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**Department of  
Computer Science & Engineering**

**Federal Institute of Science And Technology (FISAT)®**

## DEPARTMENT VISION

To become a centre of excellence, moulding quality computer science professionals, catering to the ever-changing needs of the industry, society and promoting quality research.

## DEPARTMENT MISSION

Department of Computer Science and Engineering is committed to :

M1- (Teaching-Learning) : Inculcate a passion for academic excellence through innovative teaching and learning process.

M2- (Develop Entrepreneurial Skills)

: To create opportunities for students to pursue research and develop entrepreneurial skills.

M3- (Social Skills) : Nurture the students to be technically competent, morally upright and socially responsible computer science engineers to meet global challenges.

## PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

Graduates of Computer Science and Engineering will

PEO1 - (Successful Careers) : Achieve successful careers in the IT industry with their knowledge, interpersonal skills and adaptability to evolving industry trends.

PEO2 - (Commitment to Society) : Be industry ready professionals with ethics, knowledge and entrepreneurship to drive social change and lead development in the industry.

PEO3 - (Lifelong Learning) : Possess interest in pursuing higher studies, enriching soft skills, adopting ethical code of conduct and life-long learning.

## PROGRAMME SPECIFIC OBJECTIVES (PSOs)

Graduate Program in Computer Science and Engineering will demonstrate:

PSO1 : The ability to implement, analyze and develop algorithms based on computational theory in the fields of networking, machine learning, data mining, pattern recognition, robotics and other important areas of computer science for productive and effective design of computer-based systems of diverse complexity.

PSO2 : The ability to apply standard engineering practice, strategies and tactics for the development and management of software and hardware projects, using open source programming environments to deliver quality end product.

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# EDITORIAL



**R VYSAKH**  
**S6 CSE-B**

Welcome to the third edition of TechToday, the technical buffet from the Department of Computer Science and Engineering of FISAT. In the past two issues of TechToday the recent technologies of that period were discussed, this year 2020 paved the way to deliver the relevance of those technologies to overcome the pandemic, and to rise like a phoenix to the normal life. We are really proud to incorporate the recent and also the upcoming technologies in the field of computer science with this edition, which will surely have a positive impact on society in one way or the other.

I am indeed very happy and proud to announce that the main objective of our TechToday magazine is accomplished with the combined effort of our editorial board and Faculty members even during this pandemic. I take this opportunity to express my sincere gratitude to all the contributors, for their effort, time and dedication to give back what they have learned to the society.

## BLOCKCHAIN TECHNOLOGY : AN OVERVIEW

Blockchain is the word that you might be hearing frequently. But most of us are not completely aware of what blockchain is or how to describe it to others. Mostly people think that Blockchain is Bitcoin and vice-versa. But it's not the case.

### What is blockchain?

A very simple definition to this question can be given as “blockchain is the chain of connected blocks”. A clear definition to this is: blockchain is an online distributed system which can store the information and it is based on interconnected blocks which is open to everyone. Blockchain was first described in the year 1991. It was never been so important until 2009 when a cryptocurrency called Bitcoin used it as the 1st blockchain based cryptocurrency. Blockchain is sometimes referred to as Distributed Ledger Technology (DLT), makes the history of any digital asset unalterable and transparent through the use of decentralization and cryptographic hashing.

A simple analogy for understanding blockchain technology is a Google Doc. When we create a document and share it with a group of people, the document is distributed instead of copied or transferred. This creates a decentralized distribution chain that gives everyone access to the document at the same time. No one is locked out awaiting changes from another party, while all modifications to the doc are being recorded in real-time, making changes completely transparent.

How does blockchain work?

Blockchain consists of 3 important concepts : blocks, nodes and miners.

### Blocks

Each block has # basic elements:

- 1.data: The information we store on block. The data depends on the type of blockchain.  
For example, if we consider the case of crypto currency, the data contains the details of the sender, receiver and transaction.
- 2.nonce: It is a 32-bit whole number, which is randomly generated when a block is created, which then generates a block header hash.
- 3.parent block hash: It is a 256-bit hash value that points to the previous block.

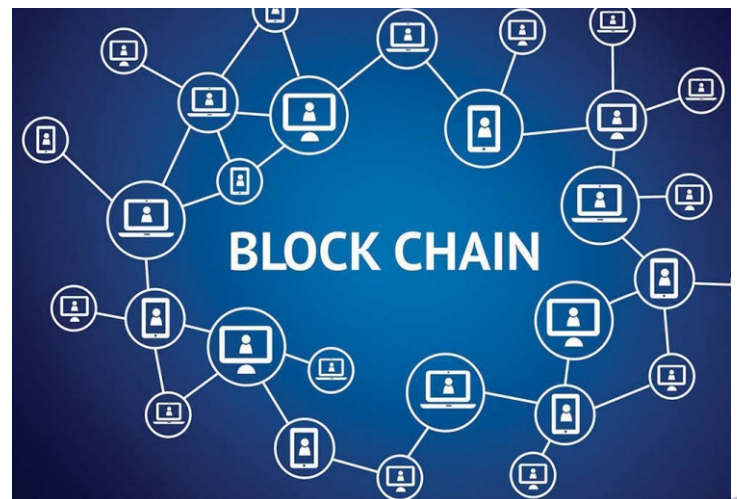
Blockchain uses an asymmetric cryptography mechanism to validate the authentication of transactions. Digital signature based on asymmetric cryptography is used in an untrustworthy environment. And what does the term digital signature refer to? Each user owns a pair of private and public key. The typical digital signature consists of 2 phases : signing phase and verification phase. In the signing phase, the sender encrypts her data with her private key and sends Bob the encrypted result and original data. In the verification phase, Bob validates the value with Alice's public key.

### Nodes

Nodes can be any kind of electronic device that maintains copies of the blockchain and keeps the network functioning. Every node has its own copy of the blockchain and the network must algorithmically approve any newly mined block for the chain to be updated, trusted and verified.

### Miners

Miners create new blocks on the chain through a process called mining. Making a change to any block earlier in the chain requires re-mining not just the block with the change, but all of the blocks that come after. When a block is successfully mined, the change is accepted by all of the nodes on the network and the miner is rewarded financially.





## KEY FEATURES OF BLOCKCHAIN

1. One of the most important feature of blockchain technology is decentralization. No one computer or organization can own the chain. Instead, it is a distributed ledger via the nodes connected to the chain.
2. Data stored in blockchain is immutable and cannot be changed easily. The data is added to the block after it is approved by everyone in the network and thus allowing secure transactions.
3. Blockchain provide a peer to peer network. This characteristic of blockchain allows the transactions to involve only two parties, the sender and the receiver.

