00:00:03 good afternoon everyone and welcome to the next lectures on virtualization and cloud computing uh we informally discussed about what is cloud today we'll formally look at the definition of cloud computing so as discussed earlier we mainly focus on the four types of instructure compute storage Network and application and all these four layers we will Implement virtualization and convert them into Cloud resources Dynamic resources remotely accessible resources right in the compute part in our course

00:00:48 we'll focus on the virtualization technology how virtualization works at Hardware level what are different types of virtualization and when to go for which type of virtualization that's the more important and if you want to become system admin then you also needs to learn what uh need to be there in operating system or Hardware to facilitate virtualization so those aspects also we'll cover in the storage part we very brief uh amount uh on storage part so at Storage level we'll discuss about the

00:01:29 storage virtual ization we discuss discuss about San and NES and in network uh we'll discuss about uh virtual switches virtual Nic cards virtual networking virtual land and you will be also implementing uh virtualization hello sir uh sorry to interrupt you but this is a first class right yes s before you join I announced about PG diploma program the formally the technical course we are starting from today's class for other batch we already had two classes and those were introductory classes we just informally discuss about

00:02:12 cloud computing right and you will also have access to those two uh lectures uh on the YouTube channel which I will share with your bch fine so for is it first class like technically is it first class for everyone for all the batches so can you please share the recordings of the classes of YouTube channel link let me record the today's class lecture I'll share after that we'll take up all the questions regarding course logistic after 3 p.m. fine let's cover the technical part from 2 to 3 p.m. uh so at networking side we will be

00:03:10 covering virtual switches virtual NIC card and I as I was mentioning we'll be also doing Hands-On practice about virtual Network as part of your VM assignment which will be your first assignment then uh we'll be also looking at the overall management of multiple virtual machines that will make a system like a cloud in Cloud you will you will have large number of virtual machines which you would like to manage from a service provider end of end point of view so as a service provider of AWS or Google cloud or IBM Cloud how will you

00:03:51 ensure that there's a smooth transitioning between uh creation of virtual machines or destruction of virtual machines or how to transfer one VM or migrate one VM to another physical host how to scale up scale down so all those issues we will be discussing as part of overall management then we will be looking at containers uh lightweight virtualization part which uh uh so in virtualization we will uh you will have assignment on Virtual box or CM player uh in containers we will be using Dockers which are

00:04:34 lightweight substitute of virtual machines uh those these uh these two are entirely different Technologies containers and virtualization uh they have their own use cases uh lightweight doesn't mean that it will be useful for every use case so we have to be very careful when to go for virtualization and when not to go for containers so that also will be covering towards the end of our course so to begin with let's discuss about how flip cart set up their own data center in India so uh in early days of flip

00:05:19 cart like uh cloud is good for rented property you don't want to invest Capital amount in buying uh uh Hardware resources large amount of expensive Hardware resources so you rent the facility on cloud now Flipkart also started small they also rented their facility on some cloud service providers uh earlier Flipkart used to sell only books now they are selling all sorts of a stuff and who is their key competitor for flip cart amazon.in and they were using cloud from which service provider AWS and suddenly they realized that

00:06:13 their competitor have all their data because they were hosted on AWS and amazon.in is also part of Amazon group AWS is also part of Amazon group AWS stand for Amazon web services so I think in 2013 or before that they started thinking about setting up their own data center so Flipkart set up their own data center in Chennai and at that time they were not able to find suitable Manpower who can help them in setting up data center in India so it's essentially cloud is breaking in between sir I feel

00:06:57 I don't know whether for me only or for all uh someone can else confirm if it is breaking might be not break so uh flip cart uh started setting up their own Data Center and they moved their complete flip cart uh web application to their own data center in 2013 or 14 so uh the key takeaway from the flip cart uh story is to begin with you may rent but as you grow it's better to have your own uh Cloud so there are now two different types of cloud we come across one is AWS which you can rent and another is uh flipkart's own data center

00:07:51 so you can have your private Cloud as well so public cloud and private Cloud public Cloud can be shared with others anybody can rent private cloud is your own your data uh does not leave your premises uh you have full control on Hardware you are responsible for managing the hardware services in that data center. cloud service so now flip cart is not only web company right it's also you know Cloud management company so it has huge team which is responsible for managing their own cloud so uh in my earlier

00:08:40 offerings meme creation used to be one of the task for each lecture so this was the M uh meme we got from for this lecture Flipkart after realizing that their competitor competitor have their own the they all the data and then it's for you to realize that cloud doesn't mean anything else it's only the others laptop having your own data okay so now let's formally discuss about what is cloud computer uh today maybe we'll spend most of time in dissecting this definition doing postmart of this definition today for and once you

00:09:33 understand this definition and it remains inside you half of the concepts about Cloud will be clear to you easily otherwise you will keep it struggling those who wants uh who are facing difficulty in uh you know having good display of this screen you can also join online in this class Google meet link is there in your Google classroom so the definition is cloud computing is a model so when I say we dis we excuse me sir sir can you share the code so that you can enable it in Google Classroom so that can EAS can we discuss after 3 p.m.

