A

Report On

Internship

Under "Industry Internship & Project" Track

at

Prodevance Technologies Private Limited, Bengaluru

Submitted

in partial fulfillment of the requirements for the degree of

Bachelor of Technology

in

Computer Science and Information Technology

by

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Under the Guidance of

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Department Of Information Technology

K.E. Society's

Rajarambapu Institute of Technology, Rajaramnagar

(An Empowered Autonomous Institute, Affiliated to Shivaji University, Kolhapur)

2023-2024

K. E. Society's

Rajarambapu Institute Of Technology, Rajaramnagar

(An Empowered Autonomous Institute, Affiliated to Shivaji University)

Department of Information Technology

CERTIFICATE

This is to certify that the internship under Industry Internship & Project (IIP) track completed at **"Prodevance Technologies Private Limited, Bengaluru"** is the bona fide work submitted by the following student, to the Rajarambapu Institute of Technology, Rajaramnagar during the academic year 2023-24, in partial fulfillment for the award of the degree of B. Tech in **Computer Science & Information Technology** under our supervision.The contents of this report, in full or in parts, have not been submitted to any other Institution or University for the award of any degree.

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DECLARATION

I declare that this report reflects my thoughts about the subject in my own words. I have sufficiently cited and referenced the original sources, referred or considered in this work. I have not plagiarized or submitted the same work for the award of any other degree. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute.

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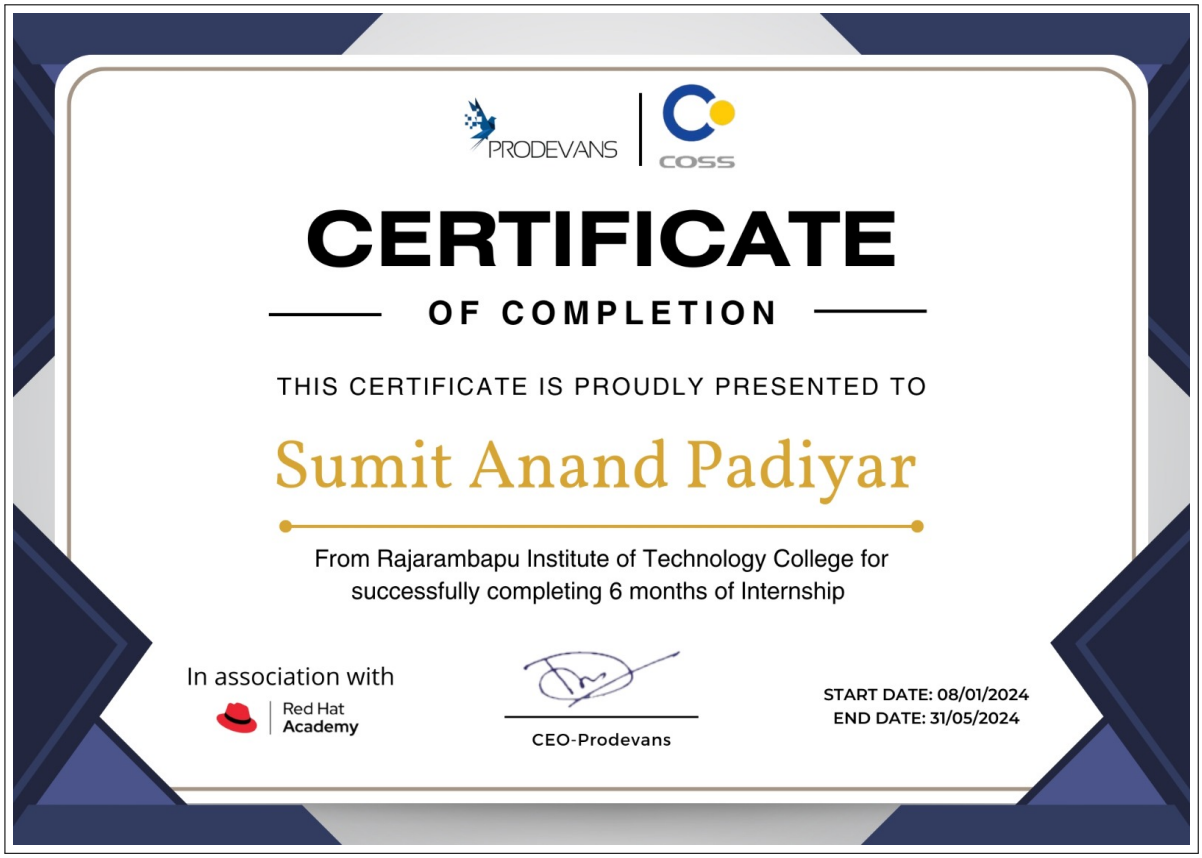
Internship Completion Letter



