### Network\_week3\_lecture3\_1-20240919

说话人1 00:00  
That's true. So we already talked about the upp and tcp basically, the the informal, what was about now we further give it down was if they are transport the bit by bit from one side to other side, if something wrong, whether to resolve this issue, that it has a political is typical is so for the best offer, effort, service.

So where is our efforts? As I mentioned, and I get you got aa hot potato is right. So you just throw away which is convenient for you. You just this wrong way. So sometimes we call the best effort. Edp as audp with it may be lost. So you can send a package, grow up or lost, doesn't matter. We not really care about that out of order of application. The policy is because upp usually, it is used to not have a shaking, do not checking so very fast. You delay specifically, for example, you what's your movie? There are friend by friend if this friend is get lost, the previous one next one put together in your visit. If very fast you want the detector, what's the difference?

That's the cable car in the multimedia, in streaming data. We use that one. We have to connect. Collective one is no hand shaking between uvp et cetera, and the single. Like in when you already mentioned the http catcp why is it about two rp ps? Because you need an energy. This one, whether I shall throw away, whether you receive or not receive or do not care. So you just say you do not have decision. This is the same matter independent of other. Because even you are out of order, indeed, I do not care that I sent the first target and the second and the third on the receiver may be received the third and the first and second. I do not care because you have made some department for me. This is the characteristics of connectivity. So what is there are? Most of this is the second one. Some kind of risky, no connection is not to delay. That means the very beginning. We always say you have two rdd the source of the rdd and the the second rdd then you send a request, in this case, become the model.

Ok are we on your package? Whether you are not as simple? So if you want to be the the connection is w to delay central local connection, state and central receiver work, usually is a small head of size.

So what this exactly means, what's the unity? Except, as I mentioned, is for stream of video on the subject that's sometimes we call the low city media. If you do not want any loss, you can only use this one also some control. Things pointed out on the system going down, I need to send a hong kong message will be more than something. This is how control message you already said very small, maybe just of one people or abide each be, the different people means. How do you sit down? Okay? If you can pass away as fast as you are, this is no congestion control. We will talk about congestion control in our lives. And the diagram, basically, as I said, that somehow technology of people abuse, because in a different, they are, you put a different header on head. So that is, we already mentioned in terms of message to the list they are sitting.

So they get up around agreement. It should be available and they are, but you don't want to take a break. As being a multimedia application are not already made a sensitive dns what dns do they want to do that? What do you do? That? Means, man, name solution. Today, we will talk about how to this, also not a very important. This is you can see all of these. You certainly particular ipss be large as it is the feeling like seeing you got a video bar, and the dp is often reviewed from the ch we want to do what people need to begin with the das so this is an article is the failure that will be picked up at the matter becomes very short, even reliable as from it is over udp at.

He did a lot of the cases they are and come from there. Do you have that? Okay. Now, the further through that, we already actually, basically, I I think the only one we talk about the snmp 40 % is the upp what procedure? Ok this is the server. This is the time the application. Here we have a process, become the complication multibody through process, right? So you have no topic, both sides. Ok so the sender action, this means from our occasion, you can see here, just over there occasion, they are this. The message goes to the socket telephone. They are the telephone they are, then because these particles are used to go back on the th this is more specifically. This uppa particle have a part in here.

Then you you create aupp segment, usually reading aa message, glass of the head, part of the form a segment. But in some cases, you will add an extra one, become a lot. You can partition as you form the before you have two messages, two syllables, 3 seconds. This will talk about the next again. Maybe the several there are about this. All right? This is clear, actually original message. This you already have a segment. Okay? Pass segment to ip so called ip actually, they are putting this. They are actually you have an extra handle part that would be hand up okham this and you go through to that. The same aside, I have got to the network they are nuclear company is local ok is. Here then you give more vaccine to the transport area. The transporter becomes the ceo that see you save the same from ip you check some kind of evidence, this one you are talking about next to the slides.

Typically if you are labour for the universe, this group from the next group or end to end you find your transmission the we call redundant b that's the basic memory you she had with all this. Is it correct or wrong? This is supposed for the dark house. This is supposed to be good or have to decide, right? So I maybe add, for example, far at least, okay? Are this and educated? You have purpose. So that means this is part of the redundant one. This is not part of your information. This actually is overhead, but this one I have, however, you are helpful with this bit is correct or not. If more you have the more bit, if we just want, you can have the 1 bit is wrong and correct people wrong. That means you can't ask the second. The second is pack it again. So that's the purpose. Check the value, export to the application. There are people like, say, that's it, ok now we specifically talk about the what's udp about ok in terms of udp you only need there's a nature for the number, because the nations are there's always there, and but the number you can send, okay?

