INTERNSHIP REPORT ON

DevOPS Engineering

Submitted to

Madhav Institute of Technology & Science, Gwalior

Towards the Partial Fulfillment for the Award of the degree of

Bachelor of Technology

In

ELECTRONICS & TELECOMMUNICATION ENGINEERING

2023

Company Name: Health Catalyst, Hyderabad

Company Mentor: Mr. Sunil Kandukuri

Duration: 01-01-2023 to 30-06-2023

SUBMITTED BY

HARSHDEEP SINGH TOMAR

(0901ET191028)

GUIDED BY

Dr. Hemant Choubey

ASST. PROFESSOR,

DEPARTMENT OF ELECTRONICS ENGINEERING

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE, GWALIOR,

(474005)

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal, M.P.)

2023

CERTIFICATE OF APPROVAL

This is to certify that the Internship is carried out in **Health Catalyst, Hyderabad** which is submitted by **Harshdeep Singh Tomar (0901ET191028)** student of **B.Tech. IV-Year (VIII Semester)** in partial fulfillment for the award of the degree of **Bachelor of Technology in Electronics & Telecommunication Engineering** under R.G.P.V, Bhopal. It is a record of their own work carried by them during internship.

Supervised/Verified by

Dr. Hemant Choubey
Assistant Professor

Approved by

26/5/23

Dr. Vandana Vikas Thakare
H.O.D

MADHAV INSTITUTE OF TECHNOLOGY & SCIENCE GWALIOR

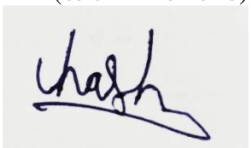
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV, Bhopal, M.P.)

2019-2023

CANDIDATE DECLARATION

I hereby declare that the work which has been carried out during the Internship in the company **Health Catalyst, Hyderabad** in partial fulfillment for the award of the degree of **Bachelor of Technology** in **Electronics & Telecommunication Engineering** from Madhav Institute of Technology & Science, Gwalior is an authenticated record of our work carried under the supervision /mentorship of **Mr. Sunil Kandukuri (Industry Mentor) & Dr. Hemant Choubey** (Assistant Professor, MITS Gwalior). The matter embodied in this internship report has not been submitted for the award of any degree or diploma anywhere else.

Name & Signature of Student
Harshdeep Singh Tomar
(0901ET191028)



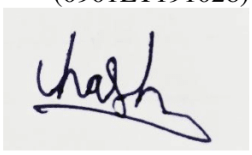
ACKNOWLEDGMENT

I express my sincere gratitude and earnest indebtedness to Madhav Institute of Technology & Science, Gwalior (M.P) for providing me the golden opportunity to complete my internship. I acknowledge with great pleasure and grateful indebtedness towards my internship mentor Mr. Sunil Kandukuri & Dr. Hemant Choubey (Assistant Professor, MITS-Gwalior) for providing me with very useful and beneficial guidance throughout the Internship.

I also express my heartfelt gratitude to Dr. Vandana Vikas Thakare, Head of the Electronics Engineering Department for her profound guidance throughout the Internship.

I would also like to acknowledge our Director Dr. R. K. Pandit for helping me with the resources needed to accomplish this task. The environment at M.I.T.S. has been a valuable experience for us. With many difficulties, this Internship has blessed us with great knowledge in our field of interest. I would also like to thank all those who have helped me in every small step during this Internship and made this Internship a success.

Name & Signature of Student
Harshdeep Singh Tomar
(0901ET191028)



To,

HR Manager

Health Catalyst, Hyderabad

Dear Sir/Ma'am,

We are grateful to the co-operation in imparting Industrial Training/Internship/Vocational Training to the Students of our Institute. Industrial training/Internship is a part of Academic Curriculum in Pre-Final and Final year of B.Tech./MCA/MBA students and the progress of the same will be counted in their overall results and also gives them exposure & improves their skills and personality.

We will be highly obliged, if the following student is/are permitted to undergo Training / Internship at your esteemed Organization for a period of 01/07/2022 to 30/06/2023.

S.No.	Name of the Student	Enrollment No.	Course - Branch
1.	Harshdeep Singh Tomar	0901ET191028	B.Tech - Electronics & Telecommunication Engineering

Hoping for your kind cooperation.

