# Chapter 1

### 1.0 Introduction

By definition a software refers to a program or a set of instructions and applications used to manage and control various functions of a device such as a computer. Unlike hardware, which represents a physical part of a device, software is virtual. Software as a Service (SaaS) has become a major end-user platform. Whether the software at hand is Customer-Relationship Management (CRM), office productivity software, or software development tools (such as Smart Bear’s own QAComplete), SaaS is a multi-billion-dollar business that continues to grow bigger. Indeed, SaaS has become so profitable that it’s one of the major factors crippling the PC businesses and even standalone software’s. It wasn’t always that way. In the early days of the dot com boom, the computer industry tried to implement Software as a Service. The term for it was Application Service Providers (ASP) back then, but the premise was similar: Users pay for a subscription to an application accessed via a website.

Companies that used ASP model mostly failed. Sure, some others had no choice but aggravate to become SaaS-driven businesses, such as the Great Plains accounting system (later became Microsoft Dynamics). Others, such as the would-be desktop-as-a-service company BmyPC, ASP services aggregator Agiliti, and early mapping company ObjectFX all survived, but it was no thanks to the ASP model.

So why is SaaS software development much hotter than it was, when yesterday it was as cold as Ice?

Let’s set the scene, with the definition of a traditional software this means that if developer **A** creates a software and has three clients he is likably to deploy the software to three different productions server’s one each for a client, making it difficult to maintain and the workload becomes unnecessary. This study shows the recent advancements in software development, this study will suggest that developer **A** creates only one software and make as much clients subscribe to it, this is known as a software as service. Put simply, SaaS is a way of delivering software applications over the internet, instead of physically installing and maintaining the software on-site, either on a server or right on your personal workstation.

This research not only offers SaaS applications but also a way of creating SaaS systems that are truly optimized, systems that will have multi-functions and work even more efficiently than the previous segmented/single functions. This will result to creating software’s that will be subscribed to a plan on a period base. Some SaaS software’s even limit functionalities to the plan subscribed.

### 1.1 Background to the Study

By interoute cloud computing company “Software as a Service is a cloud service where consumers are able to access software applications over the internet”. The applications are hosted in “the cloud” and can be used for a wide range of tasks for both individuals and organizations. Google, Twitter, Facebook and Flickr are all examples of SaaS, with users able to access the services via any internet enabled device.

SaaS is often referred to as software-on-demand and utilizing best described as renting software, just like renting a book from the library rather than buying it. With traditional software applications you would purchase the software upfront as a package and then install it onto the required computer systems. The software’s license may also limit the number of users and/or devices where the software can be deployed. Software as a Service user, however, subscribe to the software rather than purchase it, usually on a monthly or yearly basis depending on the business plan behind the software. Applications are purchased and used online with files saved in the cloud rather than on individual computers.

In SaaS, the user does not pay for the software itself. Instead, it works like a rental. They have the authorization to use it for a period of time and pay for the software that they are using.

An Optimized Software is a software that produces full functionality based on the business requirement gathered and cost reduction using lesser resources optimized system is most likely to combine several other systems or sub systems to create a single system.

Combining SaaS and Optimized software to create OPMaS will result to system that consist of six modules combined together will work communicatively and will not only be accessible to one client like a normal traditional software but to as much clients that subscribe to this service.

### 1.2 Statement of Problem

Using Bingham University as a case study, employee data may sometimes be mismanaged due to the still existence of paper records that might may be lost, damage and even if they are available they most times provide inaccurate data, inconsistent data and will not even provide other data associated to an employee (Training data, performance data). Even if this records are stored in a software, they are not connected to each other. With this reason OPMaS is developed to manage staff records, perform an employee staff performance assessment automatically, display important information such as staff training information, manage staff promotion and salary and most importantly reduce cost of managing employee data because use of paper is reduced and subscribing to different software’s to solve each of the related issue will be even more expensive, but having an optimized system with all the problems solved reduces cost, assures data safety and provides easy employee data communication within this optimized system.

### 1.3 Motivation

The motivation behind implementation of SaaS came as a result of looking at the high cost of software’s that offer little functionalities, I saw that as opportunity to change that, especially in Nigeria where software development is still growing.

Most importantly the software itself was major contributed by my project supervisor. These two have been combined to create an optimized software that will run as a service(OPMaS).

### 1.4 Aim and Objectives

The aim of this project is to design and develop a software as a service web based application that will manage employee data, provide employees with useful and related information about their work and help assess employees.

The objectives of this project are as follows

1. Develop an employee information management system that will manage employee data such as personal data, educational qualification, past work experience etc.
2. Develop a leave management system that will determine the current status of employees in an institution.
3. Develop a performance management system that will perform performance appraisal and assess employees based on the work performed.
4. Develop a training scheduling system that will help staff schedule their trainings and provide them valuable information about trainings they are expected to attend.
5. Develop a promotion and salary increment system that will recommend promotions and salary increments based on the staff performance.
6. Develop a communication system that employees can communicate through, simply like a chat avenue.
7. Develop an optimized system that will be available to many clients subscribe to the service.

### 1.5 Purpose of the Study

The purpose of this project is know how to create an optimized and integrated system and how these systems will work and communication with clients from the cloud. This gives me a chance to learn a great deal about cloud computing. The final product is set to provide use of more software’s at a lower cost and more efficient data communication within the system with painless upgrades.

