

Implementation of PRIME-HRM Program Using Cloud-Based Technology

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Abstract. This paper exhibits how cloud based technology, with a focus on Human Resource Information System (HRIS), can be used to aid the Department of Health (DOH) implement the Program to Institutionalize Meritocracy and Excellence in Human Resource Management (PRIME-HRM) which has been in effect for government agencies in the Philippine since 2012. The objective of this study is to create a cloud based system of HRIS that could be used to improve the human resource process of the DOH and bring significant change to the traditional process currently used by the department. In order to do this, the agile methodology was used in which the requirements were carefully analyzed, the system was designed according to set criteria, selected the most feasible vendor, releasing the system, and next sprint. The product functions were also determined which are employee management, recruitment management appointment and classification, learning and development, and performance management along with the requirement specifications which are the functional and non-functional. The results of testing determined that the system operating as planned and the algorithms were able to produce the expected results. The research has concluded that it is feasible to create a cloud based HRIS that could help in the implementation of the PRIME-HRM.

Keywords: Cloud-based Technology, DOH, HRIS, Prime – HRM, Web-based

I. INTRODUCTION

The Philippines' Department of Health ensures access to basic public health services for all Filipinos. As the leading health agency, they focus on Human Resources for Health to assure high-quality public service. The Health Human Resource Development Bureau (HHRDB) leads DOH HRH initiatives and activities through policy recommendations, standards development, capacity building, technical and logistical assistance, and networking. HHRDB implements the Learning and Development Management System (assessment, design, delivery, evaluation) for DOH staff and sectoral HRH, develops competency-based learning and development interventions, including online learning, and maintains an organizational learning and development database[1]-[8].

Learning and development are important HR tasks, along with staffing, remuneration, labor relations, and employee safety. Ensure employees have the skills to do their tasks and meet corporate standards, and that the company's workforce is competitive and adaptable [9]- [10]. Succession planning, performance review, and training are crucial [8] [11]. Part of the human resource process involves helping employees attain their long-term goals within the firm, helping individuals perform at their best to thrive in their current roles for succession planning, and replacing employees in important roles [12] [13]. To improve the quality, accessibility, and relevance of the HR Process, the DOH's Program to Institutionalize Meritocracy and Excellence in Human Resource Management (PRIME-HRM) must be

transformed. PRIME-HRM enhances the government's administration, bureaucracy, and public services and will be used to develop a culture of excellence and improve departmental processes. This evaluates, helps, and awards HRM Systems, Practices, and Competencies to improve public HRM[14].The program aims to standardize HR management across government agencies by encouraging organizations to alter their HRM systems to support their mission. It also intends to offer agencies the tools they need to accomplish their HRM duties well, promote and reward good HRM practices, and help them share and build their HRM expertise. PRIME-HRM requires DOH personnel HRM and fosters public accountability. This includes all government offices, such as DOH, at all levels of government. HRMOs, directors, supervisors, regular, job orders, and contractual employees are included. The Pillars include (1) Recruitment, Selection and Placement – Governance, Talent Planning, Talent Sourcing, and Talent Selection and Placement; (2) Learning and Development – Governance, Planning, Monitoring and Evaluation, and Execution; (3) Performance Management – Governance, Performance Planning, and Commitment, Performance Monitoring and Coaching, Performance Review and Evaluation, and Development Planning; and (4) Rewards and Recognition – Governance, Praising, and Recognition. This study aims to develop a competency-based human resource management system using cloud-based technology as a strategy for integrating the HR functions of recruitment, selection, and placement; learning and development; performance management; rewards and recognition; and human resource planning. This will be done following the Program's requirements to Institutionalize Meritocracy and Excellence in Human Resource Management's Maturity Level (PRIME HRM). This research aimed to help HRIS deployment in the Department of Health following the issuance of HR Prime [1][2][10][14], including examining the advantages, limits, and obstacles. A case study was created to illustrate the subject in a real-world setting.

II. REVIEW OF WORKS

The growing trend in the industry this day is the use of cloud based technology in the everyday lives of organizations. According to the study [15]-[18] that there are successful HRIS implementation in other countries using cloud-based technology and also the study showed significant improvements in the HRM process, wherein they were able to substantially reduce the number of errors done and streamline the process for all personnel involved. There are various cloud market platforms available in the market today. For instance,[19]- [23] Azure and Google Cloud offers various specialized services, including big data and analytics, game and mobile app development, data warehousing, and DevOps benefits such as agile development pipelines.

TABLE I
THE STORAGE CAPABILITIES OFFERED BY AZURE VERSUS GOOGLE CLOUD PLATFORM ACROSS THE COMMON CLOUD

	MICROSOFT AZURE		GOOGLE CLOUD	
Storage Service	Object Storage	Azure Blob Storage	Azure provides REST API, PowerShell, and CLI access	Google Cloud Storage Google optimizes price/performance using object lifecycle management
	Persistent Disk Storage	Azure Managed Disks(HDD/SSD)	Azure offers Ultra Disk SSD with up to 2 GB/Second, 1.6m IOPS	Persistent Disk(HDD/ SSD) Google offers the cheapest price/performance for HDD/SSD
	File Storage	Azure Files	Azure provides access to files via standard SMB protocol	Google Cloud Filestore Google offers NAS access and integrates with GKE
	Cold Storage	Azure Long-Term Storage	Azure offers hot, cool, and archive access tiers	Nearline and Coldline Google offers cold storage with sub-second response times
	Data Transfer	Azure Import/Export Service	Azure offers a data transfer command-line tool and an option for shipping physical drives	Storage Transfer Service Google offers API and console access and lets you schedule data transfer tasks

This table describes Azure offers a comprehensive set of storage capabilities and functionalities, but it does have a steep learning curve, particularly for customers unfamiliar with Microsoft technologies. Google has fewer features but outperforms the competition in terms of storage cost and convenience of use.