Best Regards!

Mr. Vikram Singh Rajput)
Training & Placement Officer

Kindly feel free to contact us for any further information.

Important Declaration: *This is a system generated letter with reference no. after the approval from the authority. There is no need for a signature and seal on hard copy.*

Internship/Project Expected Outcomes

Session: Jan–June 2023

Student Name: Harshdeep Singh Tomar

Enrollment No.: 0901ET191028

Internship/Project Title: DevOPS Internship

Objective of Internship/Project: The objective of this DevOps internship is to get the opportunity to learn about DevOps principles and apply those practices in a real-world setting. DevOps are practices that combines software development and IT operations to shorten the time and effort required to build test as well as deploy and provide continuous delivery with very high software quality.

Brief details of Internship: Brief details of Internship:

Company Name: Health Catalyst, it is a Healthcare data analytics and solutions company. It collaborates with healthcare organizations across the globe to provide them with data solutions.

Type of work: It is a 6-month internship where I worked as a DevOPS intern to create and manage different types of cloud infrastructure.

Expected/Achieved Outcomes of Internship/Project: Expected/Achieved Outcomes of Internship/Project:

Expected Outcomes:

- Gaining knowledge of DevOps principles and practices and technologies.
- Developing skills in areas such as automation, monitoring, and troubleshooting.
- Learning to automate the build and deployment process.
- Networking with other professionals in the field an gaining more knowledge.

Achieved outcomes:

- Gained more knowledge about AWS and the services it offers.
- Learnt about DevOPS principles and implemented them on real world projects.
- Learnt to use tools such Apache Kafka, Jenkins etc.
- Created Real time data pipelines.
    - Automated Creation of these pipelines using infrastructure as code.

Social relevance/Impact of your Internship/Project: Build real world data pipelines that carry Realtime medical data serving 1000s of patients. Used various monitoring tools like Grafana and CloudWatch to make sure they perform optimally.

Name and Signature of Students

Harshdeep Singh Tomar

Name & Signature of Institute Mentor

Dr. Hemant Choubey

Table of Content:

About The Company

Health Catalyst is a prominent company that specializes in data and analytics technology, as well as data services specifically tailored for healthcare organizations worldwide. Our primary objective is to act as a catalyst for substantial and quantifiable advancements in healthcare, driven by data insights.

With our headquarters based in Salt Lake City, Utah, we have established a strong reputation as a trusted partner for healthcare organizations, offering robust data, analytics, and expertise to enhance performance and the quality of care provided.

Our comprehensive range of software solutions includes over 100 analytics applications, catering to diverse needs such as accountable care, financial benchmarking, comparative analytics, care management, patient relationships, clinical analytics, patient safety, operations, and performance management.

At Health Catalyst, we are deeply committed to empowering healthcare organizations to fulfill their missions effectively. As a result of our efforts, we have facilitated validated measurable improvements amounting to $1.6 billion in the healthcare industry. These improvements have positively impacted the lives of more than 5.6 million individuals.

Our dedication to excellence has been acknowledged through consistent recognition as one of Glassdoor's 100 Best Places to Work, an honor we have received for eight consecutive years.

In conclusion, Health Catalyst stands as a trustworthy partner, leveraging the power of data and analytics to drive transformative change in the healthcare sector. We remain steadfast in our commitment to providing innovative solutions that lead to significant improvements in healthcare delivery and outcomes.

Introduction

Introduction to DevOps

DevOps refers to a collection of practices that integrate software development and IT operations, aiming to streamline the system development lifecycle and ensure continuous delivery of data or content while maintaining high software quality. Although relatively new, DevOps has gained significant traction due to its ability to enhance software development and operational processes within organizations. Implementing DevOps methodologies can result in improved efficiency, effectiveness, and profitability for businesses.

It has the following core principles:

- **Automation**: DevOps relies heavily on automation to streamline and speed up the software development and operations processes.
- **Continuous integration and continuous delivery (CI/CD)**: This is a practice where code is automatically built and deployed to the production environment. This helps to ensure that code is always up-to-date and that any changes are quickly and easily deployed.