### 1.6 Significance of the study

The findings of this study will redound to the benefit of both the computer science sector and educational sector in Nigeria considering that web development plays an important role in the society. The outdated paper system for stashing records, poor human management and high cost of software’s justifies the need for newer system, more effective and cost-effective systems to this sectors. Thus educational institutions that will subscribed to this service will be able to manage their employees easily and reduce the cost on paper and stand-alone software’s and yet this will display a project to which software as a service can be referenced to.

### 1.7 Definition of terms

1. Software

Software refers to a program or a set of instructions and applications used to manage and control various functions of a device such as a computer

1. Cloud

This is simply a metaphor for the internet.

1. Software as a service

This is a software that is being subscribed to over a period of time not bought as a package.

1. Active Server Pages (ASP)

ASP is Microsoft first server side script which that is used to create and run dynamic, interactive Web server applications.

1. Optimized Software

This is a software that has been modified to make it work more efficiently and use fewer resources.

### 1.8 Summary

SaaS is becoming very common, and businesses are reaping the benefits. These applications have many advantages over traditional software packages, including ease of use, lower costs, improved customer service, minimal upkeep and also creating an optimized system in some sense.

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# Chapter 2

### 2.0 Introduction

OPMaS as an optimized software integrates different software’s and make sure they operate more rapidly with less memory and with less resources allocated. OPMaS is set to run as a service whereby rather than being purchased by clients as a standalone software, it will subscribe to by different clients.

OPMaS is divided into six modules which will be reviewed individually.

The first module being the parent module on which all others depend on is the employee information management system. Employees are the most valuable and dynamic assets of any organization. An Employee Management System is an extensive and comprehensive system that maintains and tracks information pertaining to all employees in the organization. Employee information management is a vital part of any organization, institution or business. We are now in a digital era and the use of a digital employee data management is increasingly demanded because it the quickest, safest and easiest way to access employee data. These digital employee data management is mostly run through a user friendly web based platform. Information is retrieved and stored on this system. This includes items such as Personal information, Contact information, Educational information, past work experience etc.

Second is the leave management system module. This module is set to consist of system that will be accessed throughout an organization that will manage leave related information of employees that will help employees apply for a leave and create a process flow to which applied leaves can be approved or denied guided by the organizations leave policy.

Third is the performance management system. This module is set to have a system that will appraise employee performance and generally help in the boost of an employee’s performance culture set at increasing productivity of that employee and the organization as a whole.

Next is the staff training management system. This module is set to create a system that will centralize the institution’s training data, giving a feedback of each employee’s scheduled training and completion status and most importantly help the institution plan for future trainings in order to provide more effective training and save cost.

Next is the promotion and salary increment system which is set to create a system that will use the results from the performance module and help institutions determine employee promotion and salary increase. This also involves payroll management and is expected to run real time.

Lastly is the chat and collaboration system which is set to create an avenue where employees can share data and work collaboratively together.

## 2.1.0 Review of OPMaS

OPMaS as an optimized software service has a number of features which will be discussed below.

How is OPMaS an optimized software

Technically OPMaS is an optimized software because it merges different standalone software’s to form one software that will significantly reduce the resources used, serve employees efficiently and create more data connectivity.

General features of the Employee Information Management System

1. Records employee personal information.
2. Records employee educational information.
3. Records employee’s past work experience information.
4. Records employees bank information.
5. Gives employee access to modify their own information.
6. Offers reality checks and data consistency to eliminate fake information.
7. Employees can generate their curriculum vitae.

General information of the leave management system

1. Employees can apply for leave depending on the leave type.
2. Approval or denial of leaves is flexible depending on the organizational leave process policy.
3. Employees can track the status of their leave.

General features of the performance management system

1. Organizations can create their performance assessment structure.
2. Employees can see their performance rating and progress and decide to improve based on the results.
3. This Module is set to run real time.
4. This will show employee their task and completion status of this tasks.

General features of the training information system

1. Employees can see their upcoming training sessions.
2. Organization can track employee’s training programs and see their completion rate.

General features of the promotion and salary increment system

1. This will consist of a payroll system
2. This will fetch each performance data and determine whether they deserve promotions or not.
3. Employees will be able to see their salary breakdowns.
4. Employees can apply for salary raise.

## 2.3 Review on previous Employee Information Management systems

### 2.3.0 Introduction

Every employee in an organization is regarded as one of the most valuable asset of that organization. Creating an employee information management system must match the set up and activities of the human resource department of that organization. This system leads to an improved productivity for the human resource department. Having an employee information system manages and maintains all information related to each and every employee in an organization. It provides accurate data that can be modified anytime. Most importantly this is a cost and time saving method, because it reduces the paper work.

### 2.3.1 Intoweb's Employee Management System

The Employees module consists of various features allowing you to perform general human resource management tasks such as employee history, perks and incident reports. Any information needed is available with comprehensive reporting features.

General Features

1. User friendly system interface design.
2. Records employee information.
3. Records the current number of employees according to division / department with the automatic updating of figures when people are employed or leave.
4. Keeps records of inactive employees (those are no longer in the organization).
5. Employees can update their own details which are sent for managerial authorization before being added to the system.
6. Forms the backdrop for the other modules and can be used as a stand-alone module or integrated into other modules e.g. payroll, leave modules.
7. Search facility for easy finding of staff.
8. Security rights define the access people have to the information.
9. Keeps personnel records such as appraisals, incident reports, employee perks.