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ABSTRACT

The purpose of this report is to give an overall scenario of my internship experience at Prodevance Technologies. This report reflects the importance of doing an internship which enhances the student's technical skills and gives them a better platform to apply their skills in real world problems. Prodevance Technologies Private Limited, located in Bengaluru, India, Prodevans is a top technology company with several important certifications, including ISO QMS (9001), ISMS (27001), ITSM (20000), and CMMI Level 3. They are experts in DevOps, providing complete solutions to make IT delivery faster and more automated. Prodevans offers a wide range of Cloud Solutions, including Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS). Their goal is to provide efficient, time-saving solutions that maximize return on investment (ROI). By using the right Cloud-based tools and resources, Prodevans helps businesses deliver excellent customer experiences. Prodevance Technologies in collabration with Red Hat Academy they provide training on RHCSA and RHCE . During the Linux-DevOps internship, interns are assigned a project with a duration of 21 weeks, which provides an in-depth understanding of the software development life cycle. The primary objective of this internship is to expose students to various modules, applications, and functionalities within the Linux ecosystem, and to enable them to design their own applications and automation solutions. Through this program, interns are introduced to a wide range of technologies and concepts, including Linux, RHEL, Ansible, Networking, KVM, Shell Scripting, Server Setup, HA Clustering, and Storage Management. This comprehensive exposure equips interns with the skills and knowledge necessary to excel in the field of Linux administration and DevOps practices.

Contents

1 Introduction **1**

1.1 Industrial Internship and Project Course 1

1.2 Industrial Internship 2

1.3 Industrial Training Objectives 3

1.4 Project Assignment 3

2 Company Background & Structure **5**

2.1 Background 5

2.2 Vision 6

2.3 Mission 6

2.4 Values 7

2.5 Goals 8

2.6 Industry Expertise and Solutions 8

3 Weekly Jobs Summary **10**

4 Technical Content **17**

4.1 Business Overview of Prodevance Technologies 17

4.1.1 *Setup in RHEL Industry* 18

4.1.2 *Red Hat Certifications* 18

4.1.3 *Understanding of Devops Lifecycle* 18

4.2 Red Hat Certified System Administrator Training 19
4.2.1 *System and Network Configuration* 19
4.2.2 *User and File Management* 19
4.2.3 *Service and Security Management* 20
4.2.4 *Storage Management and System Monitoring* 20
4.2.5 *Containerization and Virtualization* 20
4.3 Red Hat Certified Engineer Training 20
4.3.1 *System Automation and Management* 21
4.3.2 *Network Services and Security* 21
4.3.3 *Performance Tuning and Troubleshooting* 21
4.4 Virtualisation 21
4.4.1 *KVM Storage Virtualisation* 22
4.4.2 *KVM Network Virtualisation* 23
4.5 Tasks Implemented During Internship 24
4.5.1 *Shell Scripting Basics* 24
4.5.2 *HA Cluster Implementation* 24
4.5.3 *DNS Server Setup* 24
4.5.4 *Local Repository Setup Using Apache* 25
4.5.5 *Client System Configuration* 25

5 Findings and Suggestions **26**

5.1 Opportunity to Learn New Things 26
5.2 Learning from Experience 27
5.3 Benefits 28
5.4 Advice 28
5.5 Suggestion to Department/College 30

6 Conclusion **31**

References 33

List of Tables

3.1 Weekly Job summary 10

List of Figures

2.1 **Prodevance Technologies Logo** 9

2.2 **Redhat Academy** 9

4.1 Prodevance collabration with COSS India 19

4.2 KVM Hypervisor 22

Chapter 1

Introduction

1.1 Industrial Internship and Project Course

The Industrial Internship and Project Course is a comprehensive 21-week semester program designed to immerse students in professional work environments, bridging the gap between academic theory and real-world application. Throughout this program, students gain invaluable hands-on experience by working as interns in partner companies, where they undertake various tasks and projects assigned by their company-appointed mentors. This immersive experience not only enhances their technical proficiency but also equips them with essential soft skills such as teamwork, problem-solving, and adaptability.

The course emphasizes experiential education, enabling students to apply theoretical knowledge in practical settings while cultivating critical skills and competencies that are highly valued by employers. Students gain firsthand insight into the dynamics and challenges of the business world, preparing them to navigate and excel in their future careers.

Personalized guidance and support are provided by dedicated faculty members and industry professionals, ensuring that each student's progress is closely monitored, assessed, and optimized for maximum benefit. This collaborative mentorship approach maximizes the

learning experience, fostering professional growth and development.

By the end of the program, students will have acquired the knowledge, abilities, and real-world experience needed to stand out in today's competitive job market. They will emerge as competent graduates, ready to succeed in their chosen industries with a solid foundation of practical experience and industry-relevant skills. This integrated approach not only facilitates the practical application of theoretical concepts but also encourages the development of critical skills and competencies essential for professional success.