### Why do we need blockchain?

- ♦ To save time
- ♦ To save money
- ♦ Reduce risks
- ♦ Increase trust
- ♦ It does not need any central authority

For instance, consider the case of real estate. It requires many processes, like verification of papers in govt. offices, authentication of ownership etc., to buy or sell a property. But even after these many processes we are not sure that these informations are correct. If we use blockchain in this scenerio, firstly, the informations based on the land will be correct, i.e, authentic. And second, we can know the details of the land owners without any paper work.

### Kerala Block chain Academy Innovation Club (KBAIC) – FISAT

*FISAT have become the Kerala Block Chain Academy Innovation Club Member. Kerala Block chain Academy is an initiative by the state government under the Indian Institute of Information Technology and Management, Kerala (IIITM-K). Kerala Block chain Academy Innovation Club (KBAIC) is a novel initiative by Kerala Block chain Academy (KBA) to help students from academic institutions across the country to explore deep into the potential of the block chain technology.*



## FUTURE OF BLOCKCHAIN

### ❖ Prediction # 1: Government Crypto

By 2030, most governments around the world will create or adopt some form of virtual currency. Government-based cryptocurrency will become an area of experimentation and explorations, led mostly by developing nations with unstable economies and weak institutions.

### ❖ Prediction #2: Trillion-Dollar Protocols

By 2030, there will be more trillion-dollar tokens than there will be trillion-dollar companies. There is a race among the four most valued companies in the world (based on stock market valuation) as to which one will be the first to reach one trillion dollars in value.

### ❖ Prediction #3: Blockchain Identity for All

By 2030, a cross-border, blockchain-based, self-sovereign identity standard will emerge for individuals, as well as physical and virtual assets. Blockchain-based identity decentralizes the data collection, cross-verifies the collected data via a consensus mechanism, and stores this information on a decentralized immutable ledger. It enables reduced risk of security breaches, significantly higher efficiencies, higher reliability, and most importantly self-sovereignty.

### ❖ Prediction #4: World Trade on a Blockchain

By 2030, most of world trade will be conducted leveraging blockchain technology. One of the most promising areas where blockchain can provide significant business value is global supply chain. In its current state, world trade is conducted via a chaotic, fragmented set of business relationships among parties that are untrusted. This results in inefficiencies, errors, and fraud. This is a set of real-world business problems that are currently unsolved and cannot be fully solved without using blockchain technology.

Blockchain may not be a solution for all the problems existing, but the future of this world will be great if we let this technology grow.



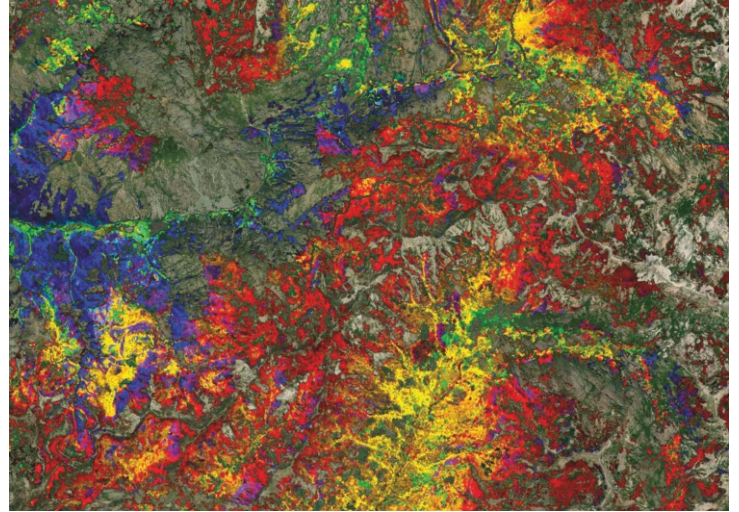
**Anagha S**  
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## AI IN FORESTRY

Artificial intelligence is undoubtedly one of the most emerging technologies which are in vogue today. From the recognition of a feeble sound to learning to solve complex problems, Artificial Intelligence is employed in four corners of the globe. With such technological advancements comes the responsibility of regarding the ecosystem with each feat.

Forests form a major part of the ecosystem and thus having accurate data regarding the same becomes mandatory. Managing such forest becomes a tedious task especially since forests cover thousands of acres of land and hence collecting data would consume months or years. Historically most data regarding forest areas are received from expert foresters. Unlike the case of farmland where there is an order of farming, it becomes very difficult to map a forest with all uncertainties of growth. The species or location of trees are unlikely to be figured especially since bigger trees can cover smaller trees under its canopy.

Zack Parisa and his team in SilviaTerra, a startup based in the US have come up with the technique of using machine learning to be applied on satellite image to obtain forest inventory containing more accurate details regarding the forest life for better analysis of the forest within a matter of few minutes, also lowering the cost of monitoring forests. This machine-learning algorithm considers every 1/20 acre of land and builds a list of trees including the species' name and diameter of the tree in the region. Values like tree height, total carbon storage etc are derived from the aforementioned features. Based on the kind of trees present they can determine the wildfire risk or suitability of the land as animal habitat etc. But to receive this list of trees there is a requirement of terabytes of satellite imagery. To receive cloud-free images, Lin Yan of Michigan State University has come up with an algorithm which replaces the pixels covering the cloud with the pixels from pictures taken during a cloudless day.



SilviaTerra has now partnered with AI For Earth and is working on more such projects based on conservation. With the monitoring of such areas and development of such models, new possibilities also pave the way to a sustainable future.



**Anagha Jayaraj**  
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## THE BLOCKCHAIN ERA



Blockchain. One of the most biggest technology trends of 2020 as mentioned by Forbes. The technology which had seen immense investments by some of the top companies like FedEx, IBM, Walmart, Mastercard etc. The technology that drives the cryptocurrencies like Bitcoin, Ethereum, Ripple etc. So goes the countless features of blockchain. But what makes this tech such a remarkable one?

As the name literally suggests, Blockchain could be considered as a chain of blocks which contains information. Wikipedia describes it as “a growing list of records, called blocks, that are linked using cryptography”. It is essentially a digital ledger used to record transactions but secured due to its encrypted and decentralized nature. It began gaining popularity when Bitcoin, the first cryptocurrency was built using blockchain, by an unknown person or group of people using the name Satoshi Nakamoto in 2009.