TABLE II
 GOOGLE CLOUD PLATFORMS FOR CLOUD-BASED VIRTUAL MACHINES AND CONTAINERIZED WORKLOADS

Compute Service	Virtual Machine Instances	Azure Virtual Machines	Azure offers more regions and availability zones	Google Computer Engine	Google provides lower prices across all instance types as well as custom machine types
	Auto Scaling	Azure Auto-scale	Azure lets you auto-scale using a wide variety of metrics	Manages Instance Groups	Google provides auto-healing and built-in load balancing
	Container as a service	Azure Kubernetes Service	AKS supports Visual Studio and Azure DevOps	Google Kubernetes Engine	GKE is considered the most robust kubernetes service
	Function as a service	Azure Functions	Azure offers an end-to-end experience from coding to deployment and monitoring	Google Cloud Functions	Google's service emphasizes simplicity

This table describes Google Cloud cannot yet compete with Azure's huge data center architecture but compensates with enhanced support for container and Kubernetes use cases and a more straightforward learning curve across all deployment options. Google Cloud is priced competitively with Microsoft Azure and offers more flexible pricing across virtually all cloud services.

TABLE III
 COMPARISON OF THE NETWORKING FEATURES OFFERED BY AZURE VS GOOGLE CLOUD PLATFORM

Networking service	Dedicated Interconnect	ExpressRoute	Azure ExpressRoute supports 102 providers and offers privately leased lines	Cloud Interconnect	Google Cloud Interconnect supports only 24 providers and uses public networks. Also provides direct peering, available in 100 locations and 33 countries
	DNS	Azure DNS	Both providers support common DNS record types and anycast	Cloud DNS	Both providers support common DNS record types and anycast. Only google supports DNSSEC (secure DNS)
	Load Balancing	Azure Load Balancer	Both clouds offer: 1. HTTP/S load balancing at network layers 7 2. TCP/UDP load balancing at network layer 4 3. SSL load balancing with encrypted communication	Google Load Balancing	Both clouds offer: 1. HTTP/S load balancing at network layers 7 2. TCP/UDP load balancing at network layer 4 3. SSL load balancing with encrypted communication

This table describes Azure provides a greater number of providers and supporting common DNS. Google supports a smaller number of protocols, but enough to meet the networking requirements. Azure and Google both provide the network load balancing services that are necessary.

Based on the study of [24]-[31], There is increasing demand at this time of the pandemic for using information systems in various functions and departments. Human resource is a department that primarily uses management information systems that support activities such as identifying potential employees, maintaining complete records on existing employees, and creating programs to develop employees' talents and skills. HR systems help senior management identify the staffing requirements to meet the organization's long-term plans with strategic goals and monitor and analyze employees' recruitment, allocation, and compensation. Industries and other sectors use HR systems to track the recruitment and placement of employees. Human Resource systems can also support various HR

practices such as workforce planning, staffing, compensation programs, salary forecasts, pay budgets, and employee relations.[32]-[38]After the enormous disruptions caused by the COVID-19 crisis in 2020, organizations and sectors have tested their agility and resilience, and they are looking to return on operations and, importantly, build great technology for the present and future. Organizations and sectors looked at their operations and saw fragile supply chains, untrustworthy information, and radically new enhancement needs. While it will be tempting for organizations and sectors to retreat to what they know, the past years brought the need for a different path to light. Suppose organizations and sectors continue to have a clear perspective and focus on their expedited digital transformations. In that case, they can emerge on technology trends.

It is a unique moment to rebuild the world better than before the pandemic and expand our definition of value, including how well people realize a goal despite the challenges, the impact left on the environment and nature, growing inclusivity, and more. In the Philippines, [39]-[42], in order to solve challenges and reduce the impact of the virus outbreak on businesses, stakeholders, customers, or clients, HR leaders and employers have made tremendous efforts to mitigate the circumstances. HR showed flexibility in addressing the needs of their people without being too technical in the extension of social safety nets.

According to needs assessment, HRIS for DOH will integrate personnel data across various HR functions, such as recruitment, selection, training, and performance, except for compensation and benefits, which will remain separate and confusing for the user and will be excluded from the system according to the personnel division.

According to [43]-[44] transitioned from a web-based system to something far more efficient and discovered that their employees liked the system's simplicity and ease of use, which enabled the organization to begin operations with minimum training.

As demonstrated in the [19]-[20],[45]-[48], Consistency, accuracy, rapid access to data and integration are the hallmarks of an advanced HRIS. Rather than maintaining a distinct and insular subsystem for each core human resource function such as selection, training, performance management, and retention, advanced HRIS integrates personnel data across HR functions; the data becomes even more robust, and analysts can retrieve and merge data from multiple subsystem functions for subsequent analysis and reporting. Indeed, some vendors like SAP[49], QLIK [50], Minitab [51], Tableau [52], and IBM SPSS Modeler[53], They are now incorporated data analytics solutions into their data management systems and delivering proprietary data analysis algorithms for projecting crucial outcomes such as employee selection and retention. Human resource experts and all organizational members should exercise additional caution to thoroughly understand the data used in such models and how to interpret their output or findings appropriately.

