### network\_week2\_lecture1lec2\_1-20240912

说话人1 00:00  
Before the lecture, I wanted to clarify that how the assessment and you must from the original I copy in the material, from my another course, under original course in the hong kong, the undergraduate. You can assessment of people in the first friday. So your guys are sitting in the following. Majesty majestic are given last time. So certainly is that your final working, you have 3 or 5 minutes. You can work to 5 points and you have a small essay was 5 . 2 meter is writing. Then you have ten marks for project. Maybe project and I see our cases among the location and all the totally 50 marks. Because in the hong kong undergraduate, we have a meeting there. We have two big assignments. So the certainly different because you are master student, you in terms you need doing some kind of small research just as a protocol to form that purpose. You do not mean it again, for example, rather than something you apply. They can solve the real problem, right?

Last week we give you a big picture, computer level, some common from the technologies concept. All of these things just a sense for their man, no, not at all. You are really working there, the risk. There is the second lecture about the fathers and lecture the delivery where detail about them. Each of them is concept. So now i'm gonna have something from the just 2 hours a year. We have something in this, so we just quickly go through. So one, we see the new major internet performance. You have multiple messages, for example, and trying to delay the transition, the poor package, transmit rate in the capacity, and the local in terms of the buffer side and period time, which is all people pay for our values, radio or later being a different physical medium.

You come from the that they are single goes through. Its speed is different, and in the end today is different.

Today we talk about very important concept of throughput, basically is how many you already know that in your second right project and how many days through from end to end from the sender receiver. This is a very simple case. In the middle. You only single rotor. In practice, as I said, why not from hong kong? You press the observer in the la is a all the scientists.

So in that case, you in the middle of many of these workers. So if you look up, if you can these two workers, the neighbors, what was the internet, maybe just several kilometers or maybe thousand kilometers? The speed is different. Here. I'll just use a very simple case. This is aa client, the board is a customer. You request our service. Ok go through this robot and the first thing from here to local. Your rate is perfect and rck after the robot ok you are rs perfect and rsb this is the service are. So in this case, usually we do not a public in china's speed, because the internet, the speed usually is not come from the depends on how many user is an italian at the same time.

For example, this particular link is many. The future of the beta or message passed through is on the congestion. Even now, very few people go through. That's are very easy. But typically, we use every, for example, it's 1 hour on every the bridge is. Which one, suppose you want aa standard or file or upload a file to server. So how much time you fire, for example, heavy? The fire slide warning, as I said on, this is fb right? You take a second 2 seconds to finish. This will easily calculate x divided by t if we use the part that is the so called the rate larger or small, for example, these two types, this is the dynamical much higher, larger than this one, the bottom leg is here. It's like you, no matter is how long from this, like this link is between how far your transport.

So this you is called awfully the limited. All right. There are 2 kinds of cases. Why is it the super side? Maybe it's a region that's the customers are. Okay. So these from sorn to n means from source to destination. If this is the source is destination or you sell the nations of the nation, all of the link in this open house, the one link is the minimum transmission range. That's the end plan through hold for this routine. In this case, because this side less than this, the circle is rs this one is just being one part. In the server side. You have very large transmission rate in the the customer side is a small part, is a larger rc in this case, in the bottleneck is here. This complication so called is determined by rca small one.

Overall, we think it on the end to end the past, looking past questions and to have this report, because this determine how long you transmission is. Data to another side, the experience, because no matter, the rest is a hard line, you can buy the bottleneck. This is like you are talking about the the market is right. If you use one of the market is the lowest, you only hold on this number, this the volume, water, right? 77 principles behind.

Now we have looked at this particular case. This is supposed to the customer. I guess it is in the cdo and one power. We got you guys have a the monitor and stuff. We all request the service may be located within guangdong or in beijing as well. So there are each of these are faster servers serving about the same things. Maybe the function that replicate if everybody doing the single observer maybe is too overloaded crash. Instead, you put multiple one, each of these server, ok along the limited rate is rs for a second, this is rc the major one is simply not to get away more better.