Benefits of using Intoweb's Employee Management System

1. You can purchase the Recruitment Module as a standalone software - you don't have to buy the entire Human Resource System
2. The Human Resource Employee Management System runs online, which allows you to access any information from anywhere in the world at any given time, as long as you have Internet access.
3. The Employee Management System is fully integrateable with Intoweb's other [Human Resource Software Modules](http://www.intoweb.com/hr/).
4. The Employee Management System is fully customizable to suit the needs of your business.

GAP Between the employee management system of OPMaS and that of Intoweb

1. A lot of the features are not memory efficient thereby posting a lot of request to the servers, OPMaS will provide more memory efficiency and provide more privacy levels of the software.
2. Intoweb uses outdated web styles and forms which renders the user interface difficult to understand in this era of UX design but OPMaS Is set to implement the latest styles of user interface.
3. Intoweb is set to run as a standalone application which will make it more expensive and difficult to maintain across multiple clients whereas will run as a service making it more cost efficient and easy to maintain across multiple clients.
4. Intoweb system is not so flexible towards employees managing their own data unlike OPMaS that will provide user flexible modifications of employee’s data.

### 2.3.2 University of Texas of Austin employee information management system

This Web-based information system was designed to allow you to view and maintain your employee information throughout the year. This system can be used to maintain your biographical information on your employee record.

Items which can be accessed, viewed and/or updated within the Employee Information System are:

1. Personal Info
2. Restrict the release of personal information.
3. Review or change ethnicity and gender information.
4. Addresses and e-mail.
5. Telephone numbers.
6. Emergency contacts.
7. Education Background
8. Teaching experience.
9. Veteran status.
10. Employee summary
11. Appointment summary: Review current and past employment with the university.
12. State service: Review record of prior service with state agencies and institutions of higher education.
13. Verification of employment: Create and print a personal verification of employment for use when verifying employment for mortgage companies, state agencies, etc.

GAP Between the employee management system of OPMaS and that of Texas Austin

1. Texas system is set to run as a standalone application which will make it more expensive and difficult to maintain across multiple clients whereas will run as a service making it more cost efficient and easy to maintain across multiple clients.

### 2.3.3 Beehive Entire Employee Information Management System

A Human Resource information system(HRIS) is an integral part of any Human Resource Management System(HRMS). It is built for businesses of any size, whether they are start-ups with about 10 employees all the way up to the larger corporations. It is very useful indeed, as it completely automates the process of managing a business’ HR activities. Also knows as the Employee Information Management System, it is better known in the corporate world as the HRIS. In a world where it can be pretty hard to keep track of all the employees within an organization and their information, this kind of system is very vital, because of the powerful features that it offers.

The communication between employees and the superior departments as well as the HR department is also made easier. Instead of having to root around in employee detail files all day to find out the specifics of the process, HR departments can simply access all the information online. This also leads to a great save of paper, and gives a central location where nearly everything can be stored including important company policies and announcements. Changing application and request forms is also an automated process. This can actually lead to faster approval of requests. The main features of Employee Information Management System HRIS include:

1. Document manager for employee details
2. Dedicated resource/asset tracker
3. Rewards and recognition system
4. Details about joining company
5. Job confirmation details
6. Profile of the employee
7. Details about the family and dependents (if any)
8. Medical history and insurance details

GAP Between the employee management system of OPMaS and that of Beehive

1. Beehive system is set to run as a standalone application which will make it more expensive and difficult to maintain across multiple clients whereas will run as a service making it more cost efficient and easy to maintain across multiple clients.
2. Beehive system captures not as much employee information as that of the OPMaS employee management system.

## 2.4 Review on previous Leave Management systems

### 2.4.0 Introduction

The Leave Management System is a Web-based system incorporated in OPMaS that enables the employee to submit leave requests. When an institution registers on OPMaS it is given the permission to set up its leave structure. OPMaS allows up to five people to approve a leave, therefore the system administrator selects according to order the process of approving a leave. The Leave Management System keeps track of all these leave requests and calculates the leave balances of each employee.

### 2.4.1 Employease Leave Management

Given the financial resources committed to time off programs and the paper intensive processes that surround those policies, it's no wonder that many employers are evaluating their leave management processes and policies to make sure they are not wasting time and money.

Employease Leave Management helps Finance and human resource Departments sleep better at night knowing that their leave programs are efficiently managed and accurately tracked.

Companies can establish and enforce the rules for all of their leave policies, and build workflows into the system so that the person responsible for the request is making the request. Routing and approvals can also be customized based on a company's unique business processes. Most importantly, time off information will be consolidated for analysis, reporting, and financial planning.

Using Employease Leave Management, Employees can:

1. View time earned, time taken and remaining balance for each policy assigned.
2. Model available time balance as of a specific date to get a real time snap shot of balance information.
3. Enter and request time off.
4. Carryover time.
5. View time off transaction history.

Using Employease Leave Management, Managers can:

1. Approve or reject employee requests for time off.
2. View time earned, time taken and time remaining for each employee.
3. Model an employee's balance as of a specific date.
4. Carryover accrued time.
5. View time off transaction history.
6. Make adjustments to an employee's balance.
7. View transaction history of employee leave requests.