Blockchain has a peer to peer network (P2P network) among its members' computers (also known as nodes) i.e. there is no official body to centralize or control the interactions between the nodes. Each block in a blockchain ledger consists mainly of three types of vital information: data, hash of the block, and the hash of the previous block. Consider a context of transaction. The data represents the amount of the money transferred, members of transaction, time of transaction etc. On the other hand, hash is like a digital fingerprint. It is a unique string of fixed length got as an output by encrypting the data stored in the blocks. If the data in the block changes the hash associated with the block also changes. It distinguishes each block in a ledger.

When someone requests for a transaction (may include transaction of cryptocurrency, contracts, records or other information), the requested transaction is broadcasted to the P2P network of nodes to verify whether the request is genuine one. This is done by a series of algorithms which



evaluates details such as status of the participants of the transaction, content of transaction etc. After the validation, the transaction is added with other transactions to form a new block. This block is then added to the chain of other blocks in the ledger in such a way that it cannot be tampered with. And when this is done the transaction is achieved.

There are many reasons for this technology to be amongst one of the most promising technologies of the future. The main advantage mostly praised for is the highest level of security provided for the data stored. But how exactly is it made possible? When a node is added to a blockchain, it is provided with the full copy of the existing blockchain. When a new block is created by a node, this block is made available to every other node in the network for verification and when verified it is added to the ledger of each node. This creates a consensus in the network. So what happens if someone tries to tamper with a block in the ledger? Even if he could manage to manipulate one block of a node, it would be very difficult to change the corresponding block in the ledger of each node. So even if one block in a node is changed the other nodes could recognize it as a tampered one and take the necessary action.

The blocks in the ledger are chained together by their hashes. As mentioned before each block has details such as data stored, hash and the hash of the previous block.





Consider a blockchain of 3 blocks. The third block is connected to the second block by the by the hash details of the second block it has stored in it. Likewise the second block is connected to the first by the hash of the first block stored in it. The first block does not have a previous block's hash record and is known as Genesis block. This recording of previous block's hash helps a block connect to the chain. So if any change is made to any detail in a block, the hash associated with that block changes making it a completely different block. As a result the other blocks associated with it also become invalid as their previous block's hash record also change. Hence tampering with details in a block without making it an invalid one is a strenuous and nearly impossible task.

But what if someone tamper the details of a block and manages to recalculate the hashes of all the other blocks? Well, blockchain has covered it too. To tackle such obvious attacks we have something called as the Proof of Work (PoW). Technically it is the "original consensus algorithm in a Blockchain network." In order to broadcast a block, a miner (nodes responsible to add new blocks to the network) must solve a complex computational puzzle. If one is able to find a solution to the puzzle corresponding to a block, he can broadcast that block to the network. The other miners in the network verifies the solution found and the block gets added to the chain. This authentication of each blocks is called Proof of Work. Well, it may seem to be simple when read, but in the real world, getting a PoW done is a very exhausting task. It requires a lot of computational power and a lot of time to do the calculations. So even if an attacker tries to tamper one block, as he would have to do the PoW of that block and all the other blocks following it to complete a successful attack, it will turn out to a condition where the time and money spent to do the attack is much more than the rewards that he might get through the attack. Because

what it takes to compromise a blockchain's security is an exceptionally extreme computational capability, which is hard to achieve even by using today's supercomputers. Also the P2P network implemented in blockchain, eliminates all the third party interventions in transactions. The benefits of the transaction are received straight to the members of the transaction in a clear and transparent way. The proper implementation of blockchain in fields such as supply chain management and other areas could reduce costs incurred in production and make the industries much more efficient.

The world is at the verge of a tech explosion. The computational abilities are being pushed ahead through technologies like quantum computing. On October 23, 2019 Google claimed to have achieved quantum supremacy by making a quantum computer which could do in 3 minutes 20 seconds, a mathematical calculation that supercomputers could not complete in under 10,000 years. Though all these developments makes the life of humans a lot much easier, such computational capabilities in the wrong hands might turn out to be catastrophic, even for blockchain. But just like all other technologies, blockchain too is evolving in a faster and more efficient way, adding new unique features, uses and security measures. With governments and businesses adopting blockchain technology for application in wider areas, the blockchain era have begun making history.



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## IOT IN THE BACKDROP OF COVID-19

Internet of Things popularly abbreviated IoT has been in the limelight since the year 2010 and has become one of the leading-edge technologies, especially in this lustrum. From small smart-home equipment to large industrial machinery, the implementation and development of IoT have seen a remarkable upsurge to the extent that it has grown to become one of the hottest topics to learn and know in this decade.

In the current unprecedented crisis, IoT has been helping several nations to prepare for a pandemic to a certain level especially in terms of health services from checking the temperature of patients to monitoring their locations using IoT enabled devices. IoT, when combined with other technologies like Artificial intelligence, cloud, machine learning etc, are more or less creating magic now. Currently, many gadgets are being made by companies that have definitely lifted some weight off the shoulders of healthcare workers across the globe. Some of those gadgets can monitor and handle patients, deliver medicines and maintain the hospital thus allowing minimal requirement of the physical presence of healthcare workers and further helps to prevent the spread of the virus as this allows minimal contact with people and equipment exposed to patients.

In various parts of the world especially in North America, with the help of IoT, bracelet shaped devices have been developed which monitors temperature, blood pressure, oxygen level in the blood level etc. Considering a closer environment, we have smart home and work devices like IoT enabled lights, speakers, security systems etc which allow people to have fewer contacts with vulnerable surfaces. Apart from these, several IoT start-ups have also gained global attention in the past few months. In fact, one entire hospital in the province of Wuhan in China has exhibited some technological prowess by combining IoT and AI. They have succeeded in letting the entire functioning of the hospital to be taken care of by robots and other IoT enables devices thereby letting the workers take a break from the exhausting work at the hospital. IoT enabled buttons are also placed so as to send message to concerned staff regarding maintenance and other aid.

To keep up with this ever-growing and changing needs of the world, IoT has by far been a huge influencer in terms of technological aspects. Therefore, with the uncertainties revolving around the current scenario, IoT could play an important role in reducing the work-loads and stress from the health care workers and is definitely going to remain significant even when this crisis ceases. Unarguably it is also on the step to modernize health care systems.



So, barring all its shortcomings, we must learn to make a continuous and constant effort towards making use of such technologies to make this world a better place to live in and thereby to give a better future to the generations to come.



**Anagha Jayaraj**  
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## Simple Procedures to learn: FREE AND OPEN-SOURCE SOFTWARE

Technology and its advancement in the recent years has managed to develop curiosity in human lives. One among the advancement is the usage of free and open-source software distributions in all over the world. People have started to realize and hence understand the usefulness of open-source software's and open-source distributions such as Linux, Fedora, Multics etc.