- **Infrastructure as code:** is a methodology that involves defining infrastructure through code rather than manually configuring it. This approach enables the automation of infrastructure deployment and management processes. By treating infrastructure as code, organizations can achieve greater efficiency and consistency in their operations, as well as easily replicate and scale their infrastructure setups.
- **Culture:** DevOps is also about culture. It is about creating a culture of collaboration and communication between developers and operations engineers.

About The Internship:

The duration of this internship is 1 year from Jul-2022 to Jul-2023 but this report covers the activities I did during the second phase of my internship which is from 01/01/2023 to 30/06/2023.

Chapter 2 - Tech Stack Used

1. Git:

Git is a distributed version control system that helps teams collaborate on code. It is a powerful tool that can be used to track changes to code, manage multiple versions of code, and collaborate with other developers. Git is a critical tool for DevOps teams, as it can help to improve the efficiency and effectiveness of the software development process.

Git is a distributed version control system that helps teams collaborate on code. It is a powerful tool that can be used to track changes to code, manage multiple versions of code, and collaborate with other developers. Git is a critical tool for DevOps teams, as it can help to improve the efficiency and effectiveness of the software development process.

Git can be used in DevOps in a number of ways. For example, Git can be used to:

- Track changes to code: Git can be used to track changes to code, which can help to identify and fix bugs early in the development process.
- Manage multiple versions of code: Git can be used to manage multiple versions of code, which can help to ensure that the right code is deployed to production.
- Collaborate with other developers: Git can be used to collaborate with other developers, which can help to improve the quality of code.
- Git is a powerful tool that can be used to improve the efficiency and effectiveness of the software development process. It is a critical tool for DevOps teams, and it can be used in a number of ways to improve the development process.

The git hosting tool that we use at our organization is called Bitbucket. And we use it for all our version control services.

Bitbucket is a code hosting service built on the Git version control system and is owned by Atlassian. It provides a range of options, including commercial plans and free accounts that allow for an unlimited number of private repositories. Bitbucket has gained significant popularity among teams of various sizes and is particularly favored by DevOps teams due to its robust feature set. It offers a variety of functionalities that cater to the needs of DevOps teams, making it a preferred choice in the industry.

2. AWS:

AWS is the cloud hosting provider we use at our organization and it is one of the services I used the most during my internship.

Amazon Web Services (AWS) is a comprehensive collection of cloud computing services that utilize the same underlying infrastructure employed by Amazon.com for its online retail operations. With AWS, organizations can access a wide range of global resources for computing power, storage, databases, analytics, application development, and deployment. These services are designed to facilitate quicker operations, reduce IT expenses, and enable the scalable growth of applications. In essence, AWS empowers businesses by providing a robust and flexible platform to leverage the benefits of cloud computing.

Some of the benefits of using AWS include:

- Scalability: AWS can be scaled up or down as needed, which can help you save money on IT costs.
- Reliability: AWS is highly reliable, with a 99.9% uptime guarantee.
- Security: AWS is one of the most secure cloud computing platforms available.

AWS also offers many managed services which you can utilize without configuring them yourself.

AWS is necessary for DevOps because it provides a number of services that can help teams to automate the software development and operations processes. These services include:

- **Amazon EKS**: it is a service that can automate the deployment and management of Kubernetes clusters. This can help to improve the efficiency and scalability of applications. We use it to deploy and manage Kubernetes clusters.
- **Amazon CloudWatch**: Amazon CloudWatch is a service that can collect and monitor metrics and logs from AWS services. Again we use this tool for monitoring our infrastructure.
- **AWS VPC:** An AWS VPC, which stands for Virtual Private Cloud, is a logical partition

within the AWS cloud environment. It allows you to launch and manage AWS resources within a virtual network that you define. This virtual network closely resembles a traditional on-premises network found in your own data center, but with the added advantages of AWS's scalable infrastructure.

By utilizing a VPC, you can enhance the security of your AWS resources. By isolating your resources within a VPC, you gain control over who has access to them and what actions they can perform. Additionally, a VPC enables you to create separate networks for different types of resources, such as development, staging, and production environments.

In essence, an AWS VPC offers a flexible and secure way to organize and manage your AWS resources within a virtual network environment, leveraging the scalability and robustness of the AWS infrastructure.