When it comes to data management and human resource information systems, there are several opportunities as well as challenges. Opportunities lie in tracking employees, making data available for HR analytics, and saving and merging employee attitude surveys and data from other sources over time. [54] The University of Cebu is an example of HRIS in action. It took an unconventional strategy to combine data from the manual human resource system with other data sources to improve its workforce planning efforts. Human resources professionals now have access to a technology that allows them to forecast how the university's workforce will appear in a few years and how many jobs are available now and soon.

According to one study of HR executives and managers from various nations [55]-[58], A global HRIS was associated with higher employee retention of international IT service providers in emerging markets. This was especially helpful in reducing turnover for employees assigned to other countries, as the support of a global HRIS for scheduling and training was cited as beneficial for new employees and their managers alike. Effective human resource management in a firm to gain competitive advantage requires timely and accurate information on current and potential employees in the labour market.

A significant degree of responsibility comes along with a large amount of data. Because HRIS is a personal information repository, it is imperative to protect and secure data. Individuals' right to decide how their data is gathered, stored, accessed, and reported on is at the heart of data privacy. Those who

choose the HR management system they employ are less concerned about privacy and more satisfied with the system overall. Because of this, they are especially cautious when it comes to storing medical information, which may be used for insurance purposes or to sway personnel choices within the company. Employers are required by the Republic Act of 2012 - the Data Privacy Act of 2012 [59] to maintain the personal information of their employees.

As a response to today's cybercrimes, the Philippine Cybercrime Prevention Act of 2012 was passed 2012[60]. It aims to focus on the pre-emption, prevention, and prosecution of cybercrimes such as crimes against the confidentiality, integrity, and availability of computer data and systems, as well as computer-related and content-related offenses.

Criminals that commit their crimes online will face the consequences of the law. People who utilize technology to engage in harmful operations on digital systems or networks that steal sensitive company information or personal data and generate profit are committing cybercrime. Cybercrime is still a problem even though laws have been in place, and it is difficult to track down the perpetrators. They often camouflage their IP address by routing traffic through multiple servers around the world.

With the difficulty of catching and prosecuting fraudsters, we need a trustworthy cybersecurity plan. A person's privacy should be protected when they post personal information online. Those who use these gadgets should be aware that their private information will be protected from unauthorized access.

As risks like spam calls and texts and fake promotions are out of the company's control, it encourages the public to be more attentive and vigilant. Users can file complaints with the National Telecommunications Commission or the PNP Anti-Cybercrime Group at www.acg.pnp.gov.ph/eComplaint.

III. METHODOLOGY

A. General Method Used

Agile improves system development and deployment. Each role is connected to the organization's purpose, vision, and values. An organization that values employee engagement and trust is willing to transfer control of the HR department and is digitally prepared with HR technology or human resource information system (HRIS) with easily accessible development goal setting and engagement platforms for all employees. Agile concepts in human resources emphasize innovation and collaboration instead of rules and controls. Agile methods can transform HRIS. [19]-[20],[45]-[47]

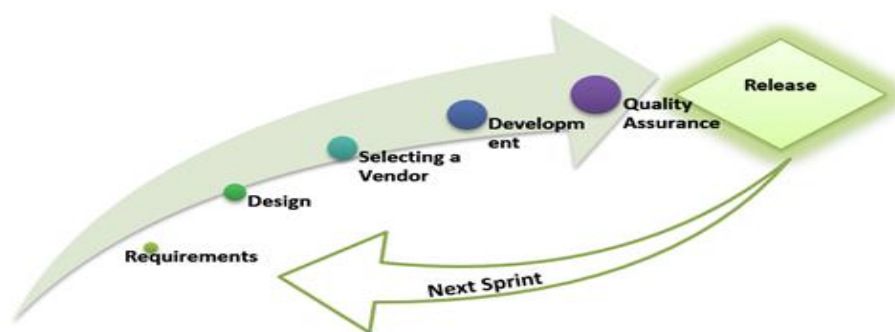


Fig. 1 Agile Methodology

B. Initial Assessment

During the initial evaluation phase, it is essential to decide whether internal HR professionals or an HRIS consultant should perform the selection process, given time, experience, and money constraints. Imagine this: If a new HRIS is needed. HR lacks time and skill in this area. Hiring a consultant may be helpful. Obtaining buy-in from management and important stakeholders during this phase is crucial since they may be gatekeepers to crucial resources later in the development and implementation

process. Find the organization's needs. The goal is to develop a system that meets current needs and allows for future growth

C. Designing the system

After compiling a list of essentials and options, analyze the project's budget, technology, and timetable. This degree of organization requires being open and honest about all the organization's features. The HRIS software will include them. The rational design improves business processes by communicating business needs. Human resources may have a list of data communicated and stored throughout recruitment. Business processes are explained via data flow diagrams. Physical design determines the most effective way to translate business processes into software and hardware solutions. Human resources can use a recruitment system's logical architecture to determine the software and hardware needed to implement and integrate it with other systems. Logical design (process and data demands) should precede physical design (including the associated hardware and software). Logic may disclose that the current physical design is fragile, requiring a method adjustment to avoid a total redesign

D. Selecting a Vendor

The references used while selecting vendors should have a competent developer or reseller and have references from comparable-sized clients. After reviewing the list of vendors and their specifications, one of the vendors was chosen because the vendor was able to meet all the requirements for the HRIS platform. Microsoft Azure was selected for cloud-based technology because Azure offers various specialized services, including big data and analytics, game and mobile app development, data warehousing, and DevOps benefits, such as agile development pipelines. [61]

E. Release

One of the challenges on the release of the system is the people affected by new procedures and information access, such as HR professionals, managers, and employees. Consistent HRIS efficiency strategies may ease short-term worries during transition and training in a hierarchical society. HRIS or ERP deployments require realistic timetables for each stage and a complete switchover.