Using Employease Leave Management, HR Professionals can:

1. Perform all of the functions that employees and managers can perform.
2. Edit leave records.
3. Delete leave records.
4. Manage leave policy assignments.
5. Edit the employee's service date.
6. Assign leave policies during the hire process.
7. Report on aggregate data for leave policies

### 2.4.2 PlanMyLeave Leave management system

PlanMyLeave is an online leave management system designed to scale from small, medium businesses up to large enterprises. PlanMyLeave offers fully featured flexible multi-location based settings found in enterprise applications and offers companies a quick way to implement their Leave Management System on the cloud. This results in time management and cost savings as well as a rise in productivity of the organization.

PlanMyLeave helps you customize leave types and set up complex leave policies for any type of industry having locations in multiple countries. By automating your leave approval process you can curtail unexcused absences and contain HR overheads. PlanMyLeave’s user friendly employee self-service dashboard offers an easy interface to apply and view leave request status and calendars. The online staff leave planner allows administrators to set up employee information and leave types and policies easily.

Staff leave planning using PlanMyLeave benefits both employers and employees by giving a fair and transparent leave approval workflow. Employees can view current leave balances, request leaves, view past leave history, and managers can review and approve leave applications on the dashboard.

Online leave management using PlanMyLeave helps you customize leave types and set up complex leave policies for any type of industry. By automating your leave approval process you can curtail unexcused absences and contain HR overheads. Employees can plan their leave around the team calendar to make sure your departments are adequately staffed. Setting restricted days or restricted team members ensures that key members of the team do not take off at the same time. With centralized absence management you can ensure that your global resources are managed well.

Benefits of PlanMyLeave Leave management system

1. It saves time, money and helps manage resources.
2. It increases efficiency to the leave activities.
3. Suits multiple company policies.
4. Provides resource management and planning
5. Calculates accurate leave balances.
6. cost efficient and easy to maintain across multiple clients.

### Texas A&M University - Corpus Christi

The Office of Human Resources at Texas A&M University Corpus Christi (A&M & CC) contributes to the University's mission of public service by facilitating informed decision making regarding employee benefits by providing accurate, timely, accessible information. Of the many benefits available to the employees, leave is one of the most valuable. The Human Resources Department is responsible for keeping track of multiple types of leave for all of its employees.

The current procedure requires an employee to manually fill a leave-request form and submit it to his/her supervisor for approval. After the supervisor’s signature, the leave form is submitted to the Human Resources Department. The Human Resources Department retrieves the employee’s record from a database, currently maintained in MS Access, and reviews his/her available leave hours. Depending on the result of the review, requested hours are posted into the database. An audit report showing the employee’s remaining leave hours is attached to the leave form and returned to the respective department to the employee’s attention. This procedure suffers from certain drawbacks:

1. The Human Resources Department must get their leave-application forms printed

from any paper printer company that wins a bid, leading to a high cost of paper and

printing charges.

1. The employees must wait outside the office of their supervisor for the approval of a

leave application, and then must approach the Human Resources Department for the

pending leave status.

1. The supervisor cannot verify the employee’s available leave hours before approving

the leave-request. Also, Human Resources personnel must manually check the leave requests

of any employee before posting into the database.

1. The Human Resources Department must maintain bundles of papers in their files or

drawers.

Benefits of the leave management system

The primary objective of the proposed Leave Management System is to ensure that all leave records are stored on this system by making all leave process executable on this system guided by the administrative leave policies, and routing of the leave applications from the applicants to the acting supervisors in the department and to the administrator of the Human Resources Department. The Leave Management System enables employees with capabilities to submit leave requests online, check their leave-time balances and view the status of the leave requests via the internet, relieving the Human Resources Department from time-consuming inquiries on paper work. The automated leave management ensures that employees accrue the right amount of "leave" that they are entitled to receive, and provides a quick and efficient validation method that saves precious time and eliminates a cumbersome paper process. Also, enabling the supervisor to approve online requests saves management time. The Leave Management System calculates and maintains balances of each employee's vacation, sick and other benefit time. It gives Human Resource administrators the ability to review, edit, and approve employee time and leave from any location.

Thus, the Leave Management System simplifies the leave process, makes it more maintainable, gives better, clearer and more frequent and fluent information to employees, standardizes the processing of different types of leaves, and lowers the amount of data entry and verification activities.

## 2.5 Review on previous Performance Management systems

### 2.5.0 Introduction

Performance Management is very important to any organization to keep their employees happy, productive and motivated. Without this, they could become unhappy and start to reduce the quality of their work as much as time spent to work effectively. They will get lazy, because there is no driving force in terms of performance. This is fixed in a lot of companies by regular performance appraisals and reviews. Each employee is monitored throughout the time period, whether it is a month or a year, and their performance at the end of the month is evaluated by the HR department. This is done in conjunction with the employee’s managers and supervisors, all of whom know enough to judge the performance of the employee objectively. Whether it is in work, or whether it is their behavior towards their peers and superiors, everything is reviewed.