00:10:19 please yes sir all the class Logistics will discuss after 3pm okay so cloud is a model for enabling uous convenient OnDemand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction This Cloud Model is composed of five essential characteristics three service models and four deployment models and this definition is mentioned by n us so let's look at in more detail what this definition says and half of the

00:11:11 course will be covered within this definition so cloud computing is a model it's not a physical thing it's a logical model what is model what do we understand by a model in technology space what is a model or mathematics anyone online people can also unmute and share your answer what do you mean by model framework what is framework uh uh kind of utilities like binded together to be used for a particular purpose us model is generally miniature of something big like uh when we create the buildings we

00:12:11 create the models of those buildings something similar to that okay some answer is coming from physical classroom yes like uh creating the abstract abstract representation of Real World Systems kind of things to get a data to inside a blueprint or abstract representation right yes anything working uh system so that's a model so cloud computing is what it's a model so it's only a blueprint idea like what you want to do there basically yes that you convert into a abstract entities right we'll call it a

00:12:56 model yeah so cloud computing is model which is kind of a theoretical concept or abstract idea how things should be working so uh that can be easily covered in you know classroom kind of setup it's a theoretical concept it's not a practical thing but we will have lots of assignment which will help us in understand better about the cloud computing models okay so it's a model so it it will have set of Po the the outcome from this model right sorry AWS clouds is implementation of this model implementation outcome from okay

00:13:43 not outcome outcome is yeah got it sir it's imp from definition itself so definition also has outcome of this class this class is also outcome of cloud computing concept virtualization and cloud computing right so but AWS instance is particular implementation of this model now when you implement a model it's not necessary that you will by law or by heart will follow the model policies or regulations you can also tweak it you can also extend it you can add more features but there will be some basic

00:14:23 requirement which this definition explains that must be there in any uh implementation then you can call it cloud computing fundamental things would be like that but you can add your own concept and Engineering there yes so minimum implementation must be there which is explained in this definition if some aspect is missing you can call it something else but not cloud computing or not you cannot call it Cloud platform you may call it maybe distributed system platform or cluster platform that depends but if

00:15:04 it follows the definition at minimum then we will call it cloud computing platform so it's a model and this model is for what for enabling uous uous means everywhere you can have uous access you can have convenient access convenient mean easy to easy to access you there should not be much barrier to access these uh things and On Demand network access and whenever you demand then you can access it should not be that today you create a demand and tomorrow uh things will be provisioned to you it should be in real time on

00:15:53 demand accessible and network access so remotely through Network you can access those things and what you can access you can access to a shared pool of configurable computing resources we'll come to this part what we can access but the access has these features of from anywhere easy to access whenever we need then we can access and through Network we can access we should not go there in person and access those resources now what is accessible a shared pool of configurable computing resources what

00:16:37 are Computing resources Network compute power server or CPU gpus then memory storage applications and maybe some software Services as well so these you can access easily from anywhere in on demand manner through Network and it has objective a shared pool of configurable resources shared pool means what you it is not exclusively accessible to you you are sharing it with other users other consumers configurable although you are sharing the resources but it still you can configure as for your requirement it's not that everyone has

00:17:27 same set of uh say configuration for virtual machine you can create a AWS virtual machine of 8 GB Ram others can create of 2 GB Ram so it's a still configurable but coming out of shared pool of resources those two VMS 8 GB RAM and 2GB Ram might being used by two different consumers and might be possibly hosted on a single physical machine so two different consumers might be competitors might be using same physical machine but they are not uh they are not uh they are not having information whether our

00:18:17 competitor is also on the same physical machine or not there's a separation that will come okay so let's continue the definition so these access can be rapidly provisioned and released so it's a real time Factor so it can be rapidly provisioned on demand whenever you need resources will be created for you and access is provided to you or released whenever you don't need it can be released from your account with minimal management effort now it's coming from service providers point of view so service provider should

00:19:02 not uh spend much effort in managing your demand or releasing your uh resources so should be minimal management effort or service providers interaction it's not uh it should not be the case that every time you are creating a service request and somewhere in the service provider company is looking at your service request and then they are fulfilling your requirements so it should be minimal service providers interaction or minimal management effort essent essentially it should be automatic most of the things should be

00:19:44 automated without having uh interaction requirement from service providers point of view so it's making life easy for service provider as well and this cloud model which we have just discussed in the previous sentence is composed of five essential characteristics and three service model and for deployment model which we will see in the subsequent slides so definition is clear the first sentence of the definition is clear and if you byard this definition if you understand the definition it's easy to remember as well many times you

00:20:27 can easily uh you know check whether it's a cloud platform or not a cloud platform many of you play managerial role in your some consumer company and you might be consuming some cloud services so there you can easily bargain there no this is not on demand this is not in real time why do I need your interaction every time when I whenever I need resources there should be maximum bar allocated to me and then I can use any as much as possible the best example uh you might be familiar with IRCTC online ticket uh tkal ticket

00:21:12 booking at the tatal time there's a peak load and uh there's a another Peak load at 800 a.m. so after uh whenever you have a booking of two months window opens earlier it was 4 months window now 2 months window Bing so either at 8:00 a.m. you will have Peak load for booking tickets for 60 days in advance or you have Peak load at the tatkal period at 10:00 a.m. then 11 a.m. right and after 12 there never a peak load in General on normal days so at 8:00 a.m. 10 and 11: might be these 1 and half hour half an

00:22:02 hour each time 8 to 8:30 or 10 to 10:30 11 to 1130 there a peak load so out of 24 hours 1 and a half hour is a peak load now IRCTC is also hosted the web application is also hosted on cloud so when you have this kind of peak load for only for some time and you cannot compromise with the quality you need to entertain that Peak load one possibili is you find out how much resources you need for managing handling the peak load and keep it running for 24 hours or you may get the additional resources

00:22:56 to manage just the peak load only for this 2 hours or 3 hours time window for rest of the days for 21 hours you don't require those additional resources so you don't need to keep them running now if I C is on cloud what does it mean for these 2 three hours you can get more resources to handle your Peak load and for rest of the 21 hours you can release these resources the advantage is what what are the advantage following this strategy resource resource is available for someone else who needs it so one thing

00:23:46 is resources are freed from your end you are not occupying them anymore for 21 hours so that can be shared with others who needs them during those 21 hours time okay cost op optimization is you don't need to keep running those resources and your electricity will be only for 3 hours not for 24 hours so electricity bill is one of the biggest concern for this data center service provider not the data center itself but the electricity bill of running this data center and that's the reason if you are aware about uh modern