After an effective change process, the following stages are to refreeze and maintain the change, which includes stabilizing employee attitudes and behaviours around the HRIS. As part of the HRIS feasibility phase, it will be evaluated to determine if it is operating as intended. There will be updates made if there are areas for improvement in the system.

F. Next Sprint

This phase brought alignment from the insights of the users after the release of the system because the insights help the developers to understand how much work will be needed on the next sprint and what functionalities are needed to improve the system. It also provided a reference point for measuring velocity, which is the key metric in a scrum and refers to understanding how much a team can accomplish throughout a sprint. There may have been any issues or concerns that came up during the last sprint. So that future sprints do not have to deal with these challenges. They must be addressed. Make it clear to everyone on the team who will and who will not be responsible for what. There should be a way for the team to pick up work if its sprint goal is met early in the product backlog. During a sprint, an agile team must have a backlog of work and be focused on delivering a good outcome.

Product Functions

This system maintains a centralized database using cloud technology. Additionally, it serves as a central repository for personnel data, providing up-to-date information on your organization's hiring trends and staff retention.



Fig. 2 Function Modules of the Department of Health Central Office's Cloud-Based HRIS

A. Employee Management contains a Personal Data Sheet and Leave of Application module. This module maintains personnel information in CSC PDS format. Users can create a PDS to store and update personal data. Staff utilizes leave of application to request leave under the Leave Entitlements Policy and leave procedure.

B. Recruitment Management Appointment and Classification. Job Classification and Appointment Management shows a job's structure, usefulness to the organization, and relative rank. This is significant because a job's hierarchical classification affects human resource decision-making, per DBM guidelines. Appointment Management automates an office's recruiting and hiring efforts, proposes open position requests, and rates employees. Supervisors and HR administer this module.

C. Learning and Development

L&DNA Analysis, Performance Rating, and Workplace Application Plan are part of L&D Management.

L&DA Analysis aligns employee goals and performance with the organization. Individuals responsible for learning and development in a business must identify skill gaps, then plan and give the training to close them. Performance Rating is a method for measuring employees' job-related labour and results. A work application plan helps employees apply what they learn in training to the workplace. It can also examine the training's impact on the learner's work performance. Evaluation helps to determine if training accomplishes objectives and chooses future training. The idea is to create a visual reference for goals, objectives, tasks, and team members. All personnel should be included in and updated on the plan. A work plan can save time and include tasks, team members, objectives, and dates if the aim is precise. Working with this plan can clarify team members' duties and boost the chance of meeting the deadline. After identifying goals, assign staff to drive initiatives. A supervisor or manager can oversee various workers, meet with those individuals, and focus on overall progress to maintain projects on time. Employees, supervisors, and HR administer this module.

D. Performance Management encompasses Internal Quality and Complaints.

Complaints Center sets work standards consistent with organizational goals. When work rules are broken, discipline is taken. Management, the HR department, and employees should collaborate to design fair, followable policies. Work norms affect organizational behaviour and output. The regulations must be known. While employees may have helped write the rules, the employer selects the final version. Each employee should receive the company's work regulations. Usually, a manual is used.

The handbook may provide more information, but work rules are essential. This module highlights GAD and CODI's importance [62].

General management includes QA. It helps boost office productivity, maintain public relations, minimize costs, manage change, and accept new challenges, all contributing to the organization's goal. This module is linked to OPCR and WFP, which increase the system's performance focus and give a full grasp of financial goals and operations. HR Planning Staff, HR Budget Utilization, and Organizational Goals.

Requirements Specification

These requirements specifications are organized in such a way that any user may simply comprehend and utilize the HRIS. In other words, it serves as a user manual for human resource management systems. This article concludes with the planning and estimation of the process's basic schedule. Currently, the Department of Health utilizes a manual system. However, integrating the existing process that is able to give additional features and properties that are nicely structured.

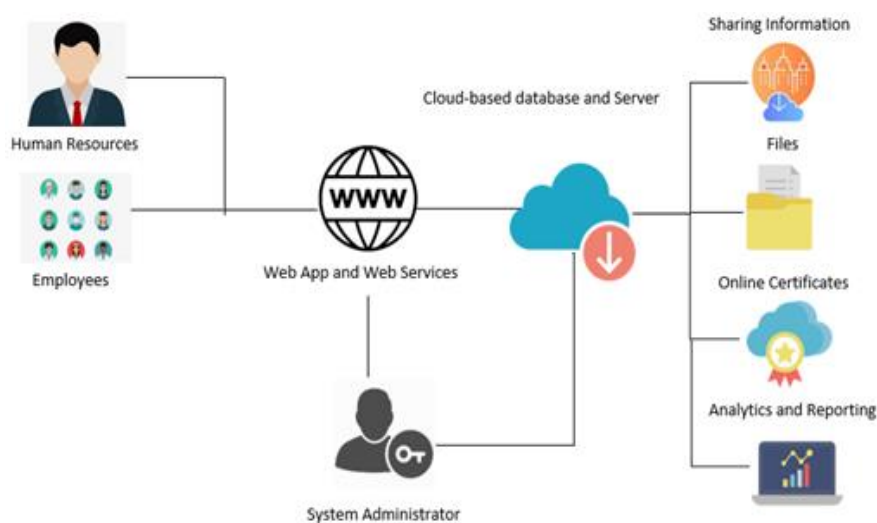


Fig. 3 General Use-Case Diagram of the Cloud-Base Human Resource Management System for the Department of Health Central Office

