing infrastructure, security risks, and other concerns would multiply and grow. This is where cloud storage can help.

(cloudfastpath, 2018)

(“Pros and Cons of Cloud Servers vs Onsite Servers,” 2021)

Cloud-Based Solution

For PlayOns Toys, a good solution may be to invest into IaaS (Infrastructure as a Service), which is a type of Public Cloud. IaaS allows a client to purchase access to infrastructure to host different software. This can include data storage, such as a database, or other software such as an ERP system. Companies who provide these services develop large, well-supplied, and energy consuming datacentres. These facilities have massive amounts of servers, storage, and other hardware. They often operate under a pay-per-use model, with the cost depending on the service provider.

Cloud solutions have the following benefits:

- Globally accessible data through an internet connection
- Data centralization
- Increase in scalability
- Increased Security
- Automated Backups
- Compatibility

It’s important to mention scalability here. How does a cloud service offer greater scalability? Well, because the only determining factor of how much data storage the company has, is how much the company is willing to spend. With IaaS, the infrastructure already exists physically, so all PlayOns Toys must do to get access to it is to increase how much they spend on it. It is not only a one-way system, as should less storage be needed, the company can easily reduce the amount it is spending.

While there are certainly advantageous, there can also be downsides to IaaS:

***“Unexpected Costs:** Monthly fees can add up, or peak usage may be more than expected*

***Process Changes:** IaaS may require changes to processes and workflows*

***Security Risks:** While IaaS providers secure the infrastructure, businesses are responsible for anything they host*

***Security Risks:** New vulnerabilities may emerge around the loss of direct control*

***Limited Customization:** Public cloud users may have limited control and ability to customize*

***Vendor Lock-In:** Moving from one IaaS provider to another can be challenging*

***Broadband Dependency:** Only as good as the reliability of the internet connection*

***Regulatory Uncertainty:** Evolving federal and state laws can impact some industries’ use of IaaS, especially across country borders*

***Vendor Consolidation:** Providers may be acquired or go out of business*

***Third-Party Expertise:** Lack of mature service providers, guidance or ecosystem support”*

(“What Is IaaS - Advantages and Disadvantages | Cloud Computing | CompTIA,” n.d.)

(Review, n.d.) (“10 Benefits of Cloud Management Services,” 2018) (McCarthy, 2021)

Despite the difficulties that may arise with Cloud data storage/management, it is very clear that it is the only future-proof method to which PlayOns Toys has access to. Most major companies operate using a Cloud service provider, for example, Spotify, the music, and media application, runs on Google Cloud infrastructure services.

Summary and Recommendations:

Now that a thorough analysis of all three issues has been conducted, this report can finally provide some concrete solutions and recommendations to the initial problem. This section will outline the following: DBMS, ERP system, and Cloud Service Provider.

DBMS

For the DBMS, MySQL Community edition is the chosen solution. It is one of the most widely used DBMS's and is compatible with a wide arrange of software. While in the previous section discussing DBMS's, the Enterprise edition of MySQL was highlighted, the Community Edition is the better choice because it 1. Is cost effective and cheaper and 2. Is more compatible with Microsoft Azure and Amazon RDS which are IaaS providers. ("How to choose between MySQL Community Edition Vs Enterprise Edition (2021)," 2021)