Source of phone number as the nation for the number, this means the nets are basically you are payload the data. Since so, be careful, you have one particular field is a chance is here. So the two is carbon life.

So why would you take seven? It means that you have the errors in the test into the segment. One example, you can draw two numbers, 125126, right? So further on eleven eleven, so you can't be the 56, and 11 of these, because the government is in the final result, but december are actually received is 46 means 54, and do something different, wrong, but the original songs that was also presentation ok so then the receiver side may be doing some simple mathematical calculation. 4 plus 6 people. Again, what do you call it? Another? So that means something wrong. Okay? This according ii think this extra bit, they are helping children which specific area, you singularly that you told me the same the transmitter rather than the civil society between corrections in civil society. If you resume side cannot correctly correction, the zeros are to tell the center your message is not correct if you send it.

Okay. Now that means a kind of fear that is not involved that they needed to send our gap. Transition content of udp segment as a second of 11 in the integers checks and add of use of ones, the complement, the sum to do that test of all the up checks and failed. Receiver. This is so called the field, as I say, that 5 + 6, 11, 11, also said, is there were calculated chances of the whole segment. If the check the compute segment checks, and before checks of your value that you are identical, the simple value put together also 11. That's fine.

Ok no, involve every detective ok if every detective, as I said, you have two strategy. Why is you able to correct? Just think of it. You have this. We call it for the tolerance strategy, the technique you can recover that original this.

But in some cases, you can send up again, say, okay, you will send me again. This is not correct. Here I will use the example demonstrate, but this one, as I mentioned, is there for your little working? They will give you more and more detail how to detect. Suppose you have to accepted in the integer, the first one, second one. You're doing addition, 0101, 11 is 10, the 00. And this is increase here. And one. This is the first one, the second one you add together. But the most significant deal is here you should remove. You can call one problem that you should move to the bottom. Here, it's right. Then this is another one one become zero. You increase by 111, you go to zero, you increase by one, you go to one. This or just a copy.

So this is some so called checks and means complement one becomes zero zero become one, laser become this texas because you can see it is one. Number of five is original. Number six, this is jackson people. This is aa procedure.

If this is the result, but if you transmission find out this this 1 bit error, you can because texas will also transfer to the other side. They couldn't receive true value and stay with our matching the text. If not the error without everyone correct or about, it depends how many redundant species you have. So that we will talk about labor, for example, crc in your mobile phone references, just certainly in the know where they are is a lot of people that they are to be limited. Today, I just give you a roughly to talk about that. Now we will go to the next one principle of reliability. That is atcpok suppose here give you before. How do we deal tcp how do we show our accountable is reliable? What's the characteristics we not in a daily life? We are not aware of you? Very simple example. First, alice and paul on their cell phones, both alice and paul are talking. This is very valid. You get a phone call. What do you want to understand the artist?

For example, this only maybe you are single have reading, maybe is suddenly interrupting, follow up, ask others. Indeed, what she said. This is a typical case that's equivalent here to send a message from this side. This side of the presentation say this is not correct. Then you send again. So what is involved ahead in the air? And for a while, you couldn't hear of that. So for you guys make a phone call, suddenly the others have lost the voice or something. Either are different and broken down or in a lot, you turn off and retire.

Again, that's a typical reality. Is alice just opinion five, just not answer your question, hold over on the other side. All of our area is not the reception because of the none of the broken value of the you how much of all the just figure of copy, maybe as it should be already and say, i'm still here. It doesn't allow it. If you got from the northern tell the other side, maybe you are there, maybe you are not there.

And how do they know that? This is a typical situation. We need the answer, right? So what the typical is, you can see ask you whether is compare me, this is called f means positive. Answer are wrong. Sometimes you couldn't say that please repeat that again. Please speak up here. This is called back. It is not economic human. Okay. Another issue, as I said about the big talking and it's no response. Maybe lost maybe some several in this one, for example, or maybe the other 5 minutes ok in 5 minutes. He is here anything just hang up or maybe send again. You can't miss it by sender after receiving a non active from the receiver. That means you got a wrong message. You are sometimes you never received. In this case, you never received, you have up ok this give us some head how to design or particle to make it this communication reliable, whether the other side is broken down or keeping silent or whatever.