- To create a VPC, you need the following:

    1. Subnets: Subnets are smaller sub-networks within your VPC. You can create multiple subnets to group your resources together.
    2. Internet gateway: An internet gateway allows communication between your VPC and the internet.
    3. Virtual private gateway: A virtual private gateway allows communication between your VPC and a remote network, such as your on-premises network.
    4. Overall, a VPC is a powerful tool that can be used to improve the security, performance, and scalability of your AWS resources. If you are using AWS, I highly recommend creating a VPC.

Overall, it can be said that AWS is the main and the most important component of the tech stack that I used during my internship. And there are many other AWS services that I used but it will not be in the scope of this internship report so I’m not going to include them.

3. Terraform:

Terraform is an open-source software tool that falls under the category of infrastructure as code. Its purpose is to facilitate the creation, modification, and enhancement of infrastructure in a reliable and predictable manner. It achieves this by allowing users to define their cloud and on-premises resources using easy-to-understand configuration files, which can be versioned, reused, and shared. By following a consistent workflow, Terraform enables the provisioning and management of infrastructure throughout its lifecycle. It is capable of handling various components, ranging from fundamental elements like computing power, storage, and networking resources, to higher-level entities such as DNS entries and features provided by software-as-a-service (SaaS) platforms. In summary, Terraform empowers users to efficiently manage their infrastructure by abstracting complex operations into configurable and reusable code.

Terraform is important in DevOps because it can help to automate the infrastructure management process. This can help to improve the efficiency and effectiveness of the DevOps team, and it can also help to reduce the risk of errors and outages.

- Improved collaboration: Terraform can help to improve collaboration between developers and operations engineers. This is because terraform provides a central repository for infrastructure code, which makes it easy for everyone to see the latest changes. I can also be combined with version control systems to make changes to the code/infrastructure easier to manage and collaborate on.
- Increased visibility: Terraform can help to increase visibility into the infrastructure management process. This is because terraform provides a history of all changes to infrastructure, which can help to identify and fix problems early in the process.
- Improved quality: Terraform can help to improve the quality of infrastructure. This is because terraform provides a way to test infrastructure changes before they are deployed.
- Reduced risk: Terraform can help to reduce the risk of errors and outages. This is because terraform provides a way to roll back changes if they cause problems.
- With this you can also use a pipeline to automatically apply terraform changes to the production infrastructure once the changes are applied.
- It can also be used as a template to automatically allocate resources to developers when they need it and then destroy them.

Overall, terraform is a powerful tool that can be used to improve the efficiency, effectiveness, and security of the DevOps process. If you are looking for a way to improve your DevOps team, I highly recommend using Terraform.

4. Kubernetes:

Kubernetes is an open-source container orchestration system it is a tool that helps to automate the deployment, scaling, and management of containers and containerized applications. It is one of the most important tools for DevOps teams, as it can help to improve the efficiency and effectiveness of the software development and operations processes.

Here is why Kubernetes necessary in DevOps:

- Improved collaboration: Kubernetes can help to improve collaboration between developers and operations engineers. This is because Kubernetes provides a central repository for containerized applications, which makes it easy for everyone to see the latest changes.
- Increased visibility: Kubernetes can help to increase visibility into the software development and operations processes. This is because Kubernetes provides a history of all changes to containerized applications, which can help to identify and fix problems early in the process.
- Improved quality: Kubernetes can help to improve the quality of containerized applications. This is because Kubernetes provides a way to test containerized applications before they are deployed.
- Reduced risk: Kubernetes can help to reduce the risk of errors and outages. This is because Kubernetes provides a way to roll back changes if they cause problems.
- Automated deployment: Kubernetes can automate the deployment of containerized applications. This can help to improve the efficiency of the software development process and reduce the risk of errors.
- Automated scaling: Kubernetes can automatically scale containerized applications up or down based on demand. This can help to improve the performance and cost-effectiveness of containerized applications.
- Fault tolerance: Kubernetes can help to ensure that containerized applications are fault-tolerant. This is because Kubernetes can automatically restart containers that fail.

Overall, Kubernetes is a powerful tool that can be used to improve the efficiency, effectiveness, and security of the DevOps process. If you are looking for a way to improve your DevOps team, I highly recommend using Kubernetes.