The main advantage that people found in these software's is that they were able to re-distribute and rebrand the software's which wasn't possible in many other OS and software's, another advantage is the prevention from viruses and trojans. Even though people have understood and realized the advantage of these distributions, majority of them do not risk themselves to give a try and understand the installation procedure of the same, they rather ask their friends or hand it over to the service Centre's and spend money for the installation there. The installation of these OS's is as simple and less time consuming even for a beginner.

**Step 1.** Download the disc image or .iso file of the distribution you want to install in your system from the concerned official website.

**Step 2.** Insert a pendrive/cd/hdd of suitable size.

**Step 3.** Download and install a software RUFUS which is capable of making your pendrive/cd/hdd bootable so that you are able to install your OS.

**Step 4.** Open RUFUS and select your .iso file and inserted pendrive/cd/hdd now click on the start button and wait until a READY mode is displayed.

**Step 5.** Insert the pendrive/cd/hdd and go to the bootable device menu, while you switch on the system.

**Step 6.** Select the device and press enter. Click on the Install button, and just follow the steps and then restart after successful installation.

After a successful reboot the system is ready for use, however some of you might not find the wifi symbol and won't be able to connect to a wifi network, this is because the wifi driver is not being installed in your system.

This situation mostly happens in Hp system as the kernel could not automatically detect the wifi driver, but the user will be able to use Ethernet or any wired connection like USB-tethering and so on.

The installation of wifi driver in a Hp system having Ubuntu OS requires just 6 steps and those steps are as follows: -

**Step 1:** `sudo apt-get update` (you will have to enter the password you have provided during the installation process)

**Step 2:** `sudo apt remove bcmwl-kernel-source && sudo apt install git dkms`

**Step 3:** `git clone -b extended`  
[https://github.com/lwfinger/rtlwifi\\_new.git](https://github.com/lwfinger/rtlwifi_new.git)

**Step 4:** `sudo dkms add ./rtlwifi_new`

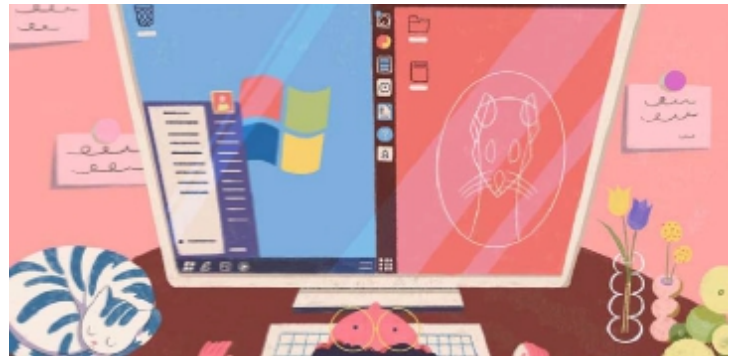
**Step 5:** `sudo dkms install rtlwifi-new/0.6`

**Step 6:** `sudo modprobe -r rtl8723de && sleep 5 && sudo modprobe rtl8723de ant_sel=1`

**Step 7:** `sudo modprobe -r rtl8723de && sleep 5 && sudo modprobe rtl8723de ant_sel=2`

**Step 8:** `echo "options rtl8723de ant_sel=2" | sudo tee /etc/modprobe.d/rtl8723de.conf`

With a faster network speed, the installation can be carried out with 15 mins, and a new learning is carried out. Take some risks to learn and understand the technology and be benefitted.



**R VYSAKH**  
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## A PEEP INTO AWS

Cloud computing is the on demand delivery of IT resources over the internet with pay-as-you-go pricing. Instead of buying, owning and maintaining physical data centres and servers. One can access technology services from a cloud provider like AWS.

In 2006, Amazon Web Services began offering IT infrastructure services to businesses as web services now commonly known as cloud computing. One of the key benefits of cloud computing is the opportunity to replace upfront capital infrastructure expenses with low variable costs that scale with your business. With the cloud, businesses no longer need to plan for and procure servers and other IT infrastructure weeks or months in advance. Instead, they can instantly spin up hundreds or thousands of servers in minutes and deliver results faster.

AWS consists of 175 products and services in a vast catalog that provides cloud storage, compute power, app deployment, user account management, data warehousing, tools for managing and controlling IOT and just about anything one can just think of that a business needs. AWS really grew in popularity and capability over the last decade. One reason is that AWS is so reliable and secure. It is used by some of the well-known brands in existence like Netflix, Uber and Airbnb. The distinguishing characteristics of AWS over other service providers is that Amazon uses its own cloud infrastructure to power Amazon.com, the most popular e-commerce website today.

Some of the most important services provided by AWS are;

- ✱ AWS AMI
- ✱ AWS AppSync
- ✱ Amazon Athena
- ✱ Amazon Aurora
- ✱ AWS Cloud Formation
- ✱ AWS Cloud Front
- ✱ AWS VPC
- ✱ AWS Lambda
- ✱ AWS EBS
- ✱ AWS Batch.
- ✱ AWS CLI
- ✱ AWS EBS
- ✱ AWS Console
- ✱ AWS EC2
- ✱ AmazonRDS
- ✱ Amazon SQS
- ✱ AWS DynamoDB
- ✱ Amazon Redshift
- ✱ AWS Snowball
- ✱ Amazon SNS

Benefits of AWS over other are;

- ✱ Ease of use.
- ✱ Incredibly Diverse Array of tools.
- ✱ Unlimited server capacity.
- ✱ Reliable Encryption and security.
- ✱ Managed IT services are available.
- ✱ AWS offers flexibility and affordability.
- ✱ Stop guessing capacity.
- ✱ Increase speed and agility.
- ✱ Go global in minutes.



With AWS you'll find a complete set of highly available services that are designed to work together to build sophisticated scalable applications. All these services are available without up-front cost and you pay for only what you use. These services help organizations move faster, lower IT costs and scale. AWS is trusted by the largest enterprises and the hottest startups to power a wide variety of workloads.



**JEES MARIA JOY**  
S4, CSE-A

## CLOUD GAMING

Cloud gaming isn't actually a new idea. In fact, the idea was first publicly presented in the 2000's and it was commercially available from 2010 from companies like OnLive and Gaikai, both of whom have been acquired by Sony, who now use their assets to host their own cloud gaming service known as PlayStation Now. Since then, many big names in the tech world have started betting their money on cloud gaming. Nvidia has bought out GeForce Now, Google entered the market with Stadia, Microsoft has bought out xCloud and even Amazon recently launched their own service called Luna. Moreover, the cloud gaming market is expected to hit a whopping 3 billion dollars valuation by 2024.



