### Network\_week4\_tutorial4-20240926

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Connection. They. Do you want vaccine so called the d multiplex? It means that you god of in multiplexing. Second. So the receiver side, now, you just there by there and remove the handle part and part to get original the message. All right? Now you can say this is supposed you have three entities and the other hand side, the right hand side, and it's each client. Once you communicate this server, right? Suppose that you have initial sessions in the formal application there, you must have a process. Process of unique id is important number, each of these number of all the number already.

Now you can see from this. You were already for come back, please. You only need destination for the number of ipss you do not like it, collect the original. In this case, you can say the destination go to material doesn't mention that for the number, this is the salt itself, nine one thirty seven or processing. This also, does it measure part number 64 286428? This one? Certainly in today's communications easily on this become a source, right? Source. All number, that's the nation. One number is here, ok so similarly, for what's this resource for number? In this case? I have another part of policy. What's called number? What's this phone number? This is from this side to here, suppose, is 6428 ok that doesn't measure of number, which is a real boundary, 75. These ones are the opposite the source of number, in this case, 5775, that the nation is going to here is 648.

In this case, you can see you have more people, the different. I have a different model number 23 before I have a different, but it turns here to share same ipis same model number ok if segments from different ipiss i'm seeing the situation on the aircraft. I have the same model number. They will be directed to the same process model to here. This is typically like audp and I would mention should be going back in this day.

All right. The contrast of this connection is give us lesson. We have so called collection already in the morning message. In this case, I mentioned it should be 1 to 1. You determine whether, in this case, for example, this all is http server, htttp server, I suppose you have ip address. The problem number is 80 for this time we have only one process that corresponds to here. Then they suppose that you have two different process. But both could be, you can get a different one.

So you can see for this kind of situation, despite that this different results about in terms of destination, there are always these big ideas. The product number 80 is right, is good. This is three how you already said. A process ip address and phone number for this one. How do you determine? In this case, actually, each of this process of different, unique id you call it in this case, as we said, you are source ipe ip address ip port number destination. I guess about what you need is a destination, is it? But it's also different actually go to different. You this one was in the pr pr pr to pr and just pity, you cannot be with someone else. So that's the significant difference.

We also talk about the in terms of stammer and doing a fire on the shell is a fire internet. Why is the so called client and the server? So each of these, you have absolute rate. You have another rate is right. For this, this is a giant server. This time, the server upload the fire, one of client family.

So this is the situation. And then you look at the kr after the server from the kr you take a fireside. If upload with the us you've got fdy units is right. You want to be the same that any copy to any, right, the total, how many days you are in? And if divided by us either days of our time, right? And in terms of sender, so then, in terms of time, become different than I that you are up looking at the speed of a little bit, the time of the speed, we use the minimum one. The minimum number is it should be f divided by d right? So then you can say, if everybody should give the document, if the minimum be careful or larger or equal, is minimum among the town or on the lower, maybe larger than you need, at least from the server side in this amount of time, giving everybody in terms of download the side and the client was through download applying the reason, the total of everybody.

The problem at least maybe more, much larger this one. So this is the fix that this detail is in you just ten user how to shop if you have 1 million users, this the last person to get the result will be part of the big 7 million rules.

Then we also talk about the pdp right? The entire effort you can you travel into the different data channel you can share. So in terms of loading, at least you have everyone. One time us is right. So the client, the slows download in the end, all of the module should download, should be active, developed by a demon.

Okay? A little bit tricky is over here because everybody get this file. So the total it should be a time the f but here are the denominator, us plus individual one. This one is exactly means, for example, is if, all right, you have 123. Before 1234, you have four, half, for example. And this is three time, okay? For the dot a got one, b maybe got three, and c got the, and two ok once you got it, ok the second round, the one, this guy under this module, ok so these are all of this one. Maybe these two come out here. So then 1 . 3. And three got one. So then at the same time, this a maybe this also a pair. So that means this is about three, right? That is about two. Okay, so also this guy get aaa two. So then maybe after this round, this is already upload the for already.

So then you kind of continue, for example, listen to come out here. This is the one we do not want to have, one you come here. Then this is two and four, two put here, and four put here.

Then this guy, 123, this is round this color form. That means each time, once you got a better chance, you upload everybody else and share with you. So that's why they got there doing this. All right? So that we will do. So this pattern is also in the little abc media, but be careful in terms of denominator part. Everybody involved in the previous one. There are no, in pr you do not have everybody involved. So that's my idea. Right? This is a theoretical result. And then we look at the practical way. We don't say it's okay. We will try to figure out. All right. Then last time we just briefly talk about the digital forum, today I have a question about that. This. We see that everybody is free come and free join free departure.

Ok suppose in the via divided 256 kennedys chart, that is easy to check it. Four hundred and fifty sixty. All right? The pr dominant ok suppose the current one, this so called connections, dynamic one. For example, I will give you a procedure. This tracker is who, in terms of our community on the rule, we know how many people participation is, right? Initial at least arrives. She sent a request, actually, she doesn't contain any documents at all. Right? She got a total list of how many people were there. Is that the system maybe signed her temporary three or four neighbors, for example, so called a neighbor means she had communicated with the city of directly.

For example, this guy and then this guy as we are discount, okay? Then she like here we do this. You are missing trump ok so you present someone, for example, in this case, if you try to figure out the higher, this already happened to, in this case, you ask this guy will not have to you do not.

So only you have this challenge. You can, maybe it's a chair, maybe you have that person doesn't have so that you may be offered to that person. All right? This is too far. The level is not fixed every 30 seconds. Shit, you maybe just rather than a sudden another three levels. This is the procedure. They are joined. The forum have no challenge, but will accumulate it over time. For example, these procedures register is a trigger to get at least the pr connected to the subset here. This is of your neighbors. When downloaded, we are upload the channel here. So one obligation you down from someone else, you take benefit at the same time, you did unload it, you already have someone in law. Yeah, or you share with someone else.