5. Jenkins:

Jenkins is a widely-used open-source tool that enables the automation of various software development tasks such as building, testing, and deploying applications. It plays a crucial role in implementing continuous integration and continuous delivery (CI/CD) systems. Jenkins operates as a server-based system, running within servlet containers like Apache Tomcat. One of its notable features is its compatibility with a wide range of version control tools, including AccuRev, CVS, Subversion, Git, Mercurial, Perforce, ClearCase, and RTC. Additionally, Jenkins can execute projects based on Apache Ant, Apache Maven, and sbt, and it can also run custom shell scripts and Windows batch commands. Overall, Jenkins serves as a valuable tool for automating essential software development tasks, enhancing efficiency, and supporting CI/CD practices.

Aside from a Web-UI you can also use a scripting language called GROOVY which is a Java based language used for creating custom Jenkins script.

Jenkins is an important tool in DevOps because it helps to automate the software development process. This can help to improve the quality, reliability, and speed of software development. Jenkins can be used to automate a wide variety of tasks.

some of the specific benefits of using Jenkins in DevOps are:

- Increased visibility and transparency: Jenkins provides a central location for teams to view the status of their software development process. This can help to improve communication and collaboration between teams, and can also help to identify and resolve problems early on.
- Improved quality: Jenkins can help to improve the quality of software by automating the testing process. This can help to catch bugs early on, and can also help to ensure that software is always tested against the latest versions of its dependencies.
- Increased speed: Jenkins can help to increase the speed of software development by automating the build and deployment process. This can free up developers to focus on more creative and strategic tasks, and can also help to reduce the time it takes to get new features to market.

6. Apache Kafka:

Apache Kafka is a distributed, scalable, and durable messaging system that can be used to process and store large amounts of data in real time. It is a popular choice for a variety of use cases, including streaming analytics, data integration, and event streaming.

Kafka works by storing data in a distributed log. This log is made up of a series of records, each of which contains a key, value, and timestamp. Records are stored in a durable way so that they can be recovered in the event of a failure.

Apache Kafka is a necessary tool in DevOps because it can be used to:

- Stream data from a variety of sources: Kafka can be used to stream data from a variety of sources, such as social media, sensors, and applications. This data can then be used to build event-driven applications that react to events in real time.
- Process and store large amounts of data in real time: Kafka can be used to process and store large amounts of data in real time. This data can then be used for a variety of purposes, such as fraud detection, anomaly detection, and real-time dashboards.
- Integrate data from a variety of sources: Kafka can be used to integrate data from a variety of sources, such as social media, sensors, and applications. This data can then be used to create a unified view of data for analysis and reporting.

It helps DevOps teams Improve the efficiency of their software development process: By streaming data from a variety of sources and processing it in real time. And as a data company Apache Kafka is the heart of our infrastructure.

We use AWS MSK which is the Amazon’s version of Apache Kafka as it is much easier to run manage and deploy on AWS.

3. Projects I Worked On

1. HL7 Data Processing pipeline:

Introduction to HL7

HL7 stands for Health Level Seven. It is a non-profit organization that creates international standards for exchanging electronic health information. These standards are used by healthcare organizations all over the world to exchange patient data.

HL7 standards are divided into a number of different segments, each of which is designed to address a specific aspect of healthcare data exchange. For example, the HL7 v2 standard includes segments for patient demographics, medical history, and medication orders.

What does this pipeline do:

This pipeline creates the infrastructure required to store parse and share HL7 data to and from our clients. It contains an MSK instance at its heart. Which takes in raw data and passes it to our parsers and then securely store it in our RDS database for future use.

It enables healthcare organizations to communicate with each other and get the relevant data when required.

My Task:

My task was to understand the intricacies of the pipeline and then deploy it on our AWS Test environment and then deploy our parsers on it.

2. Terraform Script for the pipeline:

What does it do:

This script automated the deployment of this pipeline so that it can be easily and rapidly deployed whenever required.

It was created using terraform which is an infrastructure as code tool. My task was to understand the HL7-pipeline and then convert it to code using terraform language.

3. Jenkins Pipeline for Parser tools:

What does it do:

Takes code from our bitbucket repository test branch and then and builds parsers using the build tool called Maven then deploys it to the HL7 Pipeline.