### 2.5.1 Beehive Performance Management System

In Beehive’s Human Resource Management System, the performance management system is a vital module. The fate of the company depends on how well this part of the HRMS performs. This system completely automates the process of performance management. This eliminates the problems that were quite common back in the day, such as missing appraisals. These were all grounded in the fact that there was no electronic system to store data. Paper was notoriously fickle, getting lost, damaged and dusty and easily misplaced. However, this system completely eradicates all these problems. It makes use of the rewards and recognition system in the HRMS in order to coordinate the efforts of the HR department and make sure that all the employees are motivated and challenged constantly. Some of the best features of the Performance Management System include:

1. Manage all reviews in an online storage system
2. Multiple language support and reflects local variation
3. Online guides for easy form creation and filling
4. Selective review system for each employee
5. Automatic notification for employees
6. Real-time progress tracker

GAP Between the Performance Management System of OPMaS and that of Beehive

1. Beehive system could run as a standalone application which will make it more expensive and difficult to maintain across multiple clients whereas will run as a service making it more cost efficient and easy to maintain across multiple clients.
2. Beehive’s performance assessment isn’t much powerful as that of OPMaS is set to have due to few assessment policies.

### 2.5.2 University of Pittsburgh Performance Management System

This is performance management software used to boost organization performance. Fundamentally, an effective performance management system is an ongoing process, focused on the communication between supervisor and staff, to maximize performance of the individual and to achieve the organization goals.

The effective performance management process includes:

1. Planning and discussing expectations about job responsibilities and Performance Standards.
2. Providing ongoing coaching and feedback to support success.
3. Evaluate the level of achievement of goals and demonstration of Performance Standards using the University of Pittsburgh Staff Performance Appraisal Form.

There are three forms that support the staff performance management process of the university are:

1. Annual Goals Form: can be used to help staff and their supervisors establish goals at the beginning of the appraisal year and criteria on which success may be measured at the end of the appraisal year.
2. Staff Performance Appraisal Form: to be completed for each staff member by their immediate supervisor – this form is available in two formats; one to evaluate the performance of employees who supervises others, and one to evaluate the performance of employees who do not supervise others.
3. The Staff Self-Appraisal Form: used by all staff as part of the end-of-the-year performance appraisal process. All of these forms are available below as editable Microsoft Word documents. Access performance management forms.

GAP Between the employee management system of OPMaS and that of University of Pittsburgh

1. University of Pittsburgh system is set to run as a standalone application which will make it more expensive and difficult to maintain across multiple clients whereas will run as a service making it more cost efficient and easy to maintain across multiple clients.

### 2.5.3 Reviewsnap Performance Management System

Reviewsnap is a web based software that helps make performance management of employees an easy and rewarding process and in turn derive high and exceptional results from your staff. The fully automated and flexible performance management software makes employee performance appraisals more strategic leading to better and more timely reviews, more accurate reviews, less frustration, and increased engagement. Reviewsnap is highly user-friendly and virtually maintenance-free with no software to load on your end.

Benefits of Reviewsnap performance system

1. Automate and streamline the performance review process of organizations.
2. Ensure timely completion of reviews from the administrative perspective.
3. Implement a customized performance review solution reflective of your organization's mission.
4. Accurately align goals of the company with that of the employees.
5. Keep employees engaged in their jobs and projects productively.

### 2.6 Review on previous Training Information systems

### 2.6. 0 Introduction

Employee training is usually a program set up by an organization to help their employees acquire more skills and knowledge and improve their performances.

Raymond Noe’s Employee Training and Development over the years has set the standard for developing training systems. It was first introduced in 1998, Employee Training Development became very valuable within its six months of publication. Its valuability and popularity is due to its lively, strong writing style and relevant examples that relates to most recent developments in training, research and practice, including the strategic role of training and the use of new technologies in training. Employee Training and Development strikes a balance between research and real company practices.

The role of training has gone beyond organizing and designing training program. Effective instructional design remains important, but training managers, human resource experts, and trainers are even more important as they are increasingly being asked to create systems to motivate employees to learn, create knowledge, and share that knowledge with other employees in the company innovatively. Training has moved from an emphasis on a one-time event to the creation of conditions for learning that can occur through collaboration, online learning, traditional classroom training, or a combination of methods. There is increased recognition that learning occurs outside the boundaries of a formal training course in classrooms.

With training introduced, this chapter will show some past and recent research and software’s developed on the employee training systems

### 2.6.1 Intelex Training management system

Intelex Training Management software enables you drive effective employee training tracking and completion, empowering organizations to schedule and report on training easily.

Benefits of Intelex training system

1. Access, maintain and manage all of your training schedules in a singular location. Intelex's training database software runs in real-time from a secure web-based platform.
2. Set up an unlimited number of user groups based on job titles, roles, departments, facilities or locations and easily schedule and assign training requirements to these groups.
3. Keep training requirements on track and drive their completion with automated email reminders sent to employees and their supervisors for upcoming and overdue training.
4. Improve your training tracking program with real-time insights. A comprehensive management dashboard displays reports and scorecards within one easy view, giving you unprecedented access to your employees' training performance metrics.
5. Eliminate wasted time, resources and money lost through inefficiencies in managing your organization’s employee training program through spreadsheets, paper, or other soloed systems.

### 2.6.2 U. S Marine Corps Training information system

The Marine Corps Training Information Management System (MCTIMS) is an enterprise information system for training development and management of marine corps members. An official program of record with Marine Corps Systems Command oversight, Marine Corps Training Information Management System web applications work in concert with Oracle databases containing our training information to provide integrated applications that serve all of our Corps’ training development and management needs.