This serves as a user manual for human resource management systems and concludes with the planning and estimation of the process's basic schedule. Currently, the Department of Health utilizes a manual system. However, integrating the existing process that is able to give additional features and properties that are nicely structured.

Users can access and edit the information using HRIS according to their role type (These roles are administrator/IT, manager, HR professional, and employee). Different groups within an organization may use HRIS. Various system users have different incentives or duties while accessing an HRIS; hence user experience should be considered. Employees are primary HRIS users since they need to enter, verify, analyze, and report data. Even among employees, motives or obligations may vary dependent on roles. First, all employees must examine, change, or verify their own personal data in the HRIS. Instead of relying on a face-to-face encounter with a benefits administrator, employees have direct control over their HRIS data. Second, some employees must submit data for other users. Managers may have to enter employee performance ratings into the HRIS.

Third, other staff updates, analyze, and report HRIS data. IT Administrator regularly performs system design improvements and fixes HRIS technology concerns. HR staff may examine HRIS data or collect data to answer HR-related inquiries. Managers may need to see actual employee data, although they often view aggregate data on groups or units of employees.

Functional Requirements

The system performs several essential functions in order to complete essential tasks. These functions serve as the foundation for the entire system. These are the following functions:

A) Authentication and Authorization

Users can access the system if they are connected to the internet. To view the interface associated with his or her role type, the user's account must be permitted, as well as his or her user name and password-authenticated. These responsibilities are handled mainly by the functions implemented under the Authentication and Authorization primary function's header.

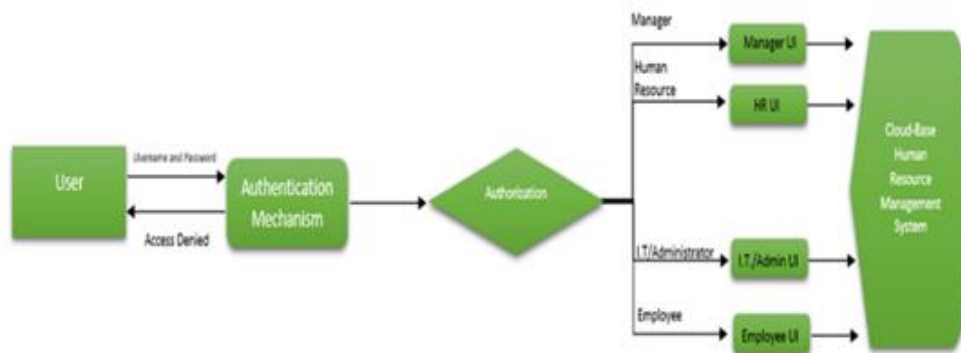


Fig. 4 General Use-Case Diagram of the Cloud-Based Human Resource Management System for the Department of Health Central Office

B) Data Processing

These features, which may be inspected in that process's data primary function, essentially enable the user to manage the database following the work at hand. These management duties are the primary function of the HRIS. These capabilities enable users to change some of their essential personal information, such as contact information and marital status. Along with updating data, a user can search the database to retrieve a list of users with the desired properties. Additionally, a user can view specific information about a user or all users via a report. In other words, searching is an operation performed on the database's rows, whereas reporting is performed on the database's columns.

Non-Functional Requirements

A. Performance Requirements

The HRMS's online user base is estimated at no more than 100. There are no limits on the number of users that can be added to the database.

B. Hardware Requirements

Around 250 employees' data would be stored in the HRMS application. Approximately 2 GB of storage space is required.

C. Software Requirements

Since the program is web-based, an internet connection must be created. This software will be installed on personal computers and accessible over the internet or through any web browser. The interface for

this system will be designed using Angular frameworks and will support Microsoft Visual Studio. The software's database model will be compatible with the MYSQL database management system. The HRIS will run on any platform that supports ASP.NET Web API.

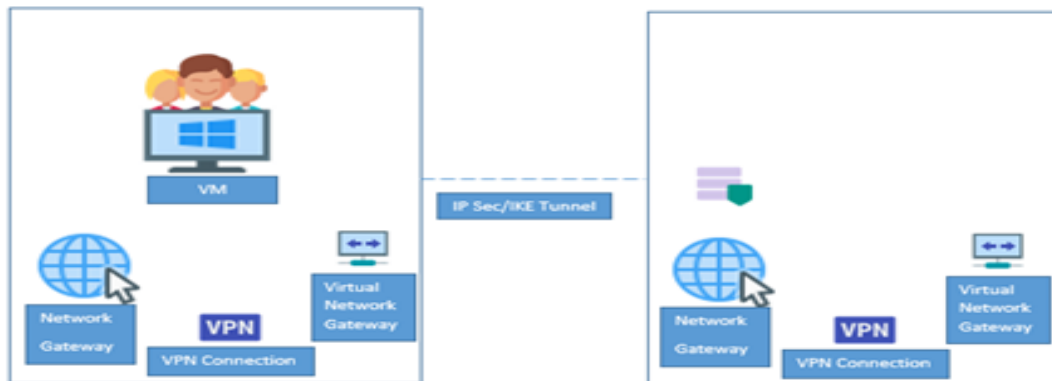


Fig. 5 System Network Architecture

The cloud-based system explains the architecture of connections and how the parts send traffic to a managed instance. SQL Managed Instance is put in the Azure virtual network and the managed instances subnet. This deployment provides:

1. A secure private IP address
2. The ability to connect an on-premises network to SQL Managed Instance
3. The ability to connect SQL Managed Instance to a linked server or another on-premises data store is to connect SQL Managed Instance to Azure resources.