Talk about, for example, if you are in hong kong, another in singapore, the cable is there in the same day is open for. So they should look like the the single table, because each of these is 1 pair from the customer to the server. So this particular the the cable, the capacity is r because you have three different customers. So you three guys fairly share model will some market higher proportional, some market less lessons? We call the bias location. But in general, if you feel everyone you for share, so that means if you can see, this just gives you an example of three customers, even when you say they have a customer here. So this total pattern is r should be divided by your ten people, each of you on the contraction. There you can see the ruling class is rsr divided by ten rc so the adequate support should be in the three way. You choose the minimum. And according the circle, that definition is easy, right?

Okay? This is, okay. The performance we already talked about how the packet loss on the first delay, because in the program of purely, you are going processing delay in the transformation. You will have the package that mission delay and physical single propagation delay. We already mentioned through both the last one we talk about the powerful label, a layer and certain models.

There are part of you. We already mentioned what are the holes, most of the robot, what's the links of various media? Why is the video? One is like wifi and hoping a little bit copper paper, et cetera. Application depends on the point of number. Use the sky that we use zone. To use wechat, there are plenty of greater applications, as I said, that the human we have common communication that is the . of time.

Is there to here? The computer is also because you are the two end, the system from here. So I have access to access on the other side. So you suppose also as possible to communicate this. So in this case, the internet is very complicated, right? The human beings can say no matter the problems of haiti. The simple way is partition several modules. You saw this is the second module, this module for maybe just single service, maybe a subset of service. If you're in the module, you have in topic, what's this module taken from there and this model delivered?

We do not have a little exception. They also use this one. We use a very simple example. If you already have taken. Aircraft is the air, we are in the past, you should of such an experience. So you started to purchase tickets, either agent, also internet, right? You gotta take it. Then you bring your luggage to the air force. You recover your luggage in the airport, then you got the forming tickets, right? So the ticket is get away the game. The really bought it. Once you bought the aircraft, the aircraft got away from the the specific role that the aircraft, just the heavy from in the air, right? In the air, the the aircraft and regional destination.

So then from the moving is supply, you got there, so you landed to the wrong way, right? Once united you got to collect your luggage, right first that you will get unloaded, then you can have your luggage. In this case, if you are lucky, damages are lost, you should use your ticket to complain the statement. This is you travel and air, this kind of procedure. This seems easy actually is also part of you a lot of service. For example, whether you approach a ticket or you are using a ticket company is basically called chicken in service. That's all people take care. The baggage handling is right, you back then you lost or something, you upload the plan so that our baggage service. So you boarding the aircraft, unload from the aircraft is usually security, check it, this we all get the service.

So runway take off, this is runway service, both airport and the people come from where the process we waited to leave, the road is to go, et cetera. The air fm from that's are in the air of the attitude that you should have these things controlled by all these on through countries in yunnan ground, they directly doing that.

So the photograph the entire journey, you have five different layers to deal each particular layer. You have a particular service. This is just for this one for why we have a modular condition, make a problem easy. My parents into some things about the problem. I think about how people are model. He does. The boston is more of the list. You do not every part will be doing that. Just do. You do cost also because things are more easily for that. We have the same thing. Basically, they have a final, they are the problem. They are called application. All you got in the future, and you are not here. You have a level here. You only able doing things in application. There you can develop. I write the code in something in your end system. After application. Next they are festival. We will talk about that. There are a set of article, for example, occasion they are as agdpi think. It does daily use, for example, your access. A kind of material uses htdtinitsm to tp is email, the sale, email you send, email you use.

This Is the final. This part is in the application there, as we did a lot of you have access to, you have a voter, the very first voter from package take out the the both are you lost and come from, you have anything. So then you're going to actually the next layer on the transport layer, the transport layer, this process. So I how many of you guys are consistent in your undergraduate study? Does your hand? Most of you didn't know your offering system. This actually process is our system very basic concept. You can say is you got a program, but the program is very different. The process means is dynamic as the concept include. The running the con power, certainly just power in the mother of all the example.

This one, so the two different sides, how communication you are in terms of coming up with all the process. The process is the process computation. So the message ok you talk about there. We will talk about the tcpudt this is a core particle. Usually. Some of the capital levels doesn't treat you guys pcdppt I what about how we do the implement, et cetera. After that, we talk about let motion set up a program from was solved as the lesson. I think most of you already know rip each of these guys want to collect the internet. The site is 30 to be, right? This idea that this market is not ip you cannot connect the internet, communicate, use the internet at all.