The Marine Corps Training Information Management System is the authoritative data source for all training data, generating, maintaining, sharing, and reporting training data as required by our other service-level systems.

The Marine Corps Training Information Management System is a government-owned software application that is available for use by the total force. The system provides a n exceptional avenue Corps’ training development and management by aligning to the Systems Approach to Training process.

The MCTIMS consist of several modules which are named as follows

#### TRAINING & READINESS (T&R) DEVELOPMENT MODULE

The T&R Development Module is the main module of the Marine Corps Training Information Management System suite of modules. This module is used during T&R Development and Review Conferences to build or maintain individual and collective events and manage T&R data. The TECOM and EDCOM staff uses this web-based application to capture the individual and collective training standards for an occupational field and MOS to produce the T&R manual. T&R Manuals provide commanders in the Operating Forces, Supporting Establishment, and formal learning centres with a tool for the planning and implementation of progressive training that ultimately ensures individual and collective proficiency.

#### MILITARY OCCUPATIONAL SPECIALTY (MOS) MANUAL MODULE

The MOS Manual Module supports TECOM’s Ground Training Branch mission to manage the MOS Manual for our Corps. This module provides the capability to store web-based MOS Manual data to expedite the annual review and reduce the labour associated with management of the MOS Manual.

#### MOS ROADMAP MODULE

Use of this web-based application guides individual Marines on career training and education. Roadmaps are single-source documents containing grade-specific information related to training and education requirements from which Marines can make informed career decisions regarding assignment, training and education requirements, and career progression opportunities. Leaders use the roadmap as an aid to counsel and mentor subordinates.

#### UNIT TRAINING MANAGEMENT (UTM) AND INDIVIDUAL MARINE MANAGEMENT (IMM) MODULES

The UTM and IMM modules are the latest Marine Corps Training Information Management System development efforts designed to provide direct support to the Operating Force. The UTM module provides commanders with a toolkit that aligns with the UTM process outlined in Marine Corps Reference Publication (MCRP) 3-0A, the UTM Guide. This capability enables commanders and their staff to execute doctrinal UTM practices via an automated system. Other capabilities within this module will allow units to record, track, evaluate, and report all individual and collective-training requirements.

#### ADDITIONAL MCTIMS DEVELOPMENTS TO SUPPORT THE MARINE CORPS

Two additional Marine Corps Training Information Management System developments fielded during FY11 are the Curriculum Library and the Electronic Training Jacket (ETJ). The Curriculum Library provides Marines in the operating forces access to formal learning centre course materials to support training and standardize instructional materials throughout our Corps. Marine operating forces will be able to access lesson plans, student outlines, instructor preparation guides, and media to support unit training requirements. The ETJ provides a cradle-to-grave record of all training accomplishments for all Marines viewable by the individual Marine or their commander.

#### OTHER FORMAL SCHOOL MANAGEMENT CAPABILITIES

The Curriculum Management (CMD) Module. TECOM staff and schoolhouse curriculum developers use this web-based application to create and manage curriculum for our Corps’ formal schools. The use of this module is mandated for the production of our programs of instruction.

The Student Evaluation (SEV) Module. TECOM staff uses this web-based application to construct tests, record test data, track student scores and grade point averages, and generate reports. The SEV module controls the synchronization of this data with an external application. SEV is also used to create survey questionnaires and track student responses.

The Student Management Module. TECOM staff uses this web-based application to manage rosters, units, and individual students for our formal schools.

Student Registrar. The Student Registrar Module is managed by the Formal School Training Division, TECOM. The TECOM staff uses this web-based application to manage class rosters and student registrations.

## 2.7 Review of promotion and increment system

### 2.7.1 Marg HR Xpert Salary Management System

Every Company processes payroll for its employees as expected, as a company grows larger in number manual processing of records becomes a big problem because it brings about errors and difficulties. With a designed software which can meet all the requirements of the company there is no need of manual processing of payroll and automatic generation of reports. So, Marg has designed its Marg Payroll Software to meet up the requirements of companies. Marg HR Xpert Software is capable enough to provide employee’s complete details which replaces the need of looking after of manual records. Marg Payroll Software is fully expertise in managing the Employee Payroll Management System, effectively and efficiently. In Marg, there is a track of every information related to employee compensation or related to wages (bonuses, etc.).

EPMS provides time saving facilities for salary calculation on the bases of daily or monthly attendance of all employees in an organization. Other Options Are Salary Summary Monthly, Salary Register, Salary Payment Mode wise and Arrear calculation & Arrear Slip.

### 2.7.2 Salary Payroll Management System

Salarypayroll.com is an online payroll management system designed specifically for companies to manage their employees’ salary information and manage accounting activities. Different branches/divisions under the company can also be managed here.

Use this accounting management system as a service to manage the salary details of your employees are managed systematically. It does not require installation and has no maintenance issues. You need not be a technical expert to utilize this. Just register and start using the features. Both free and paid version is available for your requirement.

Using this accounting system as software gives you the complete independence over the management and maintenance of the tool and the database. This wonderful product with many advanced features can be availed at lowest price and high quality. It is easy to use on your system and can be benefited both as a free and a paid version.