So we started a very simple case. The reliable temple is like a in the center side of the center process. The receivers are you have a similar process, right? Both are the process. You suppose this application there in your transport there, you use tcd this is also reliable of getting your message from this side to this. Unfortunately, so this you can do that further up this in the transporting of these characters transporting are only values available today. Therefore, we have a single kind of or maybe is interference or other situation, electricity or not. There is camera from here is unreliable. Okay? If i'm reliable, you need this reliable. How do you be able to raise the situation? All right. So the complexity of reliable is a customer probably will depend on quality of characteristic and reliable loss. It means the corrupt, it means the governor, one becomes a leader, you become the one we offer paper.

The article on regional language, the sample and receive a model on the scale, so called scale. You mean with another person is secure the way your call or just another situation you reserve on this complication is not a message. This means from the center of the single side is not in the blind. Holden is right. You couldn't see each other with a that person. There are not. Actually, it's a very challenge. The tcd is another really solved problem in total. Okay? Overall, perfect line of channel is almost don't exist in real life. The same part send the same data, the same word, the same word data. That's the idea of it. The present not over a channel is a bit errors. That means the building corruption, one becomes zero 2 becomes one. You get power all of the data around in order, but somebody is a corrupted. I it's the first time, the second and third and so on.

But the individual one, for example, one company really number one, reserve detector error and says, please repeat again. That means the receivers are able to act every. That's a good thing. You don't. Listen, you said, okay, but be careful, you reset you incurred x or da right center. We cancel the data again with we are corrupted, is not correct. Overall, those in the channel is a bit area. Something are missing, something that are corrupt. You see what you have to have, but cannot always have a loss. So sender must wait an apology. Once you send it. A particular person message that person always send you at it. It means ii received acknowledged, if is a line means gonna wrong, if you cannot receive the end line, then what do you do? You may use a lot of mechanism to detail.

First, we talked about the very naive particle during this, all the stop and the wave particle.

You can see the very first is this center side, receiver side, center side, send a packet number zero to the silver side. Receiver receive the name ok center technology. We can't be careful this put the technical number. How do you can send the power line many package? After all, you don't know where about. This is just only one or two, seven packet I received, but then so sad, stop and wait, ok you send up, maybe not even once you receive, not even send.

The next. One is right. In this case, lost idea is not a problem. But impressive. This may be not. Okay, now you have to pack the loss. For example, the center for the time seven receiver received, okay? The second time seven factor one, but the factor one, during the course, they will have the duty that's connected yet lost ok so in this case, in the receiver, they don't know whether with several will receive or not. They have no idea. You may discuss the waiting ready. You have a set of common found, for example, after 5 seconds, I couldn't get a normal even I will send again, ok so this means from the central side, you lost, actually 00. Is it your thing? You have a higher up here? That's the very first, we know loss. That's a topic loss in the source side, center side.

Now we look at in several side. Okay? The packet really 17, the silver to the body and send a lot of them back. Then on the road, this acknowledgment, message loss. So in that case, for the center, they are always really a certain feeling come up.

Then I said, okay, all right. So for this seems to me the strategy works. Do you find any part of this one? Anyone have any ideas? So why is it from the center side lost the silver human body? I put the time out and I will set up again. Then the same did receive the the package, then send a commodity back on. The road is lost. I also use the panama. This is one situations in the world, but in fact, you can imagine, if your this reply, maybe take 3 minutes, you are send out this time after 2 minutes.

That means actually this on the way in the ad, which you premature, hang up your earlier, right? You send our guests. So that's the issue. This is so called a mutual part are because suppose you in this ., you need, you said the next one, but this is going to take 3 minutes. You only 1 minute you resend again. The receiver side, because they already called the package according the number of it. So they have a due to the game ok sometimes you have send out there. So this was the reason this one will be. Seven packet. You send a twice, also, maybe 3 times you incur the export delay and the result of consumption.

So this is not good. All right? So seems to stop and wait is worse, but you can see you always reading the other side, the same it is on central side or the same side, or in the center of taking the time out, the time of the city, also a technique. And but you are not always because the network is dynamically changed. Sometimes many customers use, sometimes is empty. The kind of object was sitting in which one is on. It's a very challenging issue. So this is not work.