00:24:26 data centers they are being set up in uh cold regions like Greenland or Antarctica or under sea no they are also thinking of setting a a data center in a space so heat dissipation you don't need to spend much on electricity that's the only reason because if you set up your data center in like City like Chennai or mumbay you need good uh good arrangement for keeping the machine colder and that's where your electricity Wills goes uh exponential what are other Advantage other than cost optimization sharing of

00:25:10 resources what else management overhead is also less only for 3 hours you need to manage large number of resources for other hours you are you can just uh manage lesser number of resources so from consumer point of view as well as from service provider point of view these are win-win situation because for rest of the 21 hours your service provider can utilize the same Hardware to provide services to their other clients and then it's on demand rapidly provisioned so it's not that uh that call is starting at 10:00 a.m. and you

00:26:02 are waiting that resources yet to come it will be immediately available the billing cycle for on demand services will be only consumed for the time you have used more resources and another uh possibilities which we have not covered in the course will be covering that is cloud burst well uh like uh in real world also Cloud burst happens here also Cloud burst can happen so for say 21 hours for example for 21 hours IRCTC can have their own cloud which is a smaller in capacity and they can run 24 hour safely

00:26:45 on that cloud and whenever they go for higher load or Peak load they can go for cloud bursting they can migrate their services uh on the public cloud and utilize public Cloud for 3 hours and then come back to their own cloud back so they can use cloud bursting concept uh where you can use multiple cloud services maybe one from your own cloud service another from public cloud or uh another scenario for having Cloud bust is you don't want to get vendor locked if you host everything on AWS uh maybe you can have AWS with Google

00:27:34 Cloud combination of both is also possible but you have to architect that cloud application for yourself so we'll be Al when we will discuss about application virtualization we we will be discussing how to architect for cloud platform like your normal program or your normal software which you have built for maybe web services or desktop services or mobile that will not run as it is on cloud of course it will run but it will not be able to Lage the cloud features and what are those Cloud features mentioned here in this

00:28:15 definition on demand network access easy easy access then five essential characteristics service models deployment models so those we will not be able to Leverage if we don't build our application for cloud platform any question any doubt in this definition yes for example us can we arue that they not Computing anymore for that okay so question is if service providers Network bandwidth is not sufficient to CER the uh C the audience for that cloud data center then can we claim that they are not Cloud

00:29:12 platform yes so one of the prerequisite for building cloud is all the shared pool of configurable resources should be accessible through Network so if you are say having uh thousands uh 1,000 data nodes in that your cloud data center then you should have Network bandwidth sufficient to provide those th000 data nodes as a service to your clients if you have only bandwidth for 100 200 or 500 then your clients will suffer first of all they will not get access to all the Thousand notes uh simultaneously and then the service uh

00:30:02 level agreements will be uh broken delayed so you will have uh delay in the services service level Agreements are SLS which each service provider promises that they can provision VM in say 5 seconds or 3 seconds but if Network bandwidth is the bottleneck then you will not be able to deliver your SLS and then you can claim it's not a uh you know appropriate Cloud platform they may be cloud in building the moment they provide sufficient bandwidth then they are good Cloud any other question or doubt online or offline

00:30:54 people okay let's move ahead so these are the keywords you need to remember so you know by uh uh middle of the semester you should you know have this uh understanding of each and every word we'll be focusing on rest of our course on these features only whatever like lecture will cover they will map to one of these feature only this one of the these keyword only right okay now let's uh talk about five essential characteristics which uh a cloud platform uh must exhibit because these are essential

00:31:55 characteristics three service models are not essential service models one of them has to be there but in case of characteristics everything has to be there the one is on demand self service so when you as a as a consumer when you go to a cloud platform you should be able to have a Sal service management portal where you can create your own resources either with your mouse clicks or programmatically it's not necessary that uh you should only have a GUI access but you can write apis you can write scripts which can

00:32:39 create on demand provisioning of or releasing of resources for you Cloud resources for you uh for example say you you have 1 VM and it's a CPU utilization goes above say certain threshold certain percentage then you say that okay if uh utilization goes beyond this threshold then you should create a new VM replicate your system to another VM and now you run two VMS two virtual machines and when both the machines have utilization above the threshold then you might create 3 VM third VM or fourth VM

00:33:22 and so on and for doing this you can write simple scripts you don't need to keep monitoring your uh CP utilization and then create another VM and this exactly this statement will be one of your assignment where you need to monitor the resource consumption of your virtual machine and after a threshold you should automatically create a new virtual machine and whenever the utilization is below certain threshold then you release also one VM and what all things we need to take care while creating a new VM adding into

00:34:06 our application service or releasing an existing VM which is part of our application service so what are the things you need to take care okay it'll go one by one suppose you have one application service say IRCTC tal ticket booking service you are costing and now you are adding one more VM into your system to handle the peak load so what all things you need to be you know careful while adding a new VM in your service load sharing load sharing should be there it should not happen that all the load first goes to

00:34:51 two older machine and then only three third machine will be used and why do you want to have a lot sharing or equal lot sharing what is the issue if other 2 VMS keep running the below threshold whatever the maximum thresh higher threshold below that they will keep running and then you put uh load on the third VM what is the re what should be the reason behind sharing the load equally among all the virtual machines otherwise another machine will be in idle phase no but you created the third virtual machine because the earlier two

00:35:33 VMS load was you know crossing the threshold yes so the machine which is doing more task or uh working with the threshold limit their Hardware May degrade early like if you buy any external hard disk when you buy any external hard disk the life or hard disk is defined in what form number of IO Cycles you can perform 10,000 CIO Cycles or 50,000 IO Cycles now if a virtual machine is running with the threshold limit corresponding to that physical machine may have higher iio cycle being utilized and their hard disk May crash

00:36:36 earlier so to ensure that there's a equal amount of v in the physical level in Cloud you would you may go for equal Lot distribution in your virtual machines but that is from application uh developer point of view not from service provider point of view your service provider at their site imagine yourself as a AWS service provider you are having lots of virtual machines requirement from different clients and each client can have different load pattern or access pattern right so one of your client is IRCTC