So what exactly is driving this growth? It's the way cloud gaming works. All the computationally complex games reside on the server and the gameplay is delivered to the user via the internet, just like streaming a video. The cloud gaming platform takes input from the user and sends it over to the server where the game is running and performs that action in the game and sends the video stream of that back to the user. This means it frees the gamer from having to have a powerful hardware which is quite expensive. It also means the gamer can access his games from anywhere, anytime, and on any device provided he is connected to the internet. It also frees everyone from the hassle of buying and keeping a physical copy of games as they come out, since all the games are stored on the gaming platform. Some cloud gaming platforms even offer premium titles, which can be expensive, for a monthly fee.

Cloud gaming makes the jobs of game developers a tad bit easier. The developers only need to concentrate on a single platform, which saves on testing and porting costs as well as time. Game developers can increase their market base because cloud gaming will bring in more crowd due to easy and cheaper accessibility to the

platforms. Developers can rake in a higher margin of profit by avoiding retailers and publishing the game directly to the platforms, and since the game never leaves the server, cloud gaming will put an end to piracy of games.

So far it seems as if it is a win-win-win solution for everyone. But not 'yet'. Cloud gaming has its own sets of challenges which needs to be addressed before it can offer the desired performance. One such issue is the lack of accessibility to fast and powerful communication technologies. Cloud gaming requires the gamer to have a low latency and reliable connection to the server to have an undisrupted experience. With 5G and optical fiber connections, these issues are gradually being addressed. Lots of gamers have complained about input lags and dropping frame rates on cloud gaming platforms, which will cause problems as many of the games require the user to react instantly to be successful in the game. It can also give players who have better connection an advantage over those who don't. Server side hardware too is still being researched and developed to make it perform better.

All said and done, cloud gaming is still a technology that is in its first stages of development. It still has a long way to go. With a lot of big names willing to bet their money on it, it will be very interesting what developers and researchers are going to achieve here. Overtime with hardware developments, researches and better communication technologies, the scales to which cloud gaming can achieve is massive. This space is surely one to watch.



**Aman K. Shihab**  
S2 CSA

## DATA MINING

Data mining is an integral part of modern industry, where data from its operations and customers are mined for gaining business insight. It is the study of algorithms for finding patterns in large data sets. Data mining has applications in multiple fields, like science and research. As an application of data mining, businesses can learn more about their customers and develop more effective strategies related to various business functions and in turn leverage resources in a more optimal and insightful manner. It will also explain implementations in open source software.

It will explain the basic algorithms like data pre-processing, association rules, classification, clustering, sequence mining and visualization. Over the last decade, advances in processing power and speed have enabled us to move beyond manual, tedious and time-consuming practices to quick, easy and automated data analysis. The more complex the data sets collected, the more potential there is to uncover relevant insights. Retailers, banks, manufacturers, telecommunications providers and insurers, among others, are using data mining to discover relationships among everything from pricing, promotions and demographics to how the economy, risk, competition and social media are affecting their business models, revenues, operations and customer relationships. The manual extraction of patterns from data has occurred for centuries. Early methods of identifying patterns in data include Bayes' theorem and regression analysis. The proliferation, ubiquity and increasing power of computer technology have dramatically increased data collected.

Data mining involves 6 tasks:

- **Anomaly detection** - The identification of unusual data records, that might be interesting or data errors that require further investigation. Data is then cleansed, and missing data is included to ensure it is ready to be mined. Data processing can take enormous amounts of time depending on the amount of data analysed and the number of data sources.
- **Association rule learning** - Searches for relationships variables. For example, a supermarket might gather data on customer purchasing habits. Using association rule learning, the supermarket can determine which products are frequently bought together and use this information for marketing purposes. This is sometimes referred to as market basket analysis. Data is collected from all applicable data sources in this step Data visualization tools are often used in this stage to explore the properties of the data to ensure it will help achieve the business goals
- **Clustering** - is the task of discovering groups and structures in the data that are in some way or another "similar", without using known structures in the data. Therefore, distributed systems are used in modern database management systems (DBMS) to improve the speed of the data mining process rather than burden a single system. They're also more secure than having all an organization's data in a single data warehouse. It's important to include failsafe measures in the data manipulation stage so data is not permanently lost.
- **Classification** - is the task of generalizing known structure to apply to new data. For example, an e-mail program might attempt to classify an e-mail as legitimate or as spam. Mathematical models are then used to find patterns in the data using sophisticated data tools.
- **Regression** - attempts to find a function that models the data with the least error that is, for estimating the relationships among data or datasets. The findings are evaluated and compared to business objectives to determine if they should be deployed across the organization.
- **Summarization** - providing a more compact representation of the data set, including visualization and report generation. The data mining findings are shared across everyday business operations. An enterprise business intelligence platform can be used to provide a single source of the truth for self-service data discovery.





Data mining processes are used to build machine learning models that power applications including search engine technology and website recommendation programs. Warehousing is an important aspect of data mining. Warehousing is when companies centralize their data into one database or program. With a data warehouse, an organization may spin off segments of the data for specific users to analyse and use. However, in other cases, analysts may start with the data they want and create a data warehouse based on those specs. Regardless of how businesses and other entities organize their data, they use it to support management's decision-making processes.



The complete data-mining process involves multiple steps, from understanding the goals of a project and what data are available to implementing process changes based on the final analysis. The three key computational steps are the model-learning process, model evaluation, and use of the model. This division is clearest with classification of data. Model learning occurs when one algorithm is applied to data about which the group (or class) attribute is known in order to produce a classifier, or an algorithm learned from the data. The classifier is then tested with an independent evaluation set that contains data with known attributes. The extent to which the model's classifications agree with the known class for the target attribute can then be used to determine the expected accuracy of the model. If the model is sufficiently accurate, it can be used to classify data for which the target attribute is unknown.

There are some drawbacks for data mining. Generally, tools present for data Mining are very powerful. But they require a very skilled specialist person to prepare the data and understand the output. This system violates the privacy of its user. That is why it lacks in the matters of safety and security of its users. Eventually, it creates miscommunication between people. There is a problem with this information collection that the collection of information process can be little overwhelming for all. In data mining system, the possibility of safety and security measure are really minimal. And that is why some can misuse this information to harm others in their own way. Therefore, this data mining system needs to change its course of working so that it can reduce the ratio of misuse of information through the mining process.