So then you have to say how the higher idea is, how do you how to locate the ip for example, you see them in this classroom. The university level side of a temporal ip like that for you. When you you take away your laptop to the public library, ok the library may be also assigned your ip your ip lots of ip address actually start marriage. Change is not very, but sometimes the point like acpu in here, cpu dt dot cu dot cn that's usually permanent one. And I guess we will talk about that later. The engineer has said you have access network in the room is all of these the access go up through this door when within this local market city you can run. Right? So in here, maybe internal you have a lot of switches.

So, for example, from this department to that department, you not go to rather than you gonna doing that, this may be used as ethnic particle ok here is a link into, they are the last day and 50 area when the singular, given this super packing the 01, how do you the if you use the optical signal, if you use why the radio, including of the module that's based on you should keep going to people working in w area. We do not cover is up.

So with the risk, we raise our hopes on the with the four layers. Here I give you a diagram another take seriously, but it just gives a very rough idea. First of all, you need to know for the carbon tax elimination. Suppose in the application, there you have a message, the simple case, you have bigger, larger fire. When you talk to the package ok this is possible package. Once you pass rotor and you the next, there are all the transfer there. First of all, they are usually at the export bit, the number of people of the other. This we call the header is transformed, their header called ht is right. Then this original we call the message is right. This will change the name of a segment because you have an extra component here. Then you go down the list, they are networking, they are, you add a header as well. Actually, it means the network they are that only is the second. We call the segment.

Now we change it because you have the extra loss for modern we call the data brand. So that will further going down to the link layer is right. You hold on, I believe they are header. This will give original. This diagram is right. This will be called a friend. After here. The everything is there just physically in a similar counter ok this is going down. This is local switch, right? But in the end, you got you'll get away here. Once you go to the gallery, because you can see here, 12 party get away. The link is already removed, because as I say, the link is usually local anymore.

After that, you just go to pass through, you already get up local. Can I do anything for you? You just through this side, you have linked there again, then you. So the internet go to your single side. This is in accepted. The here there you are also. Could you remember these friends? Right? Ok so now is expression ok you remove the link they are, so they're working, they are the and remove them. You got some for there. Okay? The possible they are to the application you have. Our case is right. You need where we get it. You pick up on the soft gate.

Now you usually go back to here. So want to go through the gate. I you got an obligation there. So the silver paper save your message. This is roughly the procedure. If you have this textbook using the file, there are capture of file, and they are interpreted from the network, have to go through the procedure. So there have another so called in soosi you can check out. I is international is spending all organization, this international organization make us stand.

Actually, another principle that, as I said, andrew, how about you need to talk about canal university and then the back to how to get that university investment? That's the early book. He adopted this one that's seven there. So what's the difference? The risk is a identical place only in publication. They are to transform their for the 2 kinds of artificial. 11 is part of the education. They are ones session. So because the internet is no guarantee service when we're talking about data. Why is that from here to there? I you finish about seconds. So you don't have another give you such a guarantee, because let's say the ones in your package pick out your door, you couldn't control at all. But in this case, they are visually. Is it something, for example, actually compressive and impression all of these subjects for the vr and put the name?

Sometimes in the summer check power, you the transfer basically more synchronized. Right? In some point, you need to synchronize. You take the time. So all of these implement or paired by software by then in new york. So because most of the people couldn't achieve this one, so that's why the districts for another usually have most justice of occasion they are found for their followed by many more. They are eagerly. So we basically focused on this for their entire courses. Ok so that's for last one. Now we go back to today is start our business and the lecture. I think about my last lecture also very worthy to say, but maybe it's listen. Because this week in that side that I have 3 hours. How much more than here? Because you only do our lecture. There's the third lecture. We will talk about more details. There is probably up there for the male application. There was look like we cover these six components, but the last components so called the videos gaining and confidence to do that.