IV. RESULTS AND DISCUSSIONS

TABLE IV
 SYSTEM PROCESS TESTING

Test Writer:	Jacob P. Manahan	Test ID		
Test Case Subject:	System process	Type:	Black-box	
Description:	The system must be able to perform all of this process		White-box	
Tester Information:	Auditor, CPA Passer	Date:	8/24/2022	
Name of Tester:	Allen Cruz	Time:	8:30 P.M.	
Setup:	The system should be accessible through the internet			
Step	Action	Expected Result	Remarks	Comments
1	Edit	A user with the employee position has the ability to edit his or her own individual personal information. Except for user role type, the manager can modify only the personal information of employees that fall under his/her purview. HR has the ability to edit all employee information except the user role type. The administrator has the ability to edit any information pertaining to all employees, including their user role type.	Pass	n/a
2	Search	A user with the manager role type can do a search of the database's content for employees who fall under his or her coverage. HR have the ability to search the database for all personnel information. The search option is based on certain keywords and displays information about an employee's qualities, idiosyncrasies, skills, and features.	Pass	n/a
3	Display	Users with established roles can view the database's content. To be more precise, the employee has access to only his or her own personal information. The manager has access to not only his or her own personal information, but also to that of the people who work under his or her supervision. Admin and HR can view their own personal information as well as that of all employees.	Pass	n/a
4	Report	This feature is mostly used to filter the search mechanism's contents. After obtaining a list of employees as a result of the search tool, he/she can acquire a specific report by checking the associated checkbox for each employee. Or, by checking the checkbox, a manager role type can obtain a report of certain or all employees who work under his or her supervision. Except for the employee job type, this capability is available to all other role kinds such as administrator, human resources, and manager.	Pass	n/a

TABLE V
IMPROVEMENTS THROUGH INTEGRATION TESTING

Test Writer:		Jacob P. Manahan	Test ID	
Test Case Subject:		Improvements through integration	Type:	Black-box
Description:		The system must exhibit significant improvements and its use as compared to the previous process.		White-box
Tester Information:		Auditor, CPA Passer	Date:	8/24/2022
Name of Tester:		Allen Cruz	Time:	8:30 P.M.
Setup:		The system should be accessible through the internet		
Step	Action	Expected Result	Remarks	Comments
1	Report generation functionality	The system has two report generation functionalities. First, employees who are under the HR department have the ability to generate company wide reports, such as a list of employee data, list of employees with training deficiencies, etc. Second, each employee has the ability to generate certain reports attributed to him/her.	Pass	n/a
2	Tracking system	The system has the ability to track specific activities on the system such as the disciplinary action and filing of leave of application	Pass	n/a
3	Accessability	The system can access through internet use and has the ability to accommodate remote users	Pass	n/a
4	Database and back-end design	The system can minimize redundancy, protect accuracy, and provide access while also protecting data security. The API's ensure everything runs smoothly	Pass	n/a
Overall test result:		The system met all of the above-mentioned requirements and also achived significant improvements		

The data in tables IV and V black-box testing demonstrates how the system process and integrated enhancements were tested. There are no cautions or errors in the steps. Overall, the test result showed that the specified standards were met through objective testing and verification. On August 24, 2022, one of the experts in using HRIS systems completed the tests.

TABLE VI
USER AUTHORIZATION AND AUTHENTICATION TESTING

Test Writer:		Jacob P. Manahan	Test ID	
Test Case Subject:		User authorization and authentication	Type:	Black-box
Description:		entry page to a website that requires user identification and authentication, regularly		White-box
Tester Information:		Auditor, CPA Passer	Date:	8/24/2022
Name of Tester:		Allen Cruz	Time:	8:30 P.M.
Setup:		The system should be accessible through the internet		
Action	Code	Expected Result	Remarks	Comments
Login	<pre>error => { if(error.status == "404"){ this.showLoadingProgressBar\$.next(false); this.err\$.next("Invalid Credentials, Please try again.."); }else{this.showLoadingProgressBar\$.next(false); this.err\$.next("Connection error, Please check your network or the server may be down.");};}</pre>	The user can access the system by entering his or her username and password.	Pass	n/a
Logout	<pre>logout(){ sessionStorage.clear(); localStorage.clear(); this.router.navigated = false this.router.navigate(['auth/login']); window.location.reload();}</pre>	The user may log out of the system.	Pass	n/a
Login Failed	<pre>error => {if(error.status == "404"){ this.showLoadingProgressBar\$.next(false); this.err\$.next("Invalid Credentials, Please try again.."); }else{ this.showLoadingProgressBar\$.next(false); this.err\$.next("Connection error, Please check your network or the server may be down.");};}</pre>	If the user does not exist in the database or has not been authorized by the system administrator yet.	Pass	n/a