In general, to mining knowledge from the data, we first need to determine the objective, what do we want. From the data, we can make overview describe the data. After that, we can use other advanced technique to make analysis. Analysis and visualize the result are very efficient for decision maker. It is fast and accurate to know the information. The disadvantage of those methods is that, it is difficult for the person who directly work with the data, the person who use these techniques. He/she must be expert with algorithms of each methods, really understanding the data to fit with each technique. In addition, when the data is huge, it is very difficult to visualize the data, the graph, diagram, plot can be over crowded. therefore, I think those methods used for medium, small data set.



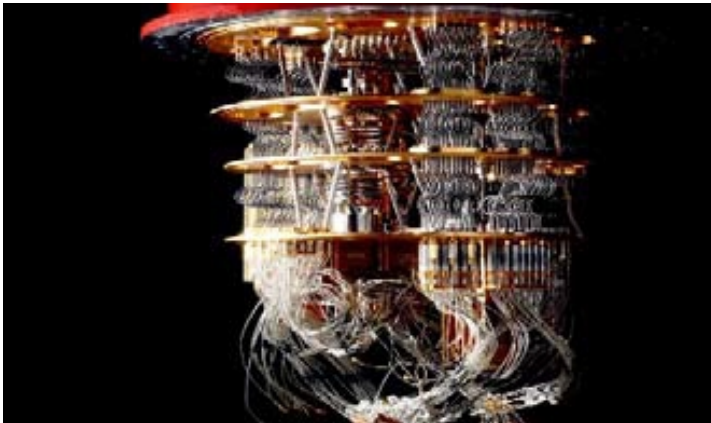
**Aparna V**  
S4 CSE A

## POSTERITY WITH QUANTUM COMPUTERS

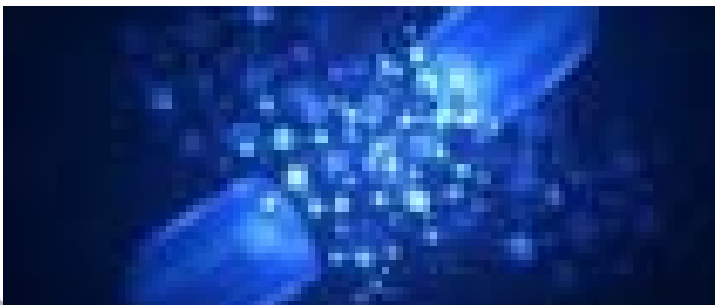
We are heading towards a world where it's impossible to think of a life without a computer. Our needs are increasing day by day and we are becoming more advanced. Classical computers lacked solutions to many problems thus humans evolved with Quantum Computers.

A quantum computer is any device for computation that makes direct use of distinctively quantum mechanical phenomena, such as superposition and entanglement, to perform operations on data. Quantum computers have the potential to impact so many aspects of our lives, including our security, our health care and even the internet.

A quantum bit identity is on a spectrum. It can exist in a superposition, or a combination of zero and one. In the case of a normal computer it has two states zero or one, it can be determined by a human. In case of qubit's it can't be determined because the state will be with some probability of being zero and some probability of being one, and allows for some uncertainty.



### TECHNOLOGY SURPASS Drug and Quantum

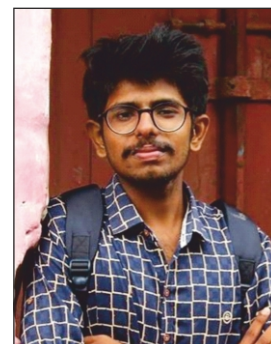


Our technologies are developing, but still we are not able to find the medicines for certain diseases, even supercomputers fail in this field. Here, we can use the quantum computer for better results unlike the others because it operates using the same quantum properties as the molecule it's trying to simulate. With this we can develop drugs for curing diseases like Alzheimer's which are affecting thousands of people.

### Teleportation and Quantum



Reciting slokas enhance a positive vibrance in the milieu, just like that through teleporting; a way of communication through quantum computers, we can communicate with people around the world. The world is built with molecules, a change in the molecules will affect the whole universe thus making the communication process effortless.



**Basil Leju**  
S4 CSE A

## OVERVIEW OF AWS (AMAZON WEB SERVICES) CLOUD FOUNDATION COURSE

SPONSEROR:ASAPSPONSEREDADD-ON COURSE.

INSTRUCTOR: DR. JYOTHISH K JOHN (ASSO. PROFESSOR, CSE, FISAT)

NO. OF STUDENTS ENROLLED :41

NO. OF HOURS: 40

BATCH: S5CSE A & B

TENTATIVE DATE OF COMMENCEMENT: NOV 2020

STATUS: INSTRUCTOR UNDERGOING TRAINING & CERTIFICATION

SIGNIFICANCE OF COURSE: AWS IS WIDELY ADOPTED CLOUD PLATFORM IN INDUSTRY, PREFERRED SKILL IN INDUSTRY

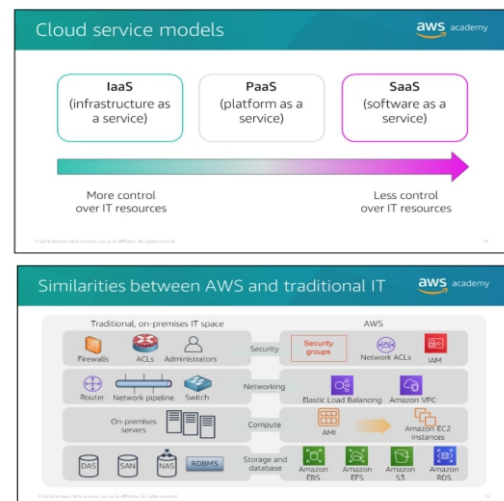
### 1. CLOUD COMPUTING

Cloud computing is the on-demand delivery of compute power, database, storage, applications, and other IT resources via the internet with pay-as-you-go pricing. These resources run on server computers that are located in large data centers in different locations around the world. When you use a cloud service provider like AWS, that service provider owns the computers that you are using. These resources can be used together like building blocks to build solutions that help meet business goals and satisfy technology requirements.

In the traditional computing model, infrastructure is thought of as hardware. Hardware solutions are physical, which means they require space, staff, physical security, planning, and capital expenditure. In addition to significant up front investment, another prohibitive aspect of traditional computing is the long hardware procurement cycle that involves acquiring, provisioning, and maintaining on-premises infrastructure. With a hardware solution, you must ask if there is enough resource capacity or sufficient storage to meet your needs, and you provision capacity by guessing theoretical maximum peaks. If you don't meet your projected maximum peak, then you pay for expensive resources that stay idle. If you exceed your projected maximum peak, then you don't have sufficient capacity to meet your needs. And if your needs change, then you must spend the time, effort, and money required to implement a new solution. For example, if you wanted to provision a new website, you would need to buy the hardware, rack and stack it, put it in a data center, and then manage it or have

someone else manage it. This approach is expensive and time-consuming.