00:37:23 other your client might be flip cart Now flip cart loot comes at the Festival season only IR C load also comes at Festival season but almost daily basis also so they have different load patterns different access patterns and as a service provider as a virtual machine service provider you need to come up with an algorithm which can allocate a VM to a particular physical machine as a service provider you might having you know 10,000 computers in your data center uh and these computers will be commodity Hardwares not be server class

00:38:11 machines I'll come to in more detail about commodity Hardwares later in the class but as of them assume that AWS might have 10,000 computers or laptops and you are managing those 10,000 laptops and you have to ensure that you prolong the life of all the hardware because you want to have cost optimization for your company now VMS coming from IRCTC or flip cart or any other web service you look at their load pattern from outside you cannot go inside the VM and access their data that's the kind of s service

00:38:58 agreement you generally have with your cloud service provider that your data will remain private and confidential to you in normal circumstances they will not access or look inside your VM of course if you are using uh uh cloud services which are hosted on us data centers the US national security law says and in case of National Security concern or National Emergency they can access all your data which is hosted on us data center clouds or any company any uh service provider company whose head office is in

00:39:44 us so means if even the US companies have their data center in India but their head office is in US it comes under the law of National Security concern now India also have similar data protection uh law and uh which is not that strong as of now we are I think Parliament is still discussing about the data privacy Bill to be passed in this season so uh so uh on the lighter note our enemy countries with which we may not not have good relationship political relationships are not good their companies prefer hosting their data on

00:40:37 Indian subcontinent data centers as compared to us subcontinent us continent data centers because we lack the stronger rule for this data privacy or data regulation and you know which countries I'm referring to so uh so India is a good place for hosting data uh you know cloud services and uh similarly some countries doesn't bother about at all about the data and generally those countries becomes host for uh uh hosting illegal services or hacking Services whatever you come across all the hackings and all

00:41:27 the cloud uh if you wish to create a distributed denial of service attack you need a cloud so you need a country where such regulations are not there okay so on demand self service is clear and y equal load is essential so that if you run your machine with say 50% load in General your electronics component life might be longer as compared to if you keep using your laptop at the 80% of threshold or 90% of the threshold and generally this threshold is being kept between 70 to 80% if your computer goes above 70%

00:42:18 utilization you tend to create a new VM any any other advantage of doing equal Lo distribution how many of you from electrical background or Electronics background no one there are few okay so you must be knowing the reason what happens if we keep running our systems with higher load I wish shake you on M you can answer if you know you have any idea heat is generated uh then system is more heat is generated more electricity is consumed yes and system breakdown uh probability also increases uh if you go at the

00:43:20 electronics level the uh flip flop level all your CPUs are essentially uh Gates like transistor Gates flip flops registers so if they are working very fast the chances error also increases chances of occurring error is also increases although at our one human architecture which we are using currently in our laptops or computers we have error handling code errors we are handling we are Rec correcting lots of computation error which might be occuring at the hardware level and we are not aware about those

00:44:02 things so but why to increase the error chances And Delay your processes any error uh Discovery and Recovery will consume some time and even though so like temperature will high then the behavior of semiconductor will change yes behavior of semiconductor will change your performance will not be the same and anymore your processor might be of 2.2 GHz but they start weaving like 1.3 GHz if they are more heated up and sometimes your pan is started working in your laptops you have lots of noise production in your

00:44:46 surrounding scale up to Data Center where there are 10 thousands of laptops or computers with making so much noise right okay what else what what are other advantages interesting story reminds me about uh uh 2.3 GHz versus 1.3 GS I don't know whether some of you already heard that story from me so which one is costlier processor 2.3 or 1.3 GHz processor come on 2.3 G right all are agree okay yes 2.3 G processor is expensive as compared to 1.3 GHz processor right how they are being produced do you

00:45:46 have any idea how Intel is producing say 2.3 G processor versus 1.3 G processor are they having different batches that in this batch let's produce 2.3 GHz processor in the next batch let's produce 1.3 GHz or they have separate production line separate factories to produce these gigs chips any idea Electronics background people any idea so what they do they don't have separate facility separate batch processing they have single production line chips are being manufactured but you know vsi right very

00:46:42 large scale integrated circuit at the tip of pin they are putting millions of transistor Gates flip flops so there's a physical limitations you know Mor is low it says that everyone and half year your density of your transistor will be doubled and we have already broken Mor's low now with the current processor technology we have reached to the physical limit at Nano scale or PCO scale I don't know what scale we are enable to go you know push that limit now beond uh now this at that level there are chances of error in the

00:47:31 manufacturing process so they are producing the chips in bunch in batches and then they have testing facility which measures that particular chip works at 2.4 GHz at best the other chip may work at 1.4 GHz the third chip may work at 3.2 ghs so when a chip is produced they perform the testing performance benchmarking that at this gahz frequency it is able to perform best in terms of heat generation or power consumption and if you look at newer and newer chip sets they are good at power consumption means they are optimizing

00:48:18 power consumption and their gigs is improved that's the parameter they keep working on so all the chips are produced from the same uh production line and Intel might be selling 1.3 GHz chip uh CPU in May might been 5,000 2.4 GHz might been 12,000 and at 5,000 also they are earning profit at 12,000 also they are earning that much profit so uh that's in general the chip production uh concept ccept works so you can't control these features at the manufacturing level but you label them later on after doing the performance

00:49:09 testing now uh how many of you are aware that you can overclock your CPUs in your laptop and has anybody done that please raise your hand not yet you can try with your laptop uh you go to your bios and change the clocking you overclock your CPU only possibility is it may generate more heat and may have some damage if you keep continuously using it for longer time on overclock speed means your same chip can work with higher clock frequency also so and it can also work in underclock frequency also but in those