Now. People are thinking about the window. We are better. First of all, we find that I know in terms of you should do it, this may be okay, but you must actually we need to value quantitative way. A typical utilization utilization. What is the top market? Demand is fracture of consent of readings. And that means you will send data to other side rather than waiting and doing things. Doing that. Here we use the example. Suppose you have one linkage is one gigabit per second, right? You'll have 15 million seconds. Propagation delay, you have 80,000 meters of package. In terms of transmission delay, this package that you have 80,000 bit, you have one. This means one pdp is per second, means transmission rate. That means ten to do not means per second. You got it 5 to seconds. 1 second in for us, 10 to the six micro second.

Now we look at these operations. We were using this part of lobbying each other, okay? You need to understand what was this diagram exactly means. Okay, in the very beginning, right? You always say send a simple package or something you start from here. To the destination is the first bit that part you are right. This is the last a bit of a lot that means receiver already got your package. They are sending you back of economic until I receive. So you can say that repeat the next packet center at the and so on.

Now, for this situation, we use utilization ratio to see what innovation the center you can see. The program look at the figure of one. The single one is you are transmit the data. Actually, everyone by r is right. Ok the photo is everyone by r and rtt is right. The the nominator part is useful, one, the photo on for each of the package you success successfully send up, you got a lot of different. It's right in the market days.

Now we use the example we just learned is every middle second is right. Micro segment. Then you come from the second. That is 0 . 008 seconds. Okrtt because we already said, say, first of all, that is it's 008. Is this part? Why is the survey? Because we say that one way you go there is 15 million seconds. Rdd means you're going this way that return. So that means the 30 million seconds. This is your second, top, second, sorry? Because the deal, we said it is, sorry. There is 15 below seconds of propagation. All right?

Then you can addition, which is very, very important, is almost that 10,000 12, right? So this is majority time we just winning. You stop and wait, suddenly it's not important. Some people are dancing yet whether we can improve. If you're not with a lot of reasons, just the way you can leave the performance and the i'm going to use the infrastructure. So then people are thinking about, I can use the power line way to do that. So called a power line means send a lot more people you fly into the acknowledged package. Okay? This, for example, five people from a bunch oki send you five guys.

Then if you can do it one by one, I hope that the first person arrived there with acknowledgment ok you find that You leave someone in the middle from the third guy gone wrong, then from that guy 70 a report that's good enough or you need to get along, you just send me okay after 5 times for the there are 77, the second event certainly is. So when you are about surviving windows, so that's the principle we will talk about today. This is a very important one. I should say your final exam definitely you have. Why is it called go back again? Neither I can selected repeat. Is it too very important? But from actually adopted in the you are daily, you have an access one. That means easy packets for the second seven numbers must be an increase. That means that they have become the economic and related eg a packet identify uniquely by seconds number. This is a buffer at the center of the same works are so the buffer that means, because you are not immediately.

So most of the size is put on buffer, can stop up to any pattern, actually is less than the that are in your assignment. Maybe you have some question, then you got it. But they got, okay. Here, for example, you still remember the first one, original, only, this one. And we this, for example, the first package here are the period. How many risks I can send? Point number two. In this part, every part of the spring, I do not immediately get the feedback not immediately. Once you got it, you send it wrong about it in my back. And secondly, you got them. Once this barrier, that's 123, and the 4th packet were set up once basically the 5th, and 6th.

Each time, you suppose in there, you are in this period, instead, originally, you said only one. Right now. How you send the three in terms of influence, you improved by three, compare a very naive one. That's what we got. So called three r this is single one, okay? And rt plus r the denominator changes that's you improve the here. Compare the previous one is One out of 10,000 two is right. This is include aaa lot, okay? That in addition by a factor of three, and you can easily figure out this one. That's a basic idea.

Now we just say, let's go back again. This will force the talking about also very important. Okay? Sender can have here. We put up just three of edge. You can up to any active package in top line, okay? Be careful receive, only send a community at do not at package. They are, this is one condition. So this is not a role center for this particle. Center has the timer or oldest at the packet. That means you have a high mark. When the time point is higher, we transmit all on at the package. We were interpreted this carefully. The selective repeated is another protocol. That's the same or like go back ahead, but these are limited. Change send out the very beginning is the same. You can eat it now because at the end package in top line, we got up to end after package top line.

The difference here, the go back in, you always receive, always send opportunity to act just a single act. But in the selective repeat, each capital with a title, receiver said the individual act for each package in terms of languages or the complexity is more complicated. Is another one. The several side only maintain a one time ok until this is the oldest on act, I said, back. There is one you can, each individual up to age. Time off you should correspond one packet individual is the difference with the left hand side. Volleyball. Several men had time for each, unpack the package ok when time of expires. We try to be the order and act the practice.