And I just briefly talk about that, do not spend one time. That's not really, first of all, rather than application, we're working to talk about what's the relevant they are principle. What's the the start of dealing with in the application is? This diagram is the last lecture we already used. Each of. These is a local access. Their work are the local mesh for. This is support. Internet is on. Therefore, we can often hear the words. All of them were connected together from their world. For a user, you write pieces software, running any system, or, in example, or some other firm, even if you are our home, the reverse. So that means you have communication, you have ip address, you can doing a calculation, you can receive the message, you can the response and the message take actions.

Ok here, the decision can talk about the web server software as a certain energy commerce. You have many all of shopping, buy clothes and clothes. You may be order food is through the internet, all these so called e commerce build up is when service the software, right?

So for example, this is a city in the one right in front of our company and university. Then this is some of you may be requested this one, right? So there is the outside someone at home. They use the local festival station access. Because as we did, the different particle is always following the from there. So everybody, you use this far there, all right? Between communication. For example, this server, you communicate through this one. Similarly, this is from here to here. You also this found a layer, as I just mentioned, is a diagram show. These are obligated your message. You can see that down into layer and then you and the aircraft you can from there and the receiver side, not only extracting scrub in the end of the occasion, they are figured, what do you need?

But why be important to see that you always memorize? He'll say that no need to write software already won't get caught. Why is it? We already mentioned the better words that we have called everyone at. A so a means any system, the star party with the internet, you are over, you are as your best job, even you're a smart approach, you're not a class, et cetera.

But one thing is, for example, this is a national or global isp look for a match. You cannot write a software on the higher rather particular occasion to hear why you are not allowed to write somewhere for. Looper. Do anyone have any idea? Tell me why you can't you stand up? No. Why everyone is. Everyone use it? You write there a is a good defended by why is not? Yeah, that's absolutely correct because in the center send things to the destination. If given the middle way, someone intercept your message change, for example, you send your friend of $1,000 that I said $10. If you accept your rest of money. So that's where you are. The worst scenario is about virus stuff. So that's perhaps another is no need is rather you cannot doing this. If you put something in the future that you have no other question at all, you couldn't use the service.

So that's why you cannot. That's what I said many times. You only rather education only. They are in your ad system. You cannot in the role because this was also you transparency, you don't know this file, the internet and maybe working part of it. No, what the car device is. Rollers are sweet, sweetie, maybe on the right user application by the nation, just the sea. And in fact, sometimes they have support the governments, for example, in the government sense, political religions. In the gateway, they can put someone future recover. If is this kind of work? I just block it something that's is in, for general, common is a program. You are not looking at such a right, obligate our emphasis to allow the property development, provocation, and so forth.

The typical application we may have these Like a web service, social networking, like this. I'm not up here, is something in the background, several text message, which are you use a lot of what's up in the western world? Because we have a different, what's up you are doing do not have a good process, or what friends that are the email, right? And that was a game.

So I think some of the time, this is the boys. You sit at home with your friend, and I got a game is right. So this is a typical occupation, suspicious story about it. You will get that. And I will keep talking that currently. How about this is similar things? Didn't be a fire sharing, whatever. Today the last you would have to talk about these only applications. And where is the variety sky zoom? I think you guys, do you already experiment in the past 2 or 3 years already? Like the third remote about being pointing around or use ftd the only 1 year from your own user? You learn the our computing is usually access on mobile service like alibaba and other kinds of some service. You you need to able to access. So all of these is the web service.

There are 2 kinds of paragraphs like we talk about the package sample income. We use this call on the forward. The conditions are only one is service which, right? In terms of services that are inclined and server paragraph, that's actually both the internet problem. What's this program? The paradigm, what are the server is always on toast? That means these hosts always go on waiting response of 27. I said here it was asked my question and I was wrong. This is difficult, for example, it is I in china, now you have a camera that google immediately give you objects in the world.

In thailand maybe is metal, right? Another formula here, another issue is, this is always on and formula, I guess, not, as I say, the cpu here to the university of idsibmidip address, google of ids this have aidsids is a problem. We do not change this often, for example, get us a sample you have scanning wrong.