00:49:57 the states it might not be optimal for in terms of power consumption or heat generation so same Hardware is possible to work with different frequencies and what's Intel Intel ormd or any NV also they test it after manufacturing of course they try to control as much as possible at the manufacturing level so that there should not be any random error but at that Nano scale PCO scale there are possibility of some error okay so any doubt any question so far sir yeah one question sir sir like I just want to confirm like whether we are

00:50:43 like Intel is manufacturing the 2.5 GHz chip or uh 2 1.3 GHz chip is it the all the component is almost going to be same as the manufacturing unit the chip is of course yes on motherboard you have many more components uh surrounding circuit the fan the amount of glow hit you wish to put on the chip that because I I think like uh one thing that vary uh as as also you have mentioned just now is mostly I think the clock speed is the one that vary in both the component when we are talking about 2.5 GHz processor and 1.3 GHz processor

00:51:26 and Accord ing to that maybe the other unit would have set up with the CPU of 2.5 GHz like Cooling and other stuff and same with 1.3 so I just want to confirm from you is it like that way or is it something different no the story I talked about is only the chip not the laptop Intel doesn't give you laptop right yeah yeah laptop assembler are different yeah but the chip is being manufactured in the same production line and uh after production they test it Benchmark it and label it as 2.4 GH or 1.2 G because at the chip level

00:52:08 generally the size is also same chips and only the clock varies because of manufacturing process and it's not that 2.4 GHz processor will always give you 2.4 GHz H it work as 2.3 also 2.5 also automatically it keeps switching flipping based on your voltage current consumption your processor the how much uh stuff is there in your Cy or uh register so lots of parameters are there which will Define your uh uh clock speed we generally got flops uh flip flop operation per second flops so if you look at super computers or

00:53:00 GPU uh Nvidia GPU superc computers they have flops of one Tera or something 2 million flops or something and our computer may have said 35,000 flops so the operations they can perform the computations binary computations they can perform per second might be 35,000 computations now you translate your program into B binary and if you goes to Binary those who have read about binary or assembly programs you will be also agreed that anything any operation you can convert into addition and subtraction ultimately at binary level

00:53:46 at binary level it's all about addition and subtraction the multiplication can be addition your division can be uh subtraction and your addition can be also converted into subtraction right in that uh complement form once complement at the end one operation only subtractions or you may call it addition they are same as such so our Google meet is essentially also all additions sir you are talking about adder and subtractor right F flop add and subtractor I'm talking about the chip level translators going into

00:54:31 Assembly Language yeah means like you told like additions multiplication is Al implemented with the Ed yeah so you might have sted in your digital design course Eder and subtract half Eder Fuller yes yes everything is Adder at the end all the operations are actually Adder whether you are opening a file watching a video accessing IRCTC filing online income tax attending this class offline or online in digital form everything is Adder at the end okay so your chips are actually made for those task

00:55:10 only now with virtualization we may have uh sir sorry to interrupt I have a question on that um gig part uh so uh uh so uh As I understood like we can't uh directly say that uh this is running on a higher gig so this is a better chip right no no see if there are three chips getting manufactured one is optimally working at 1.3 another is working at 2.4 third is working at 3.2 GHz of course the third chip which is able to work optimally at 3.2 GHz is more robust more St at Hardware level okay but manufacturing production

00:56:02 line is same as compar to other FMC products if you say buy uh a pepsu dent from two different batches I'm not advertising psent okay I'm just giving example so if you have two psent bought from two different batches there might be slight variation but looking at the pepsu it's a quite old company they might have controlled those variations across batches that there might be minimum variation those variations are minimized in fmcs these pepid like companies but what I said for Intel is it's a physical

00:56:44 limit they might not be able to optimize at that level so they still have that error percentage because of which different clock frequency chips are being produced from from the same assembly line understood sir sir uh so for example if I need to Choice choose between two options suppose I have a I3 of 3.8 GHz clocked and an i7 at 2.4 GHz clocked like which parameter should I uh see for that uh that will decide that this is better so uh in I3 and I5 or i7 or rather be I3 only of different clock

00:57:31 speed okay because i7 will have more codes and all yeah if it's only I3 from same generation mhm so of course you can safely go for higher clock because that will increase your speed for your computer okay if you are doing video editing task lots of GPU stuff video processing video mem for higher the clock better the performance okay now you compare across Generations or across different I3 I5 57 version there are other differences also like M4 chip M4 has come right or M3 Has Come For Apple M3 is the latest one M3

00:58:21 you compare M3 2 GHz with M3 2.5 G mhm be M3 is better as compared to M2 although M2 has higher clock because M3 has optimized for your operations for your power consumption so it depends on what is your objective not only clock frequency matters so if your uh instruction set which you run on your chipset not optimize then even with the higher clock frequency you won't be able to perform many task but if your inst optimize then with lesser set of number of instructions you will be able to perform

00:59:04 more task got it so sir is this the reason that we see ler comparatively lesser clock speeds in uh laptop chips compared to the uh PC chips okay so that's interesting point so we generally prefer lesser clock speed as we go more mobile okay from PC to laptop to mobile phones to maybe ordino Reser P if you see the clock frequency is generally decreased because if higher the clock speed more heat dissipation Reed that will be more power required and on mobile on mobile phones your heat uh is get getting dissipated from your

00:59:59 surface surface that's it's get heated up sometimes but on laptop we have fans on desktop we have bigger fans right server machine you have much larger fans for a dissipation not only and there's a heat and dissipating glue also thermostatic glue is also there on the chip side if you open your laptop which you can you can see remove the fan from your chip and then you see there's a glue something yeah yeah that kind of controls yeah you cannot put your fan back straight away you need to put the

01:00:36 glue again yes yes glue is one time used M so that's uh uh formally ends this class for physical people in person people and uh executive people easy diploma people can stay back others can also stay back we will have General discussion about the course logistic okay thank you sir so uh so I'll take just this opportunity to introduce this class with everyone so we have three batches running in this class one is regular students which are in front of me right now sitting in classroom another is executive mtech people who are joined