By contrast, cloud computing enables you to think of your infrastructure as software. Software solutions are flexible. You can select the cloud services that best match your needs, provision and terminate those resources on-demand, and pay for what you use. You can elastically scale resources up and down in an automated fashion. With the cloud computing model, you can treat resources as temporary and disposable. The flexibility that cloud computing offers enables businesses to implement new solutions quickly and with low upfront costs. Compared to hardware solutions, software solutions can change much more quickly, easily, and cost-effectively. Cloud computing helps developers and IT departments avoid undifferentiated work like procurement, maintenance, and capacity planning, thus enabling them to focus on what matters most. As cloud computing has grown in popularity, several different service models and deployment strategies have emerged to help meet the specific needs of different users. Each type of cloud service model and deployment strategy provides you with a different level of control, flexibility, and management. Understanding the differences between these cloud service models and deployment strategies can help you decide what set of services is right for your needs.





## 1. WEB SERVICE

In general, a web service is any piece of software that makes itself available over the internet or on private (intranet) networks. A web service uses a standardized format—such as Extensible Mark-up Language (XML) or JavaScript Object Notation (JSON)—for the request and the response of an application programming interface (API) interaction. It is not tied to any one operating system or programming language. It's self-describing via an interface definition file and it is discoverable.

## 2. AWS

Amazon Web Services (AWS) is a secure cloud platform that offers a broad set of global cloud-based products. Because these products are delivered over the internet, you have on-demand access to the compute, storage, network, database, and other IT resources that you might need for your projects—and the tools to manage them. You can immediately provision and launch AWS resources. The resources are ready for you to use in minutes. AWS offers flexibility. Your AWS environment can be reconfigured and updated on demand, scaled up or down automatically to meet usage patterns and optimize spending, or shut down temporarily or permanently. The billing for AWS services becomes an operational expense instead of a capital expense. AWS services are designed to work together to support virtually any type of application or workload. Think of these services like building blocks, which you can assemble quickly to build sophisticated, scalable solutions, and then adjust them as your needs change.



Which service you choose to use will depend on your business goals and technology requirements. In the example you just looked at, the solution made use of Amazon EC2 as the compute service. However, that is only one of many compute services that AWS offers.

## 4. SOME POPULAR AWS SERVICES

Here are some other AWS compute offerings that you might choose to use for the following example use cases:

**Amazon EC2:** You want complete control over your AWS computing resources.

**AWS Lambda:** You want to run your code and not manage or provision servers.

**AWS Elastic Beanstalk:** You want a service that deploys, manages, and scales your web applications for you.

**Amazon LightSail:** You need a lightweight cloud platform for a simple web application.

**AWS Batch:** You need to run hundreds of thousands of batch workloads.

**AWS Outposts:** You want to run AWS infrastructure in your on-premises data center.

**Amazon Elastic Container Service (Amazon ECS), Amazon Elastic Kubernetes Service (Amazon EKS), AWS Fargate:** You want to implement a container or microservices architecture.

**VMware Cloud on AWS:** You have an on-premises server virtualization platform that you want to migrate to AWS. Similarly, there are a variety of services for you to choose from in the other categories, and the number of offerings keeps growing.

## Module 1 - Cloud Concepts Overview

### Introduction Video

- Section 1 Video - Introduction to cloud computing External Tool
- **Section 1 Video - Introduction to cloud computing**
- Section 2 Video - Advantages of the Cloud External Tool
- **Section 2 Video - Advantages of the Cloud**
- Section 3 Video - Introduction to AWS External Tool
- **Section 3 Video - Introduction to AWS**
- Section 4 Video - Moving to the AWS Cloud External Tool
- **Section 4 Video - Moving to the AWS Cloud**
- Video External Tool
- **Wrap Up Video**
- Student Guide External Tool
- **Student Guide**
- Module 1 Knowledge Check Assignment
- **Module 1 Knowledge Check**

## Module 2 - Cloud Economics and Billing

- **Introduction Video**
- Section 1 Video - Fundamentals of PricingExternal Tool  
**Section 1 Video - Fundamentals of Pricing**
- Section 2 Video - Total Cost of OwnershipExternal Tool  
**Section 2 Video - Total Cost of Ownership**
- Section 2 Case StudyExternal Tool  
**Section 2 Case Study**
- Section 3 Video - AWS OrganizationsExternal Tool  
**Section 3 Video - AWS Organizations**
- Section 4 Video - AWS Billing & Cost ManagementExternal Tool  
**Section 4 Video - AWS Billing & Cost Management**
- Console Demonstration - Billing DashboardExternal Tool  
**Console Demonstration - Billing Dashboard**
- Section 5 Video - Technical Support ModelsExternal Tool  
**Section 5 Video - Technical Support Models**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**

## Module 3 - AWS Global Infrastructure Overview

- Introduction VideoExternal Tool  
**Introduction Video**
- Section 1 Video - AWS Global InfrastructureExternal Tool  
**Section 1 Video - AWS Global Infrastructure**
- Section 2 Video - AWS Services & Service CategoriesExternal Tool  
**Section 2 Video - AWS Services & Service Categories**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Module 3 Knowledge CheckAssignment  
**Module 3 Knowledge Check**

## Module 4 - AWS Cloud Security

- **Introduction Video**
- Section 1 Video - AWS Shared Responsibility ModelExternal Tool  
**Section 1 Video - AWS Shared Responsibility Model**
- Section 2 Video - AWS IAMExternal Tool  
**Section 2 Video - AWS IAM**
- Console Demonstration - Identity and Access ManagementExternal Tool  
**Console Demonstration - Identity and Access Management**
- Section 3 Video - Securing a New AWS AccountExternal Tool  
**Section 3 Video - Securing a New AWS Account**
- Section 4 Video - Securing AccountsExternal Tool  
**Section 4 Video - Securing Accounts**
- Section 5 Video - Securing DataExternal Tool  
**Section 5 Video - Securing Data**
- Section 6 Video - Working to Ensure ComplianceExternal Tool  
**Section 6 Video - Working to Ensure Compliance**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Lab 1 - Introduction to AWS IAMExternal Tool  
**Lab 1 - Introduction to AWS IAM**