What did I do:

Installed it and configured it on an EC2 instance to be able to pull build and deploy the the latest code on the data processing pipeline.

4. S3 Bucket Browser tool:

What does it do:

It is a simple tool which was used to provide access of our organizations S3 Buckets to our clients without actually granting them AWS access.

How does it work:

It uses AWS API to mount the S3 bucket to the EC2 instance the tool is hosted on then uses SFTP protocol to transfer files via a sleek Web-UI written VueJS.

What did I do:

Built designed and deployed the whole tool all by myself.

3. Other Things I did as the part of this internship

Other than the technical work, I was also given opportunity to Toastmasters club as a part of our training.
A Toastmasters club is a non-profit organization that provides a supportive environment for people to learn public speaking and leadership skills.
Toastmaster's clubs are made up of people from all walks of life, and they offer a variety of programs and activities to help members improve their communication skills.

It helped me a lot in improving my confidence and my communication skills.

4. Conclusion

In conclusion, my DevOps internship was a valuable experience that allowed me to learn about the different aspects of DevOps and how to apply them in a real-world setting. I gained hands-on experience with a variety of tools and technologies, and I had the opportunity to work with a team of experienced DevOps engineers. I learned a lot about the importance of collaboration, communication, and continuous improvement. I am confident that the skills and knowledge I gained during my internship will be valuable in my future career.

Here are some of the specific things I learned during my internship:

The importance of automation: Automation is essential for DevOps teams, as it can help to reduce the time and effort required to perform repetitive tasks. I learned how to automate a variety of tasks, such as deploying code, testing code, and monitoring systems.
The importance of communication: Communication is essential for DevOps teams, as they need to be able to communicate effectively with each other and with other teams in the organization. I learned how to communicate effectively with both technical and non-technical audiences.
The importance of continuous improvement: DevOps teams are constantly looking for ways to improve their processes and tools. I learned how to identify areas for improvement and how to implement changes that will make the team more efficient and effective.
I am grateful for the opportunity to have had a DevOps internship, and I am confident that the skills and knowledge I gained will be valuable in my future career.

Internship/Project Daily Diary

Session: Jan–June 2023

Name of Student: Harshdeep Singh Tomar

Enrollment Number: 0901ET191028

Branch and Year: Electronics And Telecommunications, Final Year (VIIIth Semester)

Internship/Project Title: DevOPS Internship

Company Name with Full Address: Health Catalyst 2nd Floor, Lorven Tiara Awfis Space Solutions, Survey No. 34 Kothaguda, Kondapur, Telangana 500084……

……

Stipend Detail: Yes, Stipend Amount: 25,000/-

Industrial Mentor Detail:

Name of Industry Mentor: Sunil Kandukuri ……

Email Address of Industry mentor: sunil.kandukuri@healthcatalyst.com.……..….

Students must mention the daily progress details with dates in the given format such as daily work done/ software learn/coding/testing/site or field visit/hardware implementation, etc.

Month	Date	Daily Progress Details
Jan. 2023	**01/01/2023 - 31/01/2023**	**Week-1** Introduction to the organization and the culture. Various orientation sessions. **Week-2** Overview and discussions of the current infrastructure. **Week-3** Intro to AWS and some basic AWS projects. **Week-4** Monthly recap of the whole month.
Feb. 2023	**01/02/2023 - 28/02/2023**	**Week-5** 1-1 Sessions on terraform and some basic terraform projects. **Week-6** Some advanced terraform concepts. And projects. **Week-7** More terraform projects.

		Week-8 Monthly Recap
March 2023	**01/03/2023 - 31/03/2023**	**Week-9** Introduction to Jira and workday **Week-10** First assigned Realtime project to convert a lot of existing infrastructure to terraform code. **Week-11** Continued project from last week (Completed). **Week-12** Monthly overview and doubt session along with toastmasters meetings.
April 2023		**Week-13** HL7 Introduction and KT sessions. **Week-14** KT sessions on the HL7 pipeline. **Week-15** Another project on Deploying HL7 Pipeline. **Week-14** Monthly overview.

May 2023		**Week-15** First client-side project: S3 Bucket tool. **Week-16** Continued project from last week. **Week-17** Continued project from last week. **Week-18** Current time: Continued project from last week.