1.2 Industrial Internship

An industrial internship offers freshers the opportunity to gain practical experience by working at a company for a predetermined period. These internships provide invaluable on-the-job training and are available in various fields, including management, IT, engineering, sales, marketing, and graphic design. Internships are structured programs designed to give students or individuals looking to develop industry-specific skills and knowledge the chance to gain real-world work experience. They serve as a bridge between academic study and professional employment, offering a valuable opportunity to apply theoretical knowledge in practical situations. Typically lasting from a few weeks to several months, internships are short-term positions where interns work closely with professionals in their respective industries.

During the Linux-DevOps internship, interns are assigned a project with a duration of 21 weeks, which provides an in-depth understanding of the software development life cycle. The primary objective of this internship is to expose students to various modules, applications, and functionalities within the Linux ecosystem, and to enable them to design their own applications and automation solutions. Through this program, interns are introduced to a wide range of technologies and concepts, including Linux, RHEL, Ansible, Networking,

KVM, Shell Scripting, Server Setup, HA Clustering, and Storage Management. This comprehensive exposure equips interns with the skills and knowledge necessary to excel in the field of Linux administration and DevOps practices.

1.3 Industrial Training Objectives

1. To develop industry-specific skills and competencies relevant to your chosen profession.

2. To receive mentorship and guidance from experienced professionals to learn new technical skills.

3. To build and expand your professional network by interacting with industry experts and colleagues.

4. To gain hands-on experience in a professional work environment related to your field of study.

5. To develop time management skills by balancing multiple tasks and meeting deadlines.

1.4 Project Assignment

During the internship period, the company assigns specific tasks or projects to the intern, tailored to provide practical exposure to industry-relevant technologies. These projects are carefully chosen to align with the intern's academic background and career aspirations, ensuring a meaningful and enriching experience. Interns may work on a variety of projects, ranging from software development and data analysis to marketing research and product design. Each project is designed to challenge the intern and push them to apply their theoretical knowledge in a practical setting. The intern is expected to learn the prerequisites of the

technology used for the project, with comprehensive guidance and mentorship provided by experienced professionals. This mentorship includes regular check-ins, detailed feedback, and opportunities for interns to ask questions and discuss their progress.

The primary objective of the project is to address a specific problem through information gathering, analysis, and solution implementation. The project is thoroughly evaluated at various stages to ensure it aligns with both the intern's learning goals and the company's objectives. Feedback is given continuously throughout the internship, helping interns refine their work, learn from their mistakes, and improve their skills in real-time. This hands-on experience allows interns to apply their academic knowledge, develop essential skills, and tackle real-world challenges. By collaborating with industry specialists, interns gain invaluable professional experience and a deep understanding of their field.

Chapter 2

Company Background & Structure

2.1 Background

Prodevance Technologies is founded in 2003, Prodevans is a company that excels in providing a wide range of cloud services for both public and private cloud environments. They offer comprehensive support across different stages of operations, known as D0, D1, and D2 ops. The company has partnerships with various Original Equipment Manufacturers (OEMs), ensuring that we can offer top-notch services regardless of the technology preferences of their clients. With deep expertise in VMware, OpenStack, and Nutanix, we are capable of assisting with any cloud technology. Additionally, they have successfully delivered solutions that involve different orchestration and management planes, catering to various computing, storage, and networking technologies.

Organizations are increasingly turning to cloud technologies to save costs and increase their return on investment. This often involves updating old applications and using containerization. However, many companies struggle with a lack of skills and the rapidly changing nature of tools like Kubernetes and Docker. Prodevans steps in with its extensive knowledge and experience in Open Source technologies to guide these organizations through the process. They help them adopt containers successfully and become self-sufficient in using these

advanced technologies.

Prodevans provides extensive 360-degree monitoring solutions for both applications and infrastructure, ensuring they perform reliably and efficiently. As partners with ELK (Elasticsearch, Logstash, Kibana), They offer powerful log management and analytics capabilities, allowing us to gain valuable insights into system behavior. Additionally, They are proficient in using the native monitoring tools of major public cloud providers like AWS CloudWatch and Azure Monitor Sentinel. Their expertise also extends to other OEM tools such as MicroFocus SIEM, ManageEngine, Dynatrace, Splunk, and DataDog, ensuring comprehensive monitoring coverage.

Prodevans has developed an in-house Identity and Access Management solution called ZTrust. ZTrust provides a simple, secure, and reliable way to offer a single sign-on experience for your customers. This means customers can move smoothly through transactions with your organization without needing to log in to other applications. ZTrust not only enhances the user experience but also gives your IT team peace of mind by ensuring secure and efficient access management.

2.2 Vision

A One-Stop Solution for Hassle free identity and access management.Revitalize your Business Embrace the future.Reimagine your business in cloud.

2.3 Mission

To serve the public interest as well as the needs of our members and clients by promoting the security of life and property and preserving the natural environment.