01:01:23 online and then we have PG diploma people who have also joined online right so three batches will have three different set of question papers different exams but the same assignment and project component will be same only question paper exam will be different how it can be same there a different question right so question came me evaluation will be same or different it will be relative almost same the average is student in regular class might get some say ABC grade same grade will be getting the average people

01:02:11 and the average will be also almost nearby if average is too much varing then different grading policy will be used f okay so uh for PG diploma people I'll talk about the course logistic [Music] now sir small actually here you mentioned that like model is implementation of all right uh earlier you mentioned while saying about definition while explaining about the model in cloud computing you mentioned that L implementation of this model like AWS example you said right here I have small doubt like uh is it an implementation or

01:03:13 outcome for each and every service provider like AWS JCP and ASU these are all implementation so okay so uh what you what we generally do is we pick some mathematical model uh just give me one minute uh I'll so I'll continue with this class till 3:30 if you wish to attend you can stay back and if you have any doubt we'll discuss after 3:30 right yes okay so sir we have other classes after three at what time 3 to 4 3 to 4 right sorry who uh PG diploma also other class at three no no no no sir e diploma

01:04:07 doesn't have other class only AI executive may have other class so you can leave this classroom AI people executive V you can attend your other class uh P diploma people will have class from 2 to 3:30 every Saturday half half an hour extra for them half an hour only for PG diploma not only you can also attend Executives can also attend but sir every class we have missed this half hour right no you will not miss anything that's my okay that's my management don't worry about that okay okay yeah okay so the question was

01:04:52 uh AWS uh yeah sir what I'm what what we do in real life we take some mathematical model and implement it for example uh your camera your camera is a mathematical model in principle it take takes RGB values and convert into uh 3D Matrix and your display device consumes this 3D Matrix and shows the uh with the help of display unit shows different colors so it's a m implementation of mathematical model in form of camera device right now camera from coming from uh uh different companies are implementation

01:05:43 of those models but not the outcome are you getting my point yeah yeah sir yes in the same way like this Cloud same way cloud computing definition has been defined and now uh various companies can Implement and be add to this definition and can Pro start providing offering their own cloud services okay like uh a I mean each and every like AWS gcp all in the same way yes okay thank you sir after 3:30 I will be a yes okay yeah go ahead any other question or doubt okay so I'll talk about the grading and evaluation

01:06:37 policy uh I have already shared with other batches for your batch I'll discuss right [Music] now so this will be our class timing for you it will be sir there is a doubt like can you shift the Tuesday class to like later on the same like by the 8:00 p.m. like because everyone is working till then so it's if it's possible from your end uh so uh like I said this class is mixed up of three batches right so for other batches 6 to 7 is already finalized your batch came later to me but recordings will be available for all

01:07:21 the classes and doubt session question answering session I generally on Saturday and quizzes also will be held from 2: to 300 p.m. only 6 to 730 p.m. is generally mostly the lecture time for all the batches but so attendance is also comp 6:00 we are having our office let me also speak concern I will solve attendance is also uh there's a policy I'll talk about if it will be at least 7:30 or 7 it will be better for us means see it's only better for you if it's after 7:30 but for AI Executives and regular

01:08:11 students it's already fixed for 6 to 7 right we'll discuss that one let me complete the course logistic part for you then we will discuss all these things fine sure sir otherwise your evaluation policy will be left in between okay the course content we'll focus on cloud computing which we started today then we'll cover virtualization then uh virtual and physical networking then storage virtualization then virtual machine management then containers and then applications and case studies uh I have

01:08:52 uh applied to Google Cloud platform for getting some Google Cloud credits as soon as I get from them you will be given some $50 us us $50 credit on Google Cloud platform which you might be using for your assignments or your projects right so for executiv candidates your grading polici for executive candidates right uh for regular there's a different grading policy for them attendance 10% is mandatory instead of attendance uh I expect that you work on some case study because you are working professional you can do better in form

01:09:42 of case study so perform case study for that you will get 10% marks and then uh you watch all the lecture recordings you attend all the lecture recordings this uh three to 3:30 time which is extra for you we will be uh we will be uh taking your question answers or doubts even for Tuesday class as well right so by Saturday make sure that you have watched Tuesday's lecture already so for next say for coming Tuesday 14 January there will be class then there will be class on 19th January sorry 18 January so 18 January

01:10:28 class after 3 p.m. we will take questions for the even for even the Tuesday's class for all of you so uh Cas stud is 10% then there will be three assignments and these assignments will be released uh within this week most probably and there will be different deadlines you need to aare with those deadline there will be four quizzes in online mode using slido platform and uh those quizzes will be held on Saturday's lecture time which you can't es skip there won't be any makeup quiz or so so quiz will be

01:11:14 pre-announced there won't be any surprise quiz and it will be in slido mode you can appear uh for the quiz using your mobile phone as well it will be quite easy to access so that I will uh cover separately just before the first quiz uh if you have any technical issue during any question that we will also account up to 20% of the quiz right uh so it will be like KBC audience poll I hope all of you are aware about how KBC audience fall happens a question will appear on all of your screen and uh uh it uh and you will get around

01:12:00 30 or 40 seconds to uh uh Mark the correct answer after marking the correct answer you have to submit your question we'll have a demo quiz don't worry about that we'll see how your quizzes will happen so all of you will be experienced with using the platform and I understand that for 30 or 40 seconds it's very short amount of time there can be some momentary technical issues in connectivity so uh we accomodate up to 20% of the total quiz questions for example each quiz con May consist of 25 questions so total

01:12:44 number of questions in the semester will be 100 but we will score out of 80 only so if someone has scored 85 their score will become 80 if someone has scored 79 their score will remain 79 if someone has scored 50 their score will remain 50 out of 80 and 20% questions or 20% marks are left to uh address your uh your uh wrong answers or your technical glitches but if there are more technical Lees than more than 20% that we won't be able to entertain another use case is say you attempt first three