One example in the daytime is aa peak period. You made it for a lot in the server running to share workload. Otherwise, the user pages as long they really give up with another use your service. In the midnight, everybody has to be every so far you can argue. Cause the electricity consumption, also the heating is very put together very, hardly heating system, so it doesn't. You need so often some of them you probably heard about the the killer is right killed by you can be careful 2 or three one seven five hundred in china and china is on the host. Because not enough electricity. Guangzhou was actually by nuclear power also. Now is cost a lot of money, several thousand, otherwise even the final programs equation. I'll go to that. Now it is a chip. Guizhou is right. Guizhou convinced electricity very cheap, also mostly in the underground, is actually in the mountain in there's you have the whole system where is the like microsoft actually put in a central in the modern island, in the sea and the sea, because that the same area of water come from very low, you can and you will see a lot of in the coding system, et cetera.

So that's already far from here. So in terms of client, you contact with the server. So your behavior is immediately connected. Sometimes I told my iii asked of the coverage wifi and this isn't I can do nothing, right? So all of not your objections is a lot of problems rather than americans are, as I said, in the university because the university located ip address is usually limited, for example, is university may be several others, but if you have what has happened to people and education? Yeah, you couldn't do that.

So the other question should be recycle, because if here you can you certain period of passing you need is in the car. So that's the typical case. Your address is dynamic change is implied from the area. Do not, the one issue do not communicate with the other apply. Every time you can communicate with the server, get the results, right? The server always on, but the client you cannot communicate with each other. One is traveling another. I don't know you how I trust you, right? Here is httpiiatsntp as I said, it basically is for your email access, we were talking about the label.

Another, in this case, everybody, the server is dominant, right? I always on the greater assigned, the only people communicate in the circle. Okay, you can also communicate with each other. So the peer to peer, basically. So here nobody is dominant than others. Everybody is client means you ask somebody service. At the same time you offer several. So maybe you also. So that means you are actually the kid, you want someone. So you one, you also need a certain somebody as a return. This is sometimes we talk about at the whole table number one power, because you can give up with the debt mortgage anytime you can be other from this debt mortgage anytime as well.

For example, you here, you actually have to kind of why is this really unity or any system from an organism? Here, this is to follow up here. So the periodic world is sometimes the so called stability is depends on how many people and how many people diverse, so that give you for our citizen identical.

As me, it was a signal why the problem is. Basically, I have this service, you do not, so you want to smile, I do not. So I have an exchange. So that's above. The peers are immediately connected. So as I said, you can end up joining in, you can leave at any time point is right. So there in terms of your address, ip address is not a problem. You join it, you are here, you need you going to not, for example, you see, I think then you go to my public library, you join again. I don't know. The chaos ips is the dialogue change ok so the advantage or disadvantage in these two different architecture, we will give you an example later in your tutorial. One question help you to further understand this procedure.

I already talked about what's called the process. Process is very important concept in our system. We call the internet communication on page application. There is, as I said, that you're soft level in europe and other software. As underneath transport. They are nuclear. All of these come from by operating system. Ok so then in there are 2 types of process in single machine. Some of you already use the linux in the past is right. The meaning is somehow you gotta get a lot of reason. You couldn't do that. One single case it doesn't terms of your computer to start out here. We both. Another issue, if you have some knowledge, you can change some of the process. There are meaning is a different process in the system process. You may be using the meanings come on and kill some process.

What is that on the memory management process in the other one? So then this is one of these clearing process. The system is not out there. You still work out there. So you think of those you might have your mobile and maybe also from southern 10,000 process running in the background. In this case, a different process of communication we called in our processing computation in the single host. So then for two different projects, you don't reply.

And now the moment that is, so you remember that the last lecture we are here. Firstly, in the hand shaking, you make sure the other side is waiting for you. Even the server come down, so you send the oldest part so called the handshake. And basically you have to process with your side of the line process. If the servers are that, they have so called server process, then next about once you had a shaky, then you send your pass, right? So that the response. So this decision called a message exchange ok so the process of different hopes that you communicate with each other, we call the message. The simple reply, our picture, we have to call the line processor. The divide side, you request something from server. The server side, as I said, once you asked several questions, you have the shaky. The servers are supposed to have a servers process waiting to be answer your question.

The p to p as we said, that every care of every time you serve the most raw as a server as a client, that means in each of the here, you're supposed to have 2 kinds of different processes. Why is the server process? You? So for someone request, you doing something. I think that you also have climate process. You present someone here for you. You have both roles in your side, ok now we talk about the subjects. What color socket is very important process is said, and received a message to. And from socket, the socket, as I mentioned, maybe if you follow me, speaking, is a given away from the door, you someone walk out across your door.