## Module 5 - Networking and Content Delivery

- Introduction VideoExternal Tool  
**Introduction Video**
- Section 1 Video - Networking BasicsExternal Tool  
**Section 1 Video - Networking Basics**
- Section 2 Video - Amazon VPCEExternal Tool  
**Section 2 Video - Amazon VPC**
- Console Demonstration - VPC WizardExternal Tool  
**Console Demonstration - VPC Wizard**
- Section 3 Video - VPC NetworkingExternal Tool  
**Section 3 Video - VPC Networking**
- Section 4 Video - VPC SecurityExternal Tool  
**Section 4 Video - VPC Security**
- Section 5 Video - Route 53External Tool  
**Section 5 Video - Route 53**
- Section 6 Video - CloudFrontExternal Tool  
**Section 6 Video - CloudFront**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Lab 2 - Build your VPC and Launch a Web ServerExternal Tool  
**Lab 2 - Build your VPC and Launch a Web Server**

## Module 6 – Compute

- Introduction VideoExternal Tool  
**Introduction Video**
- Section 1 Video - Compute Services OverviewExternal Tool  
**Section 1 Video - Compute Services Overview**
- Section 2 Video - Amazon EC2 Part 1External Tool  
**Section 2 Video - Amazon EC2 Part 1**
- Section 3 Video - Amazon EC2 Part 2External Tool  
**Section 3 Video - Amazon EC2 Part 2**
- Section 4 Video - Amazon EC2 Part 3External Tool  
**Section 4 Video - Amazon EC2 Part 3**
- Console Demonstration - EC2External Tool  
**Console Demonstration - EC2**
- Lab 3 - Introduction to Amazon EC2External Tool  
**Lab 3 - Introduction to Amazon EC2**  
ViewedModule item has been viewed and is complete
- Section 5 Video - Amazon EC2 Cost OptimizationExternal Tool  
**Section 5 Video - Amazon EC2 Cost Optimization**
- Section 6 Video - Container ServicesExternal Tool  
**Section 6 Video - Container Services**
- Section 7 Video - Introduction to AWS LambdaExternal Tool  
**Section 7 Video - Introduction to AWS Lambda**
- Activity - AWS LambdaExternal Tool  
**Activity - AWS Lambda**  
ViewedModule item has been viewed and is complete
- Section 8 Video - Introduction toAWS Elastic BeanstalkExternal Tool  
**Section 8 Video - Introduction toAWS Elastic Beanstalk**
- Activity - AWS Elastic BeanstalkExternal Tool  
**Activity - AWS Elastic Beanstalk**  
ViewedModule item has been viewed and is complete
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Module 6 Knowledge CheckAssignment



## Module 7 - Storage

- Introduction VideoExternal Tool  
**Introduction Video**
- Section 1 Video - AWS EBSEExternal Tool  
**Section 1 Video - AWS EBS**
- Console Demonstrations - EBSEExternal Tool  
**Console Demonstrations - EBS**
- Lab 4 - Working with EBSEExternal Tool  
**Lab 4 - Working with EBS**  
ViewedModule item has been viewed and is complete
- Section 2 Video - AWS S3External Tool  
**Section 2 Video - AWS S3**
- Console Demonstration S3External Tool  
**Console Demonstration S3**
- Section 3 Video - AWS EFSEExternal Tool  
**Section 3 Video - AWS EFS**
- Console Demonstrations - S3 and EFSEExternal Tool  
**Console Demonstrations - S3 and EFS**
- Section 4 Video - WS S3 GlacierExternal Tool  
**Section 4 Video - WS S3 Glacier**
- Console Demonstrations - GlacierExternal Tool  
**Console Demonstrations - Glacier**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Module 7 Knowledge CheckAssignment  
**Module 7 Knowledge Check**

## Module 8 - Databases

- Introduction VideoExternal Tool  
**Introduction Video**
- Section 1 Video - Amazon RDSEExternal Tool  
**Section 1 Video - Amazon RDS**
- Console Demonstration - RDSEExternal Tool  
**Console Demonstration - RDS**
- Lab 5 - Build a Database ServerExternal Tool  
**Lab 5 - Build a Database Server**  
ViewedModule item has been viewed and is complete
- Section 2 Video - Amazon DynamoDBExternal Tool  
**Section 2 Video - Amazon DynamoDB**
- Console Demonstration - DynamoDBExternal Tool  
**Console Demonstration - DynamoDB**
- Section 3 Video - Amazon RedshiftExternal Tool  
**Section 3 Video - Amazon Redshift**
- Section 4 Video - Amazon AuroraExternal Tool  
**Section 4 Video - Amazon Aurora**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Module 8 Knowledge CheckAssignment  
**Module 8 Knowledge Check**

## Module 9 - Cloud Architecture

- Introduction Video  
**Introduction Video**
- Section 1 Video - AWS Well-Architected Framework Design PrinciplesExternal Tool  
**Section 1 Video - AWS Well-Architected Framework Design Principles**
- Section 2 Video - Operational ExcellenceExternal Tool  
**Section 2 Video - Operational Excellence**
- Section 3 Video - SecurityExternal Tool  
**Section 3 Video - Security**
- Section 4 Video - ReliabilityExternal Tool  
**Section 4 Video - Reliability**
- Section 5 Video - Performance EfficiencyExternal Tool  
**Section 5 Video - Performance Efficiency**
- Section 6 Video - Cost OptimizationExternal Tool  
**Section 6 Video - Cost Optimization**
- Section 7 Video - Reliability & High AvailabilityExternal Tool  
**Section 7 Video - Reliability & High Availability**
- Section 8 Video - AWS Trusted AdvisorExternal Tool  
**Section 8 Video - AWS Trusted Advisor**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Student GuideExternal Tool  
**Student Guide**
- Module 9 Knowledge CheckAssignment  
**Module 9 Knowledge Check**

## Module 10 - Auto Scaling and Monitoring

- Introduction Video  
**Introduction Video**
- Section 1 Video - Elastic Load BalancingExternal Tool  
**Section 1 Video - Elastic Load Balancing**
- Section 2 Video - Amazon CloudWatchExternal Tool  
**Section 2 Video - Amazon CloudWatch**
- Section 3 Video - Amazon EC2 Auto ScalingExternal Tool  
**Section 3 Video - Amazon EC2 Auto Scaling**
- Wrap Up VideoExternal Tool  
**Wrap Up Video**
- Lab 6 - Scale & Load Balance your ArchitectureExternal Tool  
**Lab 6 - Scale & Load Balance your Architecture**  
ViewedModule item has been viewed and is complete
- Student GuideExternal Tool  
**Student Guide**
- Module 10 Knowledge CheckAssignment  
**Module 10 Knowledge Check**



**Dr. Jyothish k John**  
Assosiate Professor