Name and Signature of Student

Name & Signature of Institute Mentor

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MONTHLY PROGRESS REPORT (MPR) FROM INDUSTRY MENTOR

Name of student	Harshdeep Singh Tomar		**Department**	Electronics	
Industry/Organization	Health Catalyst		**Date/Duration**	01/01/2023 – 30/01/2023	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work				√	
Learning capacity/Knowledge up gradation					√
Performance/Quality of work					√
Behavior/Discipline/Teamwork					√
Sincerity/Hard work					√
Comment on nature of work done/Area/Topic	DevOps internship focusing on the following tools/areas: Git (Bitbucket) – source code management AWS – Cloud services Terraform – Infrastructure as a Code (IaaC) Kubernetes – Container Orchestration System Jenkins – CI/CD automation tool				
OVERALL GRADE	EXCELLENT				
Name of Industry Mentor	Sunil Kumar Kandukuri				
Signature of Industry Mentor	Sunil Kandukuri				

Receiving Date		**Name of Faculty Mentor**		**Sign**	

HealthCatalyst

MONTHLY PROGRESS REPORT (MPR) FROM INDUSTRY MENTOR

Name of student	Harshdeep Singh Tomar		Department	Electronics	
Industry/Organization	Health Catalyst		Date/Duration	01/02/2023 – 28/02/2023	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work				√	
Learning capacity/Knowledge up gradation					√
Performance/Quality of work					√
Behavior/Discipline/Teamwork					√
Sincerity/Hard work					√
Comment on nature of work done/Area/Topic	DevOps internship focusing on the following tools/areas: Git (Bitbucket) – source code management AWS – Cloud services Terraform – Infrastructure as a Code (IaaC) Kubernetes – Container Orchestration System Jenkins – CI/CD automation tool				
OVERALL GRADE	EXCELLENT				
Name of Industry Mentor	Sunil Kumar Kandukuri				
Signature of Industry Mentor	Sunil Kandukuri				

Receiving Date		Name of Faculty Mentor		Sign	

HealthCatalyst

MONTHLY PROGRESS REPORT (MPR) FROM INDUSTRY MENTOR

Name of student	Harshdeep Singh Tomar		Department	Electronics	
Industry/Organization	Health Catalyst		Date/Duration	01/03/2023 – 30/03/2023	
Criterion	Poor	Average	Good	Very Good	Excellent
Punctuality/Timely completion of assigned work					√
Learning capacity/Knowledge up gradation					√
Performance/Quality of work					√
Behavior/Discipline/Teamwork					√
Sincerity/Hard work					√
Comment on nature of work done/Area/Topic	DevOps internship focusing on the following tools/areas: Git (Bitbucket) – source code management AWS – Cloud services Terraform – Infrastructure as a Code (IaaC) Kubernetes – Container Orchestration System Jenkins – CI/CD automation tool				
OVERALL GRADE	EXCELLENT				
Name of Industry Mentor	Sunil Kumar Kandukuri				
Signature of Industry Mentor	Sunil Kandukuri				

Receiving Date		Name of Faculty Mentor		Sign	

HealthCatalyst

MONTHLY PROGRESS REPORT (MPR) FROM INDUSTRY MENTOR

Name of student	Harshdeep Singh Tomar		Department	Electronics	
Industry/Organization	Health Catalyst		Date/Duration	01/04/2022 – 30/04/2023	
Criterion	**Poor**	**Average**	**Good**	**Very Good**	**Excellent**
Punctuality/Timely completion of assigned work				✓	
Learning capacity/Knowledge up gradation					✓
Performance/Quality of work					✓
Behavior/Discipline/Teamwork					✓
Sincerity/Hard work					✓
Comment on nature of work done/Area/Topic	DevOps internship focusing on the following tools/areas: Git (Bitbucket) – source code management AWS – Cloud services Terraform – Infrastructure as a Code (IaaC) Kubernetes – Container Orchestration System Jenkins – CI/CD automation tool				
OVERALL GRADE	EXCELLENT				
Name of Industry Mentor	Sunil Kumar Kandukuri				
Signature of Industry Mentor	Sunil Kandukuri				

Receiving Date		Name of Faculty Mentor		Sign	