So then your parents and your family cannot control anymore once you go up from the door. Right? So then reserve side, once you in trouble at all, i'm only one problem simple. This is you for one. You can see this is two sides, as we said, all of these computations to this is why layouts application they are. Once you got the process at the same time, you find a door, okay?

In the reserve aside, you also have a process that you create on at all. This is all called. The socket is actually from the occupation. They are pushed down to the transport there. This is okay. Once you have finished, you have a message to throw first during the socket, then to the transport layer be careful. You can see here for transport layer. They are controlled by open system. So in this society, maybe android is right. You may be used, get on the disc. You might be used. Another like and microsoft, like huawei, harmonic, et cetera. This anger is, you cannot do anything for that. So for you to come here, both sides should become a socket. Two sockets. Two process is right. It is our process communications to process. Then the process should have identical.

Now, for example, if you guys have a name, so the name you maybe have both about the rd so the university decide your unique id but this into the process id is some degree is also unique. One thing we can say, we already seen the idea that is certainly too big. The 32 is even this process is running in this particular pose. Do you know whether I can use this? So to be the ipips to read to identify this process or not? So this is a question. If so would you say is yes or no? I have a process running in this whole. This is what I do. So you did I using this ips whether I can use as this process? I identify. Not. What's the problem? Yes, you're absolutely correct. As I said, you see, your wife, that's something even meanings of different process. Become the idea that all of these using the same objects. So you are the same objects couldn't do it kind of activity. So that's not basically was not each process. I have it here is include this host ip address and so called portal number.

For the number I use this game or particular service. Why is that from et you running where the services in the HTTP what number was about? 80? If you run it, EMAIL the struggle that should be granted. This internet initially are safe as before. Is everybody agree? Some area on the point, for example, I say 2 thousand, one 5,000 doesn't empty mind, because whatever you want to use or other, not using this one.

So identical report is two parts. Why is like IP address, not only phone number, for example, in Massachusetts university, the purple science of what machine you have after this is not here on this. Use the festival for this 32, for the number of these two put together from the HTTP server process. So why don't you show? Can anyone tell me why? I guess you should be doing this. So they do not have any idea why we not use the 64, only computer, the computer world, the CPU the next is 32. The internet in Nigeria from 1968, the former available is 1972. At that time is 32. The globally, if you are 30 to be the idea is actually running off the back and choose thousand and 1, 20, 25 years ago already running up.

So what's the sometime today that you always, somehow you can say, and if you could never work it, they are all the rtv four. That means certainly 2 days. After that is for VP six. Vp six is 60, 40 ok so that's probably more than most of you guys. Early days, you wonder can be x 80,000 from 30 years is worsen for 32 days, is for 6040 now 32 on or out of the statement. So that's, rather because this idea is a location is initial about states, actually come from states.

Nobody that even now is expanded to rrpv the rpv six is include everything, include talking about internet of things. If I are good, everybody has a unique idea. You can cover that, but even that nationwide use companies with shopping and also talking about use, this is a global sense of CDR minus one. This is a local, for example, in the China Academy system, we actually inside ipp six.

We can see we have application in their body, but we define the most called messages change between different process in terms, apply the server, climate or send a request. The server always passive the response from the request. So in the messages, some text, the message is you cannot just say, if I send you this formula, you do not really understand what I say, right? So you must have some regulation.

So stand, everybody understands sender, say I feel this is a lot reserves are okay. This is you get away how many other person message is a method? The symmetric, what exactly means as we have a role, but this is the field, is you use this 01 or 10 was action I should be taking. Is that for how to do that? How would you do that? In our first lecture we already talked about? I have something that these are the proposal that is rfc request for columns once they started to give us specifically popular label this internet international authority to the us for example, HTTP today we will talk about that. Smtp is simple. Male temple particle is your EMAIL, this one like the sky, you can how to each other already on the spell on out the approaching by Microsoft. And so you can buy the Microsoft. We take 10 minutes rest. We talk about 78 and almost 1 hour.