2.4 Values

- **Safety**

  What we do matters to the lives of people and the quality of the environment. We are vigilant in our goals to improve safety practices and minimize risk exposure and downtime.

- **People**

  We have a globally diverse and engaged workforce that is trained to the highest level. The various skills, perspectives and experiences of the prodevance employees is what makes them our best asset.

- **Integrity**

  In everything we do, we are honest, ethical and trustworthy. Clients depend on us as an impartial, objective resource.

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  In everything we do, we are honest, ethical and trustworthy. Clients depend on us as an impartial, objective resource.

- **Reliability**

  You can count on us. We're easy to reach and quick to respond. We deliver practical, tailored solutions that exceed expectations.

- **Innovation**

  Solving problems is good. Anticipating problems is better. We do both through continuous research and development focused on staying ahead of the curve.

- **Teamwork**

  The best safety solutions are achieved together. We work closely with our stakeholders as a dependable, flexible and efficient partner. We are dedicated to sharing our experience and contributing to the education of future industry leaders.

- **Quality**

  Expect the best. When we set out to solve a problem, we do it right. We are thorough and relentless in the pursuit of safety.

2.5 Goals

Prodevans is an ISO QMS (9001) | ISMS (27001) | ITSM (20000) | CMMI Level 3 Accredited Certified Company, a leading technology solution provider specialising in end-to-end DevOps offerings that streamline and automate IT delivery. We specialize in the entire spectrum of Cloud Solutions from IaaS, PaaS to SaaS. We strive to offer solutions that are time-driven & efficient with a stringent focus on ROI. Prodevans helps you deliver great customer experience by deploying the right Cloud-based tools and resources.

2.6 Industry Expertise and Solutions

- PDCloudEX SDN
- ZTrust SSO
- DataScale Pro
- LivestreamIQ
- Red Hat Training

With nearly two decades of experience, Prodevans has established itself as a trusted technology partner for organizations across diverse industries. The company's deep industry expertise, coupled with its commitment to innovation, enables it to deliver tailored solutions that address the unique challenges faced by businesses in sectors such as finance, healthcare, retail, manufacturing, and more. Prodevans' team of seasoned professionals possesses a comprehensive understanding of industry-specific regulations, compliance requirements, and best practices, ensuring that the solutions they provide are not only cutting-edge but also compliant and secure. Whether it's modernizing legacy systems, implementing cloud-native architectures, or leveraging emerging technologies like AI and blockchain, Prodevans' solutions are designed to drive operational efficiency, enhance customer experiences, and unlock new revenue streams.

Figure 2.1: **Prodevance Technologies Logo**

Figure 2.2: **Redhat Academy**

Chapter 3

Weekly Jobs Summary

Table 3.1: Weekly Job summary

Week No.	**From Date**	**To Date**	**Task Completed**
1	08/01/2024	12/01/2024	I successfully enrolled in the Red Hat Academy portal and created my Red Hat Network (RHN) ID,I participated in a demonstration of the portal to understand its features and navigation. This week marked the beginning of my Red Hat Certified System Administrator (RHCSA) training, where I was introduced to the Linux kernel and its fundamental role in operating systems. Additionally, I studied various Linux distributions, exploring their unique characteristics and applications, which provided a comprehensive foundation for my future learning in Linux administration.

2	15/01/2024	19/01/2024	Basic Linux commands and shell operations. Utilization of Bash shortcuts.Linux's file organization and operations such as creating, copying, moving, and removing files and directories, Creation of hard and symbolic links.
3	22/01/2024	26/01/2024	Learned to use local Linux system manual pages. Input/Output redirection and use of pipes. Create and edit text files from the command line with the vim editor. Setting shell variables to run commands and edited Bash scripts to set shell and environment variables.
4	29/01/2024	02/02/2024	Use superuser access via sudo, managed user accounts, set password policies. Proficient in interpreting and manipulating file permissions, ensuring optimal access control and ownership management.
5	05/02/2024	09/02/2024	Managed running programs, used Bash job control, and communicated with processes. Defined daemon processes, stopped user sessions, and determined resource-intensive processes. Controlled system daemons and network services with systemctl, ensuring efficient resource utilization.

6	12/02/2024	16/02/2024	Utilization of SSH, key-based authentication.Use of OpenSSH. troubleshooting with syslog files and system journal entries. Time synchronization with NTP.
7	19/02/2024	23/02/2024	Explored network addressing and routing fundamentals, managed network configuration with nmcli, nmtui. Configured server hostname and name resolution, archived and transferred files securely with tar and SSH, and synchronized files with remote servers efficiently.
8	26/02/2024	01/03/2024	Managed software packages with dnf and RPM, and enabled/disabled repositories. Accessed file systems, searched for files with find and locate commands. Explored Red Hat Customer Portal.
9	04/03/2024	08/03/2024	Enhanced command-line efficiency with Bash features, scripts, and Linux utilities. Implemented for loops, conditional structures, and regular expressions for text manipulation. Scheduled future commands with at and recurring tasks with crontab and systemd timers.