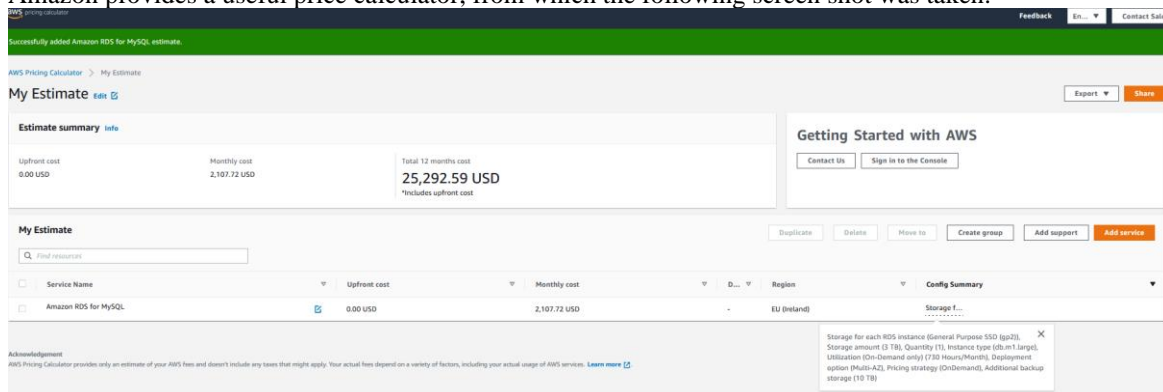
ERP System

The ERP system will perhaps be the most important aspect for the regular employee working within the company. Therefore, it is important that the chosen system is reliable as well as extensible for additional functionality. ADempiere is the chosen solution, because, again, it is completely free to use and operates under a GNUv2 license. While it may cost more in the immediate term to develop the ERP system and get it functioning for the company, as previously discussed, it will most certainly be worth the investment. It already has a suite of tools for Human Resources and Manufacturing. Even without developing custom modules, the system can be of great use. ADempiere has support for mobile clients, which means that mobile devices such as phones or tablets can be used to access the ERP system. This is very beneficial as PlayOns toys could use low-cost android tablets for workers on factory or warehouse floors, who will not have access to a desk for much of their duties. ADempiere is written in Java, so finding Java developers may contribute to installation costs as part of an IT Team.

Cloud Service Provider

Unlike the two previous headings, no solution to the service provider for Cloud data management has been discussed, this is due to the difficulty to which calculating prices can be for the vast selection of providers available, and general compatibility. Amazon Web Services (AWS) offers a variety of cloud computing products for hosting web applications, servers etc. It also can provide hosting for databases, in particular Amazon RDS (Relational Database Service). RDS is compatible with MySQL databases, as previously mentioned.

Amazon provides a useful price calculator, from which the following screen shot was taken:



1 Results of Pricing calculator, configuration setup is shown in the bottom right.

("AWS Pricing Calculator," n.d.)

Total Cost

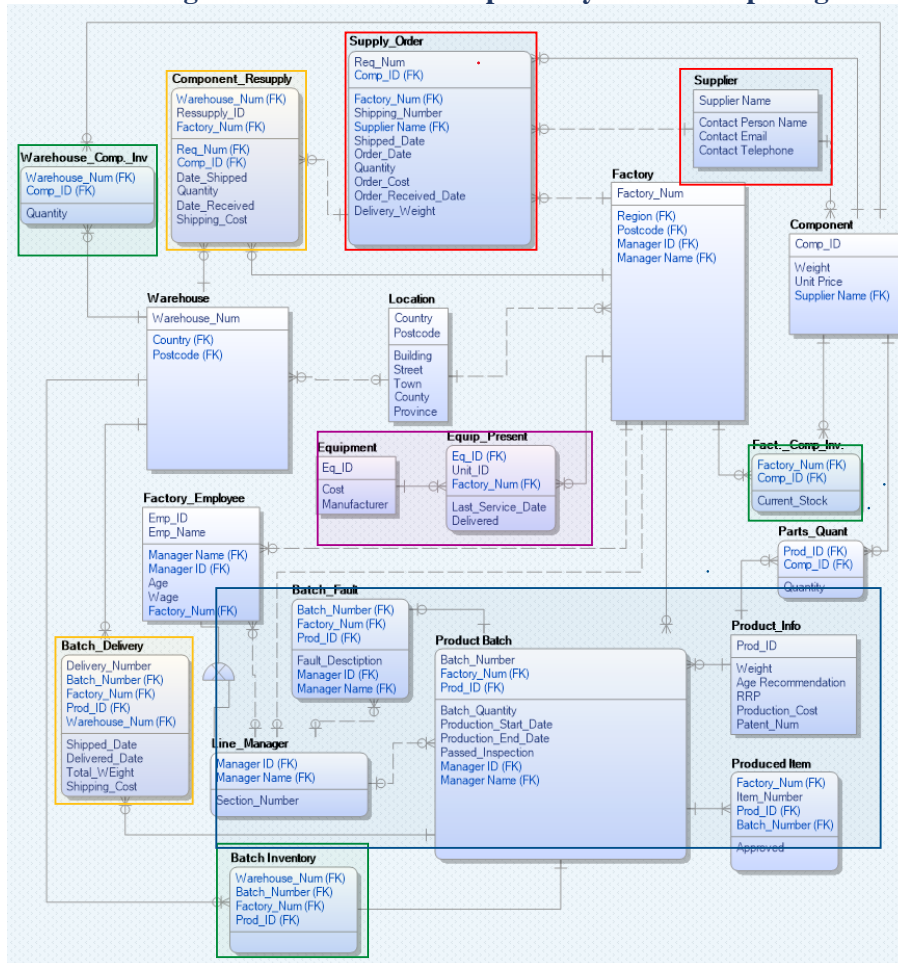
While it is difficult to estimate the total cost of such a procedure in terms of labour costing, we can assume that the main upfront cost of software will only pertain to the AWS RDS cloud database hosting, which amounts to approximately \$25,000 per annum. Obviously, this is only an indicative estimate, as depending on the IT team who is hired to set up, develop, and maintain this system may require different configurations or potentially different products altogether.