General features, customization and flexibility of the payroll accounting service and software.

1. Manage company details such as setting up logo.
2. Register Multiple Branches.
3. Register Multiple Departments.
4. Manage Bank Information.
5. Change Holidays and Leave Settings.
6. Manage Allowances and Deductions
7. Change Setting Tax percentage.
8. Manage Employee Information.
9. Change Employee Salary, Increment and Loan Settings.
10. Manage Employees Attendance.
11. Generate Reports

### 2.8 Summary

This chapter has been able to analyse OPMaS bringing out its features and compared OPMaS to previous software’s in order apply more improvements of this software’s.

# Chapter 3

## 3.0 Introduction

OPMaS as service is an enterprise web base application, each module in OPMaS can be a stand-alone software, but this means six separate software’s will be sold and this will be extremely expensive and data relationship and connectivity is lost because there are six standalone software’s different systems, but if they are all combined to create a single system then it becomes cheaper and even more effective, functional to the university.

Combing OPMaS and SaaS will give rise to a web based enterprise software whereby multiple organizations use OPMaS at the same time, all having access to only their own data. This means any organization that wants to use the software will subscribe to the software via a yearly package.

Below are the six modules that OPMaS is expected to have:

1. Employee Information Management System

2. Leave Management System

3. Staff Performance Management System

4. Staff Training Information System

5. Promotion and salary Increment System

6. Chat and Employee Collaboration System

## 3.1 Design Methodology – Agile Software Development Model

OPMaS will be developed using the agile software development model.

Agile is a software development methodology to build a software incrementally using short iterations of 1 to 4 weeks so that the development is aligned with the changing business needs. This simple tutorial uses appropriate examples to help you understand agile development in a general and quick way.

Below is the process of flow of Agile software development model:

1. Concept
2. Inception
3. Design
4. Development
5. Testing
6. Feedback
7. Release
8. Production

### 3.1.1 Concept Stage

This phase is the first phase that explains how projects are envisioned and prioritized.

Using Bingham as a case study, every year it costs the university a lot of money to manage employee’s data and most times they even get missing or damaged. The paper method is very inconvenient, especially when it comes to modifying information, just a change of name could take a very long time to approve which is quite unnecessary. Therefore, I thought about creating a system that will manage employee records from both the management and the employee, reduce cost of purchasing papers and other stationaries, stop record destruction and mismanagement and help them access employee performance without complaints of management being biased.

OPMaS will be developed using the agile software development model.

Agile is a software development methodology to build a software incrementally using short iterations of 1 to 4 weeks so that the development is aligned with the changing business needs. This simple tutorial uses appropriate examples to help you understand agile development in a general and quick way.

### 3.1.2 Inception Stage

Team member includes me and git hubbers that will help me suggest ways to fix bugs during construction as these are common issues during software development. The tools used are as follows

1. **Language** – ASP.NET C#

ASP.NET is an open source web framework for building modern web apps and services with .NET. ASP.NET creates websites based on HTML5, CSS, and JavaScript that are simple, fast, and can scale to millions of users.

1. **Language Framework** – ASP.NET MVC

Asp.Net MVC is a .Net framework that uses the idea of model view controller mechanism. It is highly recommended because it exhibits an organized style of development, separating your models from your user interfaces and the controllers as well.

1. **Data Management Framework** – Entity Framework

Entity Framework (EF) is an object-relational mapper that enables .NET developers to work with relational data using domain-specific objects. It eliminates the need for most of the data-access code that developers usually need to write.

1. **IDE** – Visual Studio 2015

Visual Studio is the official .Net IDE and is said to be one of the most powerful IDE’s. It has tons of libraries that support the .NET framework.

1. **Code Optimizer** – Resharper

Resharper is a code optimizing application developed by jebrains that helps developers code faster and better and much more efficient. It helps developer’s refractor their codes and most times suggest better ways of writing statements.

1. **Database/Data Source** - SQL server

SQL Server is a relational database management system ([RDBMS](http://searchsqlserver.techtarget.com/definition/relational-database-management-system)) developed by [Microsoft](http://searchwinit.techtarget.com/definition/Microsoft) that is designed for the [enterprise](http://searchwinit.techtarget.com/definition/enterprise) development of software’s. SQL Server runs on [T-SQL](http://searchsqlserver.techtarget.com/definition/T-SQL) (Transact -[SQL](http://searchsqlserver.techtarget.com/definition/SQL)), a set of programming [extension](http://searchcio-midmarket.techtarget.com/definition/extension)s from [Sybase](http://searchenterpriselinux.techtarget.com/definition/Sybase) and Microsoft that incorporates several more features to the standard SQL, including transaction control, exception and [error handling](http://searchsoftwarequality.techtarget.com/definition/error-handling), row processing, model diagrams and declared [variable](http://whatis.techtarget.com/definition/variable)s.

### 3.1.3 Iteration/Construction

The agile development life cycle is dominated by the iterative processes. Each iterative process is the next piece of the software development puzzle-working software and supporting elements such as documentation, available for use by customers until the final product is complete.

The iteration process flow consists of

1. Requirements
2. Development
3. Testing
4. Delivery
5. Feedback
6. **Requirements**: This consist of the functional and non-functional requirements forwar.
7. **Development**: This involves writing of source code complimented by a database.
8. **Testing**: This involves testing of each unit to find errors or bugs. Once bugs are found we move back to **ii.**
9. **Delivery**: This involves program delivery to project manager and review for any more requirements, if there are new requirements we move back to **i**.
10. **Feedback**: This involves a report that states items to be fix and other corrections.