10	11/03/2024	15/03/2024	Optimized system performance with tuned daemon, prioritized processes with nice and renice commands. Managed SELinux for resource protection, changing modes, and setting policies. Configured SELinux policy rules with semanage and setsebool commands, and troubleshooted with SELinux.
11	18/03/2024	22/03/2024	Created storage partitions, managed swap spaces, and implemented LVM storage. Explored storage components and mounted NFS exports, including automounting.
12	25/03/2024	29/03/2024	RHEL booting process, root password recovery, and manual file-system repairs. Managed network connections with firewalld, ensured correct SELinux types for network ports. Explored container concepts, management tools, persistent storage, and container as systemd services.
13	01/04/2024	05/04/2024	Introduction of Ansible.Its fundamental concepts revolve around using playbooks to define automation tasks, leveraging modules to execute specific operations, and managing hosts through inventory files.Installing ansible on control node.Ansible Concepts and Architecture.Managing Software and Subscriptions

14	08/04/2024	12/04/2024	Created an inventory of managed hosts, a simple Ansible Playbook, and run the playbook to automate tasks on those hosts.Building an Ansible Inventory.Managing Ansible Configuration Files.Managing Variables, Managing Secrets,Managing Facts.
15	15/04/2024	19/04/2024	Managing task control, handlers, and task errors in Ansible Playbooks Writing Loops and Conditional Tasks Implementing Handlers Handling Task Failure Including and Importing Files Selecting Hosts with Host Patterns.Automating Linux Administration Tasks, Managing Software and Subscriptions.
16	22/04/2024	26/04/2024	Implemented Ansible Roles and Ansible Content Collections to develop playbooks more quickly and to reuse Ansible code. Describing Role Structure,Creating Roles, Deploying Roles from External Content Sources, Getting Roles and Modules from Content Collections, Reusing Content with System Roles,Troubleshooting Ansible Managed Hosts.Managing Users and Authentication,Managing the Boot Process and Scheduled Processes.

17	29/04/2024	03/05/2024	Set us a DNS server on Linux involves various configuration steps and security considerations.Installed a DNS server software.Used BIND utility as DNS server software. Local repo setup by using apache server and that repo should be used by client.
18	06/05/2024	10/05/2024	All vendors data that we have received from our accountant team we have uploaded it maximo using load template functionality. In asset module written acript for increase and decrease the count of inventory after assigning and removing the custodian for particular asset.
19	13/05/2023	17/05/2024	Implemented High-Availability cluster on linux to insure that services remain available by minimizing downtime and eliminating single point of failure.Used Pacemaker as clustering solution and Defined cluster resources as virtual IPs.
20	20/05/2023	24/05/2024	Learned about virtualization and Operating system,kernels, OSI model,hypervisors. Type-1 and Type-2 hypervisors.Implemented Type-1 Hypervisor Kernal based virtual machine (KVM).On personal computer.

21	27/05/2023	31/05/2024	Learned networking and storage about KVM and associated vm's how network connectivity is done like NAT,Bond networking tools. Also learned how to assign storage to guest vm's.how to save state of vm by using snapshot. At last created script for Automated monitoring and maintenance of e-commerce website and also backup the criticle data here i used shell scripting skills and used cron job utility.

Chapter 4

Technical Content

During the period of the Internship, I I have learned two courses Red Hat Certified System Administator (RHCSA) and Red Hat Certified Engineer (RHCE) and performed the following tasks and activities and also learned various technologies like Linux , RHEL , Cloud Technology , Ansible , DevOps etc.

4.1 Business Overview of Prodevance Technologies

Prodevance Technologies collaborates with various organizations to offer specialized training programs. One of their key partnerships is with COSS India, through which they provide training for courses like Red Hat Certified System Administrator (RHCSA) and Red Hat Certified Engineer (RHCE).

RHCSA Training: In this course, participants learn essential Red Hat Linux commands, resource management, memory management, and efficient network handling.

RHCE Training: This course focuses on automating infrastructure using Ansible, which leverages Red Hat and Python for automation tasks.

Additionally, Prodevance Technologies offers practical experiences such as setting up DNS servers on Linux using VirtualBox and developing high availability clusters on Linux. These hands-on sessions ensure that participants not only understand theoretical concepts

but also gain practical skills.

4.1.1 *Setup in RHEL Industry*

During this period, I gained an understanding linux distributors and types of linux distributors. how prodevance is working working with red hat and coss india collbrately . The business operations of Prodevance Technologies, focusing on the setup red hat enterprise linux and devops culture. This included studying various use cases of linus and devops.

4.1.2 *Red Hat Certifications*

RHCSA Certification: In this course, participants learn essential Red Hat Linux commands, resource management, memory management, and efficient network handling.