TABLE VII
LEAVE OF APPLICATION TESTING

Test Writer:		Jacob P. Manahan	Test ID	
Test Case Subject:		Leave of Application	Type:	Black-box
Description:		The system must be able to perform all of this process		
Tester Information:		Auditor, CPA Passer	Date:	24/08/2022
Name of Tester:		Allen Cruz	Time:	8:30 P.M.
Setup:		The system should be accessible through the internet, CRUD Operations, REST API should be tested		
Action	Code	Expected Result	Remarks	Comments
Leave Credits	<pre> var person = PlutoContext.PersonDetails.AsNoTracking().AsEnumerable().Where re(w => w.personId == personDetail.personId).FirstOrDefault(); if (person != null) { PlutoContext.PersonDetails.Update(personDetail); } else { personDetail.vacation_leave_credit = 10; personDetail.sick_leave_credit = 10; PlutoContext.PersonDetails.Add(personDetail); } PlutoContext.ChangeTracker.DetectChanges(); await PlutoContext.SaveChangesAsync(); return personDetail.userId; </pre>	Once an employee files for leave, it will be automatically routed to the supervisor/manager for approval. The system will be also able to display the employee's remaining leave credits	Pass	n/a
Overall test result:		The system met all of the above-mentioned requirements and also achieved significant		

TABLE VIII
APPOINTMENT TESTING

Test Writer:		Jacob P. Manahan	Test ID		
Test Case Subject:		Appointment	Type:	Black-box	
Description:		The system must be able to perform all of this process			
Tester Information:		Auditor, CPA Passer	Date:	8/24/2022	
Name of Tester:		Allen Cruz	Time:	8:30 P.M.	
Setup:		The system should be accessible through the internet, CRUD Operations, REST API should be tested			
Step	Action	Code	Expected Result	Remarks	Comments
	Weighted Average Computation	<pre> this.frmglobaldataserve.getRecord("WorkplaceApplicationPlan/GetWAPRating/"+selectedPDS.personId) .subscribe((data:number) => { switch(data){ case 1: data=100; break; case 2: data=88; break; case 3: data=75; break; case 4: data=50; break; case 5: data=25; break; default: break; } this.AppointmentForm.patchValue({wapRating:data}); this.frmglobaldataserve.getRecord("PerformanceRating/GetPerformanceRating/"+selectedPDS.personId) .subscribe((data:number) => { this.AppointmentForm.patchValue({performanceEval:data}); }); this.frmglobaldataserve.getRecord("PerformanceMgmt/GetIsGuiltyComplaineer/"+selectedPDS.personId) .subscribe((data:ComplaintDetail) => { if(data != null){ if(data.is_guilty == true){ var rate = 0 * 20; this.AppointmentForm.patchValue({adminCaseRate:rate}); }else{ var rate = 100 * 20; this.AppointmentForm.patchValue({adminCaseRate:rate}); } } }); {(error) => { var rate = 100 * 20; this.AppointmentForm.patchValue({adminCaseRate:rate}); }}; </pre>	The system will be able to gather the data regarding an employee's WAP, Performance Rating, and Admin Cases and will generate an overall score of an employee's assessment.	Pass	n/a
Overall test result:		The system met all of the above-mentioned requirements and also achieved significant			

TABLE IX
INTERNAL QUALITY TESTING

Test Writer:	Jacob P. Manahan	Test ID	
Test Case Subject:	Internal Quantity	Type:	Black-box
Description:	The system must be able to perform all of this process		White-box
Tester Information:	Auditor, CPA Passer	Date:	8/24/2022
Name of Tester:	Allen Cruz	Time:	8:30 P.M.
Setup:	The system should be accessible through the internet, CRUD Operations, REST API should be tested		
Action	Code	Expected Result	Remarks
Budget Utilization	<pre>[HttpPost, Route("PostBudgetUtil")] public async Task<ActionResult> PostBudgetUtil([FromBody] BudgetUtilizationDetail pMgmtDetail) { try if (!ModelState.IsValid) return BadRequest(ModelState); } Guid pMgmt = await unitOfWork.PerformanceMgnts.UpdateBudgetUtilizationDetailAsync(pMgmtDetail); return Ok(pMgmt); } catch (Exception ex) { return BadRequest(ex.Message); } }</pre>	When the user has encoded all the details of the budget, the system will be able to generate a budget report and it could also generate a visualization of the data	
Organizational Goals	<pre>[HttpPost, Route("PostOrgGoal")] public async Task<ActionResult> PostOrgGoal([FromBody] OrganizationalGoalDetail pMgmtDetail) { try if (!ModelState.IsValid) return BadRequest(ModelState); } Guid pMgmt = await unitOfWork.PerformanceMgnts.UpdateOrganizationalGoalDetailAsync(pMgmtDetail); return Ok(pMgmt); } catch (Exception ex) { return BadRequest(ex.Message); } }</pre>	When the user has encoded the organizational goals, the system will display the encoded data	
HR Staffing Plan	<pre>[HttpPost, Route("PostHRStaffing")] public async Task<ActionResult> PostHRStaffing([FromBody] HRStaffingPlanDetail pMgmtDetail) { try if (!ModelState.IsValid) return BadRequest(ModelState); } Guid pMgmt = await unitOfWork.PerformanceMgnts.UpdateHRStaffingDetailAsync(pMgmtDetail); return Ok(pMgmt); } catch (Exception ex) { return BadRequest(ex.Message); } }</pre>	Once the authorized user has encoded the necessary details, the system will be able to display the data and will be a basis for the staffing decisions to be done on the organization.	