### 3.1.4 Development

#### **User Interface**

This consist of the web pages that will be rendered on the browser. They will be built with

1. HTML-Razor Syntax
2. CSS -Bootstrap
3. JAVASCRIPT – Mainly JQuery
4. **Controller**

This is class that consist of all methods related to an object.

1. **Data Context**

This consist of the connection of each object to its related table in the database.

### 3.1.5 Testing

This will be carried out by me and my project supervisor to make sure the developed section meets the requirement

### 3.1.6 Delivery

This will be carried out by deploying the project to a production server to make it works appropriately.

### 3.1.7 Feedback

This will entail accepting the feedback from my project supervisor and working the changes into the requirements.

### 3.1.8 Release

This entails Q&A testing, internal and external training, documentation development and final release of iteration into production.

### 3.1.9 Production

This consist of the ongoing support and maintenance of the software.

# Chapter 4

## 4.0 Introduction

This chapter demands the analyzing of both the hardware and software requirements. The software requirement deals with establishing and analyzing the needs of stakeholders that are to be solved by the developed software. The software requirement is expected to have a functional and non-functional requirement structure.

The hardware requirement deals with the computer systems, servers and other hardware components that are expected to be used interactively with the computer system to offer efficiency application and development of the software requirements.

## 4.1 System hardware requirements

The hardware requirements are of two categories

1. The requirements the developer is expected to have which as follows
2. A windows OS computer system with at least 8GB Ram, High Graphic card and high Processor to enable the development software’s work more efficiently.
3. A web server called Internet Information service (IIS), this is a .NET server used to run web applications.
4. Another computer system for testing the web application.
5. Internet service.
6. Repository to back up code.

## 4.2 System software functional and non-functional requirements

### 4.2.0 Introduction

This section describes the functional requirements part of the Business Requirements. It comprises of Actor Profile Specification and Use case diagram and use case specification in narrative text form.

### 4.2.1 Functional Requirements Employee Management System

### Employee Personal Data

* 1. System must only accept one record for every employee.
  2. System must be able to collect employee data and validate compulsory fields.
  3. System must ensure that each employee’s email is unique.
  4. System must make sure selected state of origin generates respective local governments.

### Employee Work Experience Data

* 1. System must allow multiple entries.
  2. System must be able to collect employee data and validate form for compulsory fields.
  3. System must make sure that at least one record is entered before going to the next process.

### Employee Education Data

* 1. System must allow multiple entries.
  2. System must be able to collect employee data and validate form for compulsory fields.
  3. System must make sure that at least one record is entered before going to the next process.

### Employee Bank Data

* 1. System must allow multiple entries.
  2. System must make sure each added account number is unique.
  3. System must make sure that at least one record is entered before going to the next process.

### Employee Medical Data

* 1. System must sure form only accept one record for every employee.

### Employee Work Data

* 1. System must sure form only accept one record for every employee.

### Employee

* 1. System must allow modification of employee personal data.
  2. System must allow modification of employee education data.
  3. System must allow modification of employee work experience data.
  4. System must allow modification of employee work data.
  5. System must allow modification of employee medical data.
  6. System must endure employee is a member of a department.
  7. System must be able to assign an employee to a unit in a unit in the employee’s department.

### 4.2.2 Non-Functional Requirements Employee Management System

### Employee Personal Data

* 1. System must ensure that employee date of birth is less than today.

### Employee Work Experience Data

* 1. System must ensure start date and end date are less than today.
  2. System must ensure that end date is not less than the start date.

### Employee Education Data

* 1. System must ensure start date and end date are less than today.
  2. System must ensure that end date is not less than the start date.
  3. Consistency checks on different class of degrees.

### Employee Work Data

* 1. System must ensure start date is not more than today.

### Employee

* 1. System should keep track of date and time record was created.
  2. System should keep track of date and time record was last modified.
  3. System should keep track of who modified a record.

### 4.2.3 Functional Requirements Leave Management System

1. System must display employee data.
2. System must be able to validate the form for compulsory fields.
3. System must make sure the HOD of the employee is able to **Approve** or **Reject** a leave with comments.
4. System must ensure the registrar is able to **Approve** or **Reject** a leave with recommendations.
5. System must ensure that the vice chancellor is able **Confirm** or **Reject** a leave.

### 4.2.4 Non-Functional Requirements Leave Management System

1. System should keep track of date and time record was created.
2. System should keep track of date and time record was last modified.

### 4.2.5 Functional Requirements Performance Management System

### Appointment

* 1. System must make sure both academic and non-academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### Achievement

* 1. System must make sure only academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### Academic Administrative Responsibility

* 1. System must make sure only academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### Timer

* 1. System must make sure both academic and non-academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### Course Thought

* 1. System must make sure only academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### Publications

* 1. System must make sure only academic staff have access to this form.
  2. System must be able to validate the form for compulsory fields.
  3. System should be able to calculate the total score.

### 4.2.6 Non-Functional Requirements Performance Management System

1. System should keep track of date and time record was created.
2. System should keep track of date and time record was last modified.

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