RHCE Certification: This course focuses on automating infrastructure using Ansible, which leverages Red Hat and Python for automation tasks.

OpenShift Certification (DO280): Participants learn to deploy, manage, and scale applications using Red Hat OpenShift, which provides a platform for containerized applications. This course covers key concepts such as Kubernetes orchestration, container management, and DevOps practices.

4.1.3 *Understanding of Devops Lifecycle*

This program covers the entire DevOps lifecycle, including planning, coding, building, testing, releasing, deploying, operating, and monitoring. Participants learn to automate processes, manage code repositories, implement CI/CD pipelines, and use tools like Jenkins, Docker, and Kubernetes. Practical sessions ensure hands-on experience, enabling participants to efficiently manage and streamline the software development and deployment process.

Figure 4.1: Prodevance collabration with COSS India

4.2 Red Hat Certified System Administrator Training

In RHCSA certification training, I learned and implemented essential Linux system administration tasks, including system and network configuration, managing users and groups, controlling access to files, and using various command-line tools. I also covered system security, service management, and storage management.Along with all this topics containerization was last and important part of this certication. Tests were conducted to assess the understanding of these concepts.

4.2.1 *System and Network Configuration*

I learned how to install and configure Red Hat Enterprise Linux systems, including setting up network interfaces and configuring network services. This involved understanding and managing network configurations and ensuring system connectivity and stability.

4.2.2 *User and File Management*

I managed users and groups, including creating, modifying, and deleting user accounts. I also controlled file permissions and ownership to secure file access. This included using command-line tools to handle user management tasks efficiently and ensuring proper access control.

4.2.3 *Service and Security Management*

I worked on managing system services, including starting, stopping, and enabling services. I also learned about securing the system, implementing firewalls, and configuring SELinux policies. This involved ensuring the system's security by managing service availability and applying security best practices.

4.2.4 *Storage Management and System Monitoring*

I studied and implemented storage solutions, including creating and managing disk partitions, logical volumes, and file systems. I also learned about system monitoring tools to track system performance and troubleshoot issues. This included ensuring efficient storage utilization and maintaining system health through proactive monitoring and management.

4.2.5 *Containerization and Virtualization*

I learned the fundamentals of containerization, including how to deploy and manage containers using tools like Podman and Docker. This involved creating, running, and managing containers, as well as understanding container images and registries. Additionally, I explored basic virtualization concepts and how to manage virtual machines using KVM (Kernel-based Virtual Machine). This knowledge helped in efficiently deploying and managing isolated applications and services, ensuring optimal resource utilization and scalability.

4.3 Red Hat Certified Engineer Training

In RHCE certification training, I learned advanced Linux system administration tasks, including system automation, network services configuration, and security management. I also covered performance tuning and troubleshooting techniques. Tests were conducted to assess the understanding of these concepts.

4.3.1 *System Automation and Management*

I learned to automate system administration tasks using Ansible, including writing playbooks and managing inventories. This involved automating repetitive tasks, configuring systems, and deploying applications efficiently. The training emphasized the importance of automation in achieving consistent and scalable system configurations.

4.3.2 *Network Services and Security*

I configured and managed various network services, such as HTTP, DNS, FTP, and SMTP. This included setting up and securing these services, ensuring they operate correctly, and managing access controls. I also implemented advanced security measures, including firewalls, SELinux policies, and secure shell (SSH) configurations, to protect network services from unauthorized access and vulnerabilities.

4.3.3 *Performance Tuning and Troubleshooting*

I focused on optimizing system performance by tuning kernel parameters, managing resource allocation, and using performance monitoring tools. This involved identifying performance bottlenecks, applying tuning techniques, and ensuring efficient system operation. Additionally, I developed skills in troubleshooting complex system issues, using diagnostic tools, and implementing solutions to maintain system stability and performance.

4.4 Virtualisation

Virtualization is the process of creating virtual versions of computing resources, such as operating systems, storage devices, and networking components. It involves the use of hypervisors, which can be classified as Type 1 (bare-metal) or Type 2 (hosted). Type 1 hypervisors, like VMware ESXi and Microsoft Hyper-V, run directly on the hardware, while Type 2 hypervisors, like Oracle VirtualBox and KVM (Kernel-based Virtual Machine), run

on top of a host operating system. Hardware virtualization technologies, like Intel VT-x and AMD-V, enable efficient virtualization by providing hardware-level support for running virtual machines.

4.4.1 *KVM Storage Virtualisation*

KVM offers flexibility in storage virtualization by supporting various storage backends, including local disks, network-attached storage (NAS), and storage area networks (SANs). Local disks can be used as storage for VMs, either as entire disks or as disk partitions. NAS and SAN storage can be integrated with KVM through standard network file systems like NFS or storage protocols like iSCSI. KVM supports advanced storage features such as thin provisioning, snapshots, and cloning to optimize storage utilization. Storage pools can be created from different storage backends, allowing for scalability and flexibility in storage management. KVM also supports various disk image formats, including qcow2 (QEMU Copy On Write 2), raw, and VMDKs, enabling compatibility with different virtualization platforms. Additionally, KVM supports live migration of VMs between hosts, allowing for seamless workload mobility without downtime.