As a rough estimate, PlayOns may decide to take on a small IT Team which may consist of one or more Java Developers. The average salary of a Java developer is roughly around \$100,000 ("Java Developer salary in United States," n.d.). For a database developer, the average salary is around \$62,000 (Euro to Dollar Conversion) ("Salary," n.d.). Hiring two java developers and three database engineers can cost around \$386,000 in total.

Overall, the cost between staffing, and software could run upwards from \$415,000, which can be budgeted from the profits the company has made within the last year.

Appendix

Manufacturing and Production Concept Entity Relationship Diagram



ERP Functionality

Materials Acquisition

Incoming vs Outgoing Shipment

Inventory Management

Equipment Management

Quality Assurance

In this diagram we see the following functionality.

Materials acquisition refers to component supplies that are ordered from an external supplier. The supplier entity and component entity have a relationship as a supply order. This supply order has a Request number which is used in a non-identifying relationship with a component resupply entity. This helps keep track of which supply orders have been fulfilled by a warehouse, and to which requests they represent.

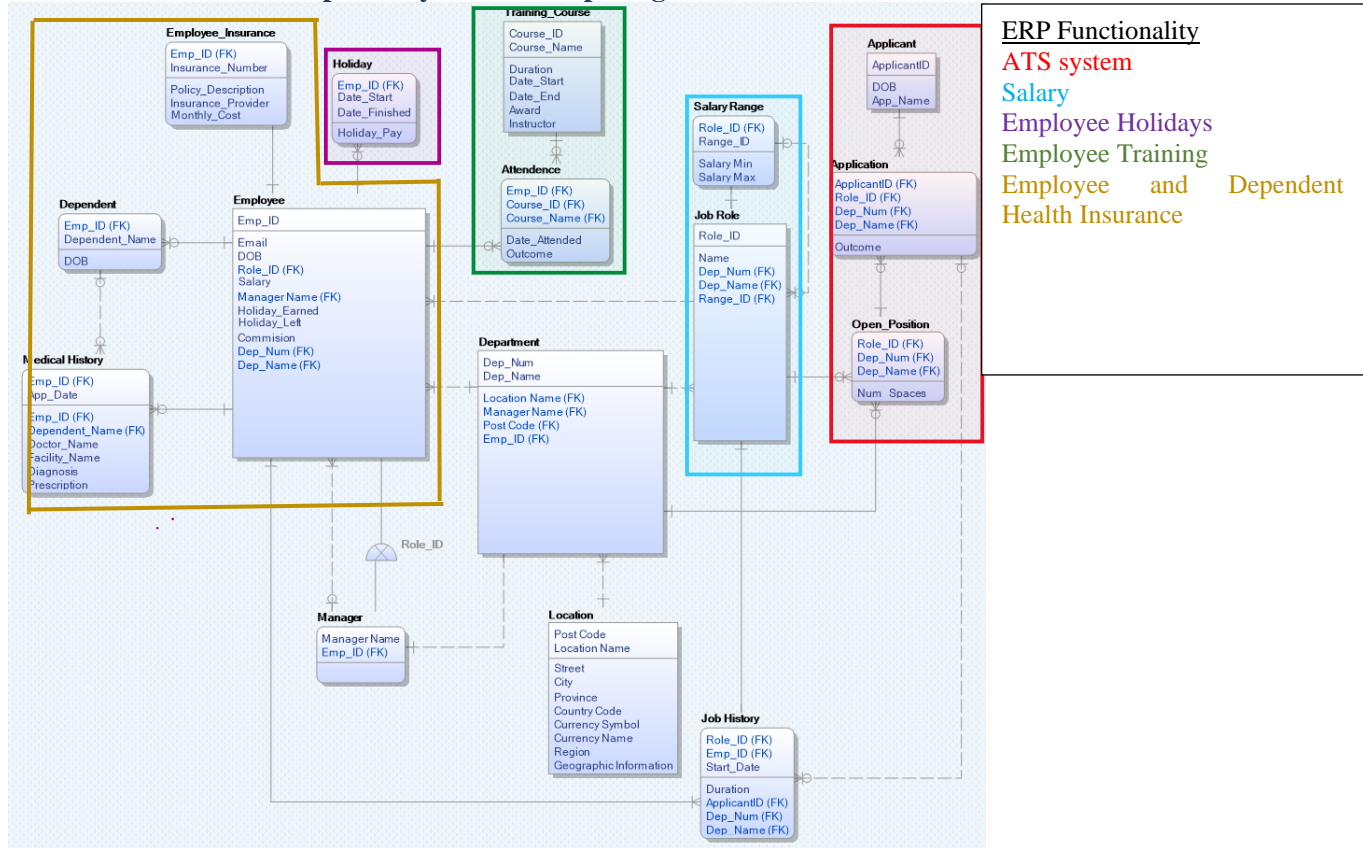
For Quality Assurance, a relationship entity between a factory and the information regarding a batch of products is created. This product batch is also used to identify individual product items. Batches are approved by a line manager, and should faults be identified within a batch, these can be logged.

For Inventory, the database stores information regarding supplies of components and products within Factories and Warehouses. Warehouses have inventory for both components and product batches, where factories only have inventory for their components.

Incoming/Outgoing Shipments refer warehouse shipments to/from factories. Outgoing shipments should only contain components, and incoming deliveries should only contain product batches from factories.