All right? We go to the very first one, go back in. So what the means go back in means if fail, you can, the rest is part of central. You're supposed to do it from the oldest figure on the three transmitter of air, with window of up to it, so called window, not get you have given up the slide window. It is, for example, we have it 123, 456789, 10, ok for example, you have four. This is your minimum, right? If this already seven, then I start from here, four, then if this observer is successful item from here.

So this is my idea sliding window. When the next sometime we call the next outside, whatever. In this case, it's a ball, it's hard to have four packets can doing that the same way. Be careful concept. You told me about anti package kb the sequence number, you have the header. As I said, each of these, you in a very first example, you already saw the top of that. We see the part of the zero and topic the one, then of the packet of zero and packet one. In this case, you can say only one single b is zero and one. In general, the window, how many packets you can do? You can use kd kd or how many package is the company? How many? So you come up to to uk right? This is several. Look at this background. You should really understand what it exactly means.

As we mentioned, the window is you should slide window. You can see the green one is in the packet about, in order if you imagine your number zero, 12345, 1235, but here the windows are ordered for 40 k in this case, the all the green one from the very beginning, the green one is already act means I have already received a successful 24. How many figure is? You got one example, n for the you have n package. The yellow part means you send your character out already on top line one by one.

You haven't got received the acknowledgment yet. The global area is you have remaining consent in this bench ok this bench, for example, in here about 60 %. Once for example, this is yellow becomes green means you receive, so the windows won't appear. That means we call a smiling window above. This is a background we talking about. So accumulate actually carefully. You said that they from receiver side, not the individual response, I hope this at the time. Now, they always said at ma include a is the capital number, so that means all of the capital, the number of one to n already received successfully. You include this one. If you receive the successfully, for example, these three become three that they should move to appear to three position ok now, for if the single one move + 51, right? The timer for oldest, you drive an active package.

So that means if, for example, this one not finished, I after a certain point, you need to make this part of some of this, maybe already, is it?

I no, I you still are from here, ok how does it happen in all higher second value is in the that means after from this end, all of these you still are in submitted. We send again. So this you really read. That is a limited try. I will give you a complete example. First, we continue to talk about this that you look at the last central side was role or action. You should take it. Now, look at the receiver side. What do you do? Act? Only the center added for correctly received a package. So far, we with the highest in order second number, be careful. You will be saved some of you on the way. How is it? You always receive the gravity season too far with five in order, that means you could jump, you can the rest is the second, you should be remarked. Maybe john generally the increase at for example you will last receive the at is time to panda is really a lost panda for your body.

So now if you have the value also successful for capital five is about the reply. I want you to pack it to become packed three is not successful. We already have center side look at. Receivers are okay. According to our winner, this is green one you receive. And the red one, for example, this one you have popular becomes the same way. How come this is higher? Number of these three are within the same as this one still on the same. On the same side, after our package, these are discarded. Like he asked you to that, you do not care or you need to be sending them. Again, this depends on the the policy.

So now we use aa concrete example to show you guys how it works. Suppose we have a winner for the packet number from 0 to 8 is increased. First of the time you become window or you can send four packets at the same time. That's right. Receive then, send it back and send it back.

Now you can see the third packet two start from zero loss, the lost. But you can say after it, have the four, here is the numbers which come to start from zero to the recent. We can see why this sender act of one. The capital is, therefore, is this one discarded? I haven't got it. Because the last successful one is at one, right? That's a successful one. Then you're up the order. You've got. This is successful. You still answer access. Actually, one that means accumulated. How is the remedy is? From where beginning so far? That's the act one. So this is everyone understand? Just be careful. So once this loss, what do you do? What do you got a timer? Right? You made a certain theory, right? For example, after that, the four also got it, because the last 34 years, 81 is the 81 back. All right. Once you do it successful, you just remove the the windows life because 12 thousand thousand brought another 01.

The ranking there, you got this for then, okay. Once they lost a certain point, so we need to resend the two again, because the two is the law. This is about 345 successful, the risk of falling successful. You need to resend them again, just last time to the oldest one failure. You send the deal all after you. In that match. You still send them again, ok so that means why we are only single panel in the center of that you can achieve. That. Is clear for everyone very important. Okay? Ok so that to repeat, I think this makes we can not be on the 7:00 past and it's supposed to finish it probably possible there. And so putting the figures back. So today we just go back ahead. That's very important. One. And we need to go home to exercise. So it's not available. What are you doing? Ai know it is.