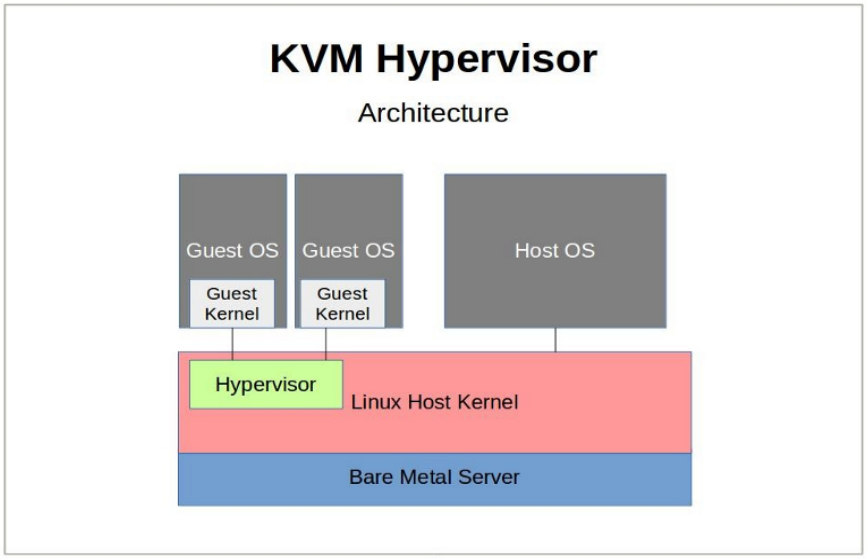

Figure 4.2: KVM Hypervisor

4.4.2 *KVM Network Virtualisation*

KVM supports various networking modes to cater to different virtualization requirements. The user-mode networking uses SLIRP to provide network access to virtual machines (VMs), while the bridged mode allows VMs to connect directly to the physical network interface, appearing as separate machines on the network. The routed mode leverages network address translation (NAT) to share the host's IP address with the VMs, enabling external network access. Additionally, the isolated mode creates a completely separate virtual network for the VMs, without external network access. KVM also supports advanced networking features like VLANs, Open vSwitch, and SR-IOV (Single Root I/O Virtualization) for improved network performance and isolation.

4.5 Tasks Implemented During Internship

I had the opportunity to work on a variety of technical tasks that enhanced my skills in system administration, networking, and virtualization. These tasks involved configuring and managing servers, automating system operations, and setting up high-availability solutions. Each task provided hands-on experience with different tools and technologies, contributing to my understanding of practical applications in a professional environment. Below are the detailed descriptions of the key tasks I implemented:

4.5.1 *Shell Scripting Basics*

I wrote scripts to automate repetitive tasks such as backups, user management, and system monitoring. These scripts utilized basic shell commands and control structures, including loops and conditionals, to improve efficiency and reduce human error.

4.5.2 *HA Cluster Implementation*

I configured multiple Linux nodes to function as a single high-availability (HA) cluster. This setup included implementing failover mechanisms to automatically transfer workloads to a backup node in case of failure, ensuring minimal downtime and enhanced service reliability.

4.5.3 *DNS Server Setup*

I installed and configured DNS server software (e.g., BIND). This task involved creating and managing DNS zone files for forward and reverse lookups, securing the DNS server against common vulnerabilities, and performing regular updates to maintain security and functionality.

4.5.4 *Local Repository Setup Using Apache*

I installed and configured the Apache web server to host a local repository. This included synchronizing the local repository with an official package source and configuring client systems to use the local repository for software installation and updates, ensuring a controlled and reliable package management process.

4.5.5 *Client System Configuration*

I updated client system repositories to point to the local Apache-hosted repository. I tested package installations and updates from the local repository, monitored repository usage, and managed updates to ensure package availability and integrity, providing client systems with access to the latest secure software packages.

Chapter 5

Findings and Suggestions

5.1 Opportunity to Learn New Things

Through the Internship, one can learn many more new technologies, frameworks, automation tools, etc. I have learned the following mentioned technologies and concepts during my internship period:

1. Red Hat Enterprise Linux
2. RHCSA
3. Cotainerization
4. RHCE
5. Ansible Automation Tool
6. Devops

5.2 Learning from Experience

- **Gateway to the corporate world**

  Take your internship as the opportunity to test out the skills you developed in college or previous work and see how they work in the real world. By applying your skills at your internship, you'll get an idea of your biggest strengths and areas of improvement before going to the corporate world.