01:13:36 quizzes with perfect score so you get 75 out of 75 for example if each quiz carries 25 questions in that case so uh any you can op for not appearing for the fourth quiz so is score will remain 75 out of 80 fine any doubt any question in Quiz part so silence means there's no doubt right no sir sir is there fixed number of questions in the quiz like how much time you got for that so quiz will so mostly you will get time for each question is around 30 or 40 seconds hardly more than 45 and quiz will happen from uh 2: to

01:14:38 300 p.m. on Saturday timing and that we will announce in advance that on which all Saturday we are having quizzes so you can be prepared you can reschedule your other things so that you are able to attend the quizzes in live mode because there's no makeup quiz there's no requiz later on and you cannot attempt it offline you have to be online for attempting the quiz any other question or doubt okay then there will be one project uh either you can come you can create a group of three or four people uh you can uh uh you can come up

01:15:33 with your own idea and discuss with us and get go ahead from us or you can also pick a good research paper from q1 journal or cor or a star conference and implement it and produce equivalent or better results uh the deadline was project also will be announced it will be towards your last day of classes and it carries 15% weightage I think your class does not have any midterm exam right PG diploma we don't so final exam will be your 55 percentage F yeah 50 60 like that yeah sorry it can be between 50 to 40 to 60 right your

01:16:30 final exam yes regulation here it's coming 55% for midterm plus final exam there will be combined question paper and it will be scheduled by your office during that schedule we will have exam and it will carry 55% weightage F yeah sir okay now attendance is not compulsory uh case study is compulsory for you to get those 10% marks right and you can watch uh Tuesday's video before Saturday and you can discuss about any doubt in Tuesday's lecture on Saturday 3: to 3:30 so essentially what I'm proposing here is

01:17:20 Tuesday 6:00 to 7:30 there will be lecture uh Saturday 2: to 3 also there will be lecture and 3: to 3:30 there will be free flow discussion like right now we are having you can ask technical questions you can ask for any help in case studies or projects anything right so for the case study we have to make a group or individually have to do the case study uh I think group will be better but for case study don't go for larger group smaller group maybe for case study you can think of having group of two and

01:18:01 for project you can have group of four people so project should be more effort because case study is like uh like I discuss about the flip cart scenario so similarly you will be looking at real world examples and creating key study out of those things and project and research paper implementation will require more effort from your site sir in the search paper do we need to publish uh somewhere or uh how is it going to be see if you are able to produce better result as compared to existing state ofthe art

01:18:40 results then I will definitely encourage go and go for publication right so for the same can you suggest us some good topics so uh okay so our any uh research paper or project should be related to any of these topics as such uh in due course in maybe in the next Saturday class I will be focusing on the project discussion we'll have a project discussion in detail and there I will propose more topics and how to search for good research paper or good project idea that will be the topic for our next Saturday's class from 3: to

01:19:34 3:30 or if time permits I our other batches Executives and uh regular students also would like to have more discussion on project so that we can also have during the regular class time as okay okay any other question or doubt sir could you share this uh P yes so I will add all of you on Google Classroom as well I was not having list of your class fill date uh I will uh get it from the uh furance and once I get the complete list I will add them add all of you on Google classroom and there we will get the

01:20:21 access to YouTube channel where earlier two lectures were also share where I mostly discuss about the idea of cloud computing I did not cover any technical uh aspect as such because we were waiting for you to join this class from today right sir also you can share the Google Classroom code in comment so like everyone in the class can join not everyone has joined on Google meet anyway so I will invite all of you on Google class CL with your email ID okay sir sir can you tell uh something about midterm

01:21:01 exam uh for executives and regular there is a midterm exam for PG diploma midterm and final is combined so it's a 55% weightage okay please share these dos as well sir in the all these are already uploaded on Google Classroom so once you are added into Google Classroom you will get access to everything in fact I will modify this slide and then add for PG diploma and this a modified grading policy your exam is 55% right sir on the assignments how will be the questions whether it be conceptual or

01:21:47 implementing uh it will be mix uh it will be mostly implementation side because it's a system course and for helping in implementation we'll be sharing the workbooks so you can go through the workbook you understand how to use uh those tools and then you can solve the assignment okay sir and you will get time for example say I'm proposing that by uh 20th January you will get all the three assignments posted on Google Classroom right now for the first assignment deadline it might be somewhere in mid faab then uh

01:22:32 first week of March then the third assignment deadline will be third or fourth week of March so essentially for each assignment you will get sufficient time about thinking how to solve how to uh use the solution but the deadline will be different for these three assignments and we will release all the three assignments well in advance Within next one week or so right okay sir got it any other question or doubt I hope all your concerns are addressed sir just one more thing I would like to add sir regarding the final exam and Midterm

01:23:12 exam which are mostly the subjective in nature from which batch executive or diploma yeah executive sir executive okay yeah so mostly like I just want to know like what are the parameters that key features in the marking scheme from your perspective like what are the things you just look into to like uh give the marks to those answers see the grading scheme will be mentioned in the question paper itself and what I will do I will share my previous year's question paper as well with on Google Classroom so you can go through that and

01:23:48 uh marking scheme is generally mentioned in the question itself and this much is expected and this is the marks so if your answers are to the point precise concise you get good marks and if you uh if you don't focus on what is being asked but tell a story then you get lesser marks okay sir sir for pgd like major exam will be in online or offline mode do you have any it the way your office works the way they will instruct I will follow that okay sir I don't have any authority to decide how your exam will get conducted

01:24:31 whatever instruction I will receive from your program coordinators I will follow that uh sir kindly clarify what is the how it is different the case study and projects okay how see uh if you have attended today's lecture I talked about flip cart yes set up their own data center so that is more of case study and the project or research paper implementation is you will be writing some code for case study you may not write some any code but you pick existing examples and demonstrate that cloud computing Works in this real word