Factory Equipment Maintenance is represented through a relationship between the factory and the equipment entities, which represents the last service date for a piece of equipment within a factory, this information could be useful for health and safety inspections.

Human Resources Concept Entity Relationship Diagram



ERP Functionality

ATS system

Salary

Employee Holidays

Employee Training

Employee and Dependent

Health Insurance

Within the Human Resources database concept, the following functionality is produced.

The Applicant Tracking System keeps track of applicants to a job, job openings, and an applicant's job applications. Applicants can apply for multiple roles or positions within a company, so it makes sense to keep track of them. Applications have outcomes, which signifies whether an applicant is hired for the job role.

Salary Information is tied to specific job roles with minimum and maximum salaries for these roles. Departments have multiple roles within them, and no role can exist outside a department.

Employee Holidays and Training exist as relationships to the Employee entity. Holidays are identified through the employee ID, the date they started and the date they ended, this is so an employee can have multiple holidays within a time frame. Included in this is the total pay compensation for the holiday. Training courses, have ID's and instructor names, and the relationship entity attendance exists which states the dates attended, and the employees result of the course.

Employees and their dependents also have their insurance and medical records stored within the company, this information is important for insurance purposes, as depending on the employee's insurance policy, their dependents may or may not be entitled to health insurance.

In addition, employees also have their job history within the company stored.

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