- **Professional Connections**

  Internships are an excellent opportunity to build professional connections. Unlike networking events, the people you connect with during an internship spend time with you in a professional setting and become familiar with your work.

- **Soft Skills**

  Whether it's how to write a concise email, answer a telephone, or shake a hand there is a professional way to do everything. Working in an office environment, you'll have the chance to observe how others operate and take on those attributes that you feel work best, whether it's communication, behaviour, or office etiquette.

- **Insight into Your Interests**

  When you're finishing college, you're not expected to know exactly what you want to do with your career. But if you use the Internship wisely, you can figure out if an occupation is right for you. You can think of Internships as career experiments.

5.3 Benefits

1. This internship provides us an opportunity to gain practical, hands-on experience in a professional work environment.

2. It helps us to enhance our skill set and acquire new skills that are relevant to our chosen industry.

3. An internship enables us to expand our professional network by interacting with professionals in respective fields.

4. Internships provide an opportunity for individuals to test their career interests and goals.

5.4 Advice

1. **Practice Consistently:** Consistency is key when learning programming. Set aside dedicated time each day to practice coding, even if it's just for 30 minutes. Regular practice reinforces your understanding and hones your problem-solving skills. Use coding challenges and exercises from websites like LeetCode, HackerRank, or Codecademy to stay engaged and motivated.

2. **Gain Hands-On Experience:** Theory alone is not sufficient; hands-on experience is crucial. Follow along with tutorials and actively build your own projects. Start with small projects and gradually tackle more complex ones. This practical experience will help you understand how to apply theoretical concepts in real-world scenarios and develop your coding proficiency.

3. **Engage with the Community:** Join coding communities and forums to connect with other learners and experienced programmers. Websites like Stack Overflow, Reddit, GitHub, and various Discord servers have active communities where you can ask questions, seek advice, and learn from others experiences. Participating in hackathons and

coding competitions can also provide valuable learning experiences and networking opportunities.

4. **Be Patient and Persistent:** Learning programming takes time and patience. Don't get discouraged if you encounter difficulties or face roadblocks. Persevere through challenges and keep a growth mindset. Remember that programming is a skill that improves with practice and experience. Celebrate small victories along the way to stay motivated.

5. **Build a Portfolio:** As you gain proficiency in a programming language, start building a portfolio of projects to showcase your skills to potential employers or clients. Include a variety of projects that demonstrate your versatility and expertise. Your portfolio should highlight your practical experience and serve as tangible evidence of your capabilities. Use platforms like GitHub to host your projects and consider creating a personal website to present your portfolio professionally.

6. **Stay Updated and Keep Learning:** Technology and programming languages evolve rapidly. Stay updated with the latest trends, tools, and frameworks in the industry. Follow tech blogs, attend webinars, take online courses, and read relevant books to keep your knowledge current. Lifelong learning is essential to remain competitive and adaptable in the ever-changing field of programming.

7. **Seek Feedback and Iterate:** Actively seek feedback on your code and projects from peers, mentors, or online communities. Constructive criticism will help you identify areas for improvement and refine your skills. Continuously iterate on your work, applying feedback to make your code more efficient, readable, and robust.

5.5 Suggestion to Department/College

1. Focus on core Computer Engineering concepts like Python, Database, Operating System, networking,Cloud Computing.

2. Organize monthly seminars, webinars on recent technologies such as DevOps, Cloud Computing, Serverless applications, IoT, Block chaining, etc.

3. Arrange weekly coding sessions and contests that will improve the skills of the students.

Chapter 6

Conclusion

In conclusion, my internship at Prodevance Technologies Private Limited, Pune, has been an invaluable and transformative experience. Over the past 21 weeks, I embarked on an intensive learning journey, significantly enhancing my technical skills and practical knowledge in Linux administration and related technologies. Initially, I laid the groundwork by enrolling in the Red Hat Academy and acquiring a Red Hat Network ID. I delved into the fundamentals of Linux, learning basic commands, file operations, and shell scripting. This foundational knowledge was crucial as I progressed to more complex tasks, such as managing user accounts, file permissions, and system processes. Midway through the internship, my focus shifted to network configuration and security. I mastered tools like SSH for secure communications, configured network services, and managed software packages. Additionally, I explored advanced topics like SELinux policies and performance optimization techniques, which were essential for maintaining secure and efficient systems.

In the latter part of the internship, I gained hands-on experience with storage management, containerization, and virtualization. I implemented LVM storage, managed NFS exports, and explored container technologies. I also learned about Ansible for automation, creating playbooks to streamline administrative tasks. Towards the end, I focused on high-availability clustering using Pacemaker and implemented KVM-based virtualization. My final projects included setting up a DNS server and developing scripts for system monitoring

and maintenance. Overall, this internship provided me with comprehensive, practical experience in Linux system administration, preparing me for advanced roles in IT infrastructure management.

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