01:25:19 context you can pick up case study for saleforce.com they are the Pioneer in multi and cloud computing so you can pick up their case study pick up their real word examples and explain share the link of this case studies so that uh means in which website so that we can no no no there's no single website or there's no particular link you have to design your own case study based on existing real word events which has already happened from blogs from technical blogs from Google cloud or Amazon Lambda

01:26:03 team so have to come up with your own case studies if I give you link and ask you to just rewrite it for that t 10% weightage is too much I guess just one question uh before working on the case studies like documenting do you have to propose the topic to yes topic proposal for case study and project uh both will be there we'll share Google form or Excel sheet there you can mention and once we say okay go ahead or discuss accordingly you proceed okay cool any other doubt or question or still there's any concern regarding

01:26:50 Tuesday class because now I'm asking you to watch Tuesday's video if you are enable to attend live classes or any video recording for all the classes will be there for Saturday class as well so uh if there's no quiz you can uh also watch Saturday's class video later on as for your convenience but during the quiz it is compulsory to attend in online mode so can you suggest some good books or provide us the PDF of the books yes yes books uh uh okay so on Google Classroom uh I have already uploaded uh

01:27:33 first handout course handout and there the textbooks and uh reference books are mentioned you can follow them so today I will uh ensure today or tomorrow I will ensure that you are added into the Google classroom um sir if possible for the regular student and executive candidates as well please make make the class more delay for the Tuesday and that is not possible because for regular student timetable is decided by office of academics not by me see after 7:30 they have other stuff in hosts or playgrounds there so many

01:28:23 other aspects concerns and if I extend it then there are there are lots of clashes might be possible with other stuffs which regular students mostly bchs have committed to do but you can if say if you're comfortable like joining at 7 p.m. you join at 7 p.m. you start attending the class start asking doubt from 7: p.m. and 6 to 7 p.m. recording you can watch later on okay any other question or doubt so what kind of subject it is like more theoretical or practical we're going to study it's more practical with

01:29:16 all theoretical Concepts but it's not Theory like computational complexity or algorithms it's more of uh system admin so once you do this course you'll find yourself that you are inclining towards system admin job or managerial jobs so sir in the course subject like will there be any lab uh like or we'll be doing the sessions online no so virtualization this course particularly does not have any lab component but uh for a PG diploma batch maybe we can think of conducting some handson session by TS from 3: to 3:30

01:30:11 time how to use cloud how to solve your assignments so we can have some practical handson session from 3 to 3:30 by DS yes sir that will be great but demand should come from you right so we don't know like what we're going to study in this subject like I so you so you are at the perfect place if you already knew the subject then there's no benefit of doing this course right so we can't even demand because we don't know like this practice part you should guide us I I I'll anyway discuss with you the

01:30:51 concepts topics assignments will be given to you that's all our guidance and help and support but if you need anything extra like you are saying handson part we can take care of it um in this 3 to 3:30 time additional time which we will have and use it for our hands on practice okay or on everyone's request like can we have sessions with TS on Sunday if that possible like Hands-On session yes that also we can work out okay sir based avability we will work out the Sunday session as so sir in the hands of session uh

01:31:33 we'll be more focusing on the setup of the virtualization lab using VMware or something kind of same or yes yes in to begin with the yes and later lectures uh later interaction with ta may also cover Google Cloud some aspects sir can you give a walk through of cabus like to just uh make us understand what's we going to study because it's milon things this is the cabus okay so what will be the learning outcomes um by the completion of this course uh see uh in I jpur the first mtech person who got placed in Google was was

01:32:32 hired as a cloud engineer and that person shared written experience with me saying that uh she was able to clear her clear her interview based on the first assignment of this course not the second or third even so you will become good fit for cloud or related jobs industry that's what I can say okay sir thank you so can you please share that assignment as well that will be your first assignment anyway and don't worry I will also ask her to uh you know interact with all of you as a class I'll invite her uh for one of the

01:33:19 industry interaction lecture with all of you so you can ask all sorts of Doubt or experience with from any other doubt or question okay then so uh let's uh end this call thank you everyone see you

Summary

The passage covers computer chip manufacturing, testing at various clock speeds, overclocking, power optimization, course structure, and industry interaction.

Highlights

🖥️ Chip Manufacturing: Focuses on the complex process of producing computer chips.

⚙️ Testing & Benchmarking: Emphasizes the importance of evaluating chips at different clock frequencies.

🚀 Overclocking: Discusses the practice of increasing a CPU’s clock speed for enhanced performance.

🔋 Power Optimization: Highlights advancements in reducing power consumption in newer chipsets.

📚 Grading Policy: Outlines the components that contribute to course grades, including assignments and exams.

🛠️ Hands-On Learning: Mentions the potential for practical sessions to enhance student experience.

🤝 Industry Interaction: Encourages engagement with professionals to deepen understanding of cloud-related careers.

Key Insights

🖥️ Manufacturing Complexity: The chip production process is intricate and involves various stages, from design to testing, which is crucial for quality assurance.

⚙️ Evaluation at Clock Speeds: Testing chips at different frequencies helps identify performance limits and ensures reliability across applications.

🚀 Overclocking Risks: While overclocking can boost performance, it can also lead to increased heat and potential chip damage, requiring careful management.

🔋 Sustainability in Design: Newer chipsets prioritize power efficiency, reflecting a growing demand for sustainable technology solutions in computing.

📚 Comprehensive Grading: A diverse grading system encourages students to engage with multiple learning methods, ensuring a well-rounded education.

🛠️ Practical Experience: Hands-on sessions are vital for applying theoretical knowledge, preparing students for real-world challenges in tech.

🤝 Networking Opportunities: Interaction with industry professionals provides insights that enhance academic learning and career readiness in cloud computing.