The data in tables VI to IX white-box testing demonstrates how the system process and integrated enhancements were tested. There are no cautions or errors in the steps. Overall, the test result showed that the specified standards were met through objective testing and verification. On August 24, 2022, one of the experts in using HRIS systems completed the tests.

V. SUMMARY OF FINDINGS

A. Testing Result

Black-box Testing

The test conducted on the User Authorization and Authentication shows that the functionalities of Login, Logout, Login Failed, and User Roles were successful in meeting the specified standard, overall there were no issues or errors encountered.

The test conducted on the System Process shows that the functionalities of Edit, Search, Display, Report, Analytics, Cloud-based Technology, and Update Authentication was successful in meeting the specified standard, overall there were no issues or errors encountered.

The test conducted on the Improvements Through Integration shows that the functionalities of Report Generation, Tracking System, Accessibility, and Database and Back-End were successful in meeting the specified standard, overall there were no issues or errors encountered.

White-box Testing

User authorization and authentication

Users were able to successfully log in and log out of the system. It was also able to perform account verification to determine if the user already has an account or if the user's access was restricted due to incorrect credentials. The system might potentially differentiate between users and restrict access based on their level.

Personal Data Sheet

The system was successful in allowing users to input their data in the PDS section, save it, make any necessary edits, and eliminate errors. Numerous notifications also appear whether the tasks were completed successfully or if errors, such as a bad internet connection, were detected.

Leave of Application

The system successfully displayed the employee's available leave credits and allowed employees to submit their leaves, which will be automatically routed to the approved people. The approving authorities could also approve or reject the filed leaves.

Appointment and Recruitment

The technology was able to accurately predict whether or not a worker was qualified for promotion based on their evaluation results. In addition, the authorized people might decide which appointments were necessary for each employee.

Internal Quality

The system was successful in the following functionalities in the system: the Budget Utilization, HR Staffing Plan, and Complaints Center. The Budget Utilization allows authorized employees to record all their data regarding budgets and input the system as the reference point for their various decisions. The system was also successful in encoding and displaying the various goals of the organization. Lastly, the system was able to allow users to file within the system various complaints which will be routed to authorized personnel for their assessment.

The overall result shows that the algorithms presented were successful in being able to make the functionalities set in the system work properly.

B. Conclusions

This study concludes the following:

In order to save much time, make daily tasks significantly more efficient, and reduce the amount of human error that occurs in the course of completing tasks, The implementation of the HRIS system automates various functions such as employee management, recruitment and appointment management, learning and development management, and performance management. The implementation of the system successfully shifted the manual system into an automated one.

In order to help HR align their rules, tactics, and personal development ideas for these to sync with the organization's overall strategic objectives, the HRIS system was able to streamline and hold all the necessary information in a centralized database and provide structural connectivity across units and activities, and to increase the speed of information transactions which can help the users with their specific objective

In order to ensure that outcomes are effective and reliable regarding decision-making for employee relations, training, improvement, human resource planning, hiring, and evaluation, the HRIS system can provide access to authorized users in obtaining necessary information on each employee and be able to generate specific reports, such as filing of leave, personal data sheet, work-application plan, performance rating, and so on.

In order to assist the organization in establishing and accomplishing clear goals as well as articulating and handling complex challenges and urgent matters, the HRIS system was able to create functionality for individual performance such as work-application plan, performance rating, and complaints center, and for the group performance, such as learning and development, internal quality, HR staffing plan, budget utilization for HR, and organizational goals.

In order to ensure issues about the legal, ethical, and social environment are dealt with appropriately in compliance with the PRIME-HRM Guidelines, the Data Privacy Act, and the Occupational Health and Safety Act, and to exercise the right to decent work, freedom of association, equal opportunity, and protection against discrimination, the complaints center was made in the HRIS so that employees may elevate all their concerns and complaints to the concerned personnel and have all the issues raised be recorded.

In order for HR professionals to now have more time to devote to making decisions based on the insights provided by data, new technologies will assist HR in modernizing and mobilizing aging HRIS systems. The HRIS has the capability of presenting visualized data from the available information stored in the system which can be used for decision-making. The HRIS System also has the capacity of revolutionizing, not only the system itself, but also pushing the process of human resources as a whole.

C. Recommendations

This study recommends the following:

To improve the Employee Management functionality, a daily time record showing an employee's time in and time out, which will serve as the basis for payroll and performance, is recommended, and a record of employee payslips. Work Accomplishment Report, which is filed every 15th and 30th day of the month, could also be included to automatize the basis for the work done. Another recommendation is the inclusion of filing of a request for cash advances, and expense reimbursements for their official travel will automatically be routed to the concerned department.

To improve the Recruitment and Appointment Management functionality, a system that could process applications, both within and outside the organization, and provide a potential applicant and provide timely updates regarding on their applications is recommended.

To improve the Learning and Development Management functionality, a system that could integrate a Learning Management System with tools is recommended.

To improve the Performance Management functionality, a system that could integrate strategic performance system such as Individual Performance Commitment and Review, and Office Performance Commitment and Review are recommended.

To improve the overall system, it is recommended the organization should integrate payroll function to have a centralized processing system related to employee and HR concerns.

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