Okay? So after the challenge to others, pma change rules of health with women. Tnbatrpoa company code is one pmi will entire fire ok so if you're selfish, I got everything. I hope the departure. This situation is okay, or tragically, they may be powerful. You you stand there, you could not do anything. You just waste this up. This is how people started become the argument or you do not upload anything. So this is actually your hair. So this is also not good behavior. Actually. They have some mechanism if you that can be some in incentive. For example, the scar is whether if you be just a scar, whether you use or not actually sometimes use you as a broker or use some of your resource. That if you what are you cannot do that. If you put in offices and you can see the law better than but the network was detected, you put your reputation as a very low.

So then you want to use for somebody else. You maybe get another small communication. They give you because of the case of variable. You are not a good citizen at all at any time, different pr or different subset, a fire chance.

And then you through labour of the exchange, then I am you will be getting okay. The raw you can see evidence is that the chance to come out of all material is there is a 400 % of our chances at the highest rate. Maybe very slow, some of it high. We just on the top four as your levels. But these every 10 seconds, your levels, and we evaluate. So every 30 seconds finally selected another neighbor. So that means, ideally, if children is wonder, so, for example, in this classroom, you have 20 or 30 students. Each time, each of you that is to so called build collection to labels. Further randomly, you have 30 student means you get everybody chance is 30 2 hours of service, right? And you do infinity amount of time. Finally, you always get the documents you need. We'll also talk about the udp unreliable. This use of the program particle, right? It is unreliable, as I mentioned, by the best ever. You just throw away who is running. Is that good there?

But if you allow the technical loss of africa property, But sometimes you just single meter crop when you can use checks. And again, it works. Okay? Now we is 46. I give you 10 minutes to look at the five questions from the up to the part of you. I need some time to talk about this. So listen for you guys. So you just quickly go through. We come back to 36 ok we have 500 and right? And they were gonna finish ok maybe we will start no solutions. In the lecture slides, we say that every in terms of udp whether it's ahead or up, whether it's real, a pair of the paper, in terms of battery, we always have 01 as part of they put in check soon.

Ok suppose now it is rather than sensitivity ok you have three, the numbers, the first one, the second one, and the third one is doing combination 11 10 that you increase it by one. This is 31 . 1, and put the one here. You got 2131 2 . 1. Here, this is 30, and the one. This is 31, the one. And the one here original already have one here, + 1 + 0, and 1. Here. You've got a 1131, and a + 1. You got a 41, you got the 001. The most significant degree should be moved to the this one to the number, the list be.

Okay. So then you have a deal. You got one, 10001, and 1, ok because of this significant one over here. Then you calculate, so the one topic, ok so there is one, couple. So after this recognition companies, then you use the one's complement. One becomes 00 becomes one. This is another 31, risk zero. Why was this at this part with the total is one ok if we go to the sun plus the jackson, what was this up? So these two put together was that they desire. So all data should be one, right? This is the first three is one. This is zero, is 430. And this is a one. That means if you will give an add to the sum plus jackson, all the equals ones means the data transfer to the other side is correct. Otherwise, you get an error.

So the second one, we see no one's talking about some, how about the receiver connected areas? You see the possible that are 1 bit error, just a single bit error of the under effective. How about the 2 piece? The center of it should be, okay, you can detect it, add up. 4 bytes. 3 bytes is the original one plus checks it. If the result or one, as I just mentioned, is right. That is no error. Otherwise, there is an error. Is this one means any one did every can be a little detector and we can do that. Yeah, if it's too big to get aa study, it doesn't, maybe you cannot able to detect. We are going actually, as the sun is making the same way to be the color, believe it.

We use the example. One, this is the second number to add is right. If we go to here, given the sum over the upside and the one that complement in the air. All right? Now, if you the transmission results, original 10, become 01, we did not the second number is 01. The sales are 10, certainly is two. Numbers are already corrupted with the zero side. You're doing this. All the reasons in the act is the same. So they put together is still one, but certainly this is a bigger error you can not able to detect. So that means in some degree answer, our second question, why did the error the probably attention class of the sun, if that I think it will become zero. The particular in the area, there is zero number 11 . 0 correction. If you need to get an error, you cannot detect. We already use an example to show you why this is. You cannot able to detect ok what about the third question? This is related about climb and so well and check the organizations.

Okay? Suppose we have a 5 or 50 g days, ok you have everything else. The slowest the one is to be, the two, maybe the processor. Us upload is 50 per second, okay? The upper lower rate is 70 700 k ps. In this case, we consider two cases. One is only ten a client, one is 1,000 client to say which model of scanner is better. First of all, you need to figure out the the unit one is k one is g one is m first, we checked in the class of a formula, and iius every the minimum for p to p we use this upload the fire rate by the server. This is covered by individual user. This is a collective effort, right?

Before that, they needed to convert the formula ok to the make it per second, because g equals 1,000 °, 700 k equals 0 . 7. Is that 0 . 7? Okay, so just read the phone number. If you were ten and f is 15, because the g is a difference of 1,000, make it is. Although it is, certainly it is okay, it is becoming black. The second one is 15 after 10 to the 3 minutes. And the slow of times two ok this is your calculation, roughly exactly 7,500. The seconds.

Now, if we use p to p we use the same topic of doing calculation. This one is identical. This one, these are technical, this one, but they have, this is the same, but here, this is not, okay. This is just without the and here. So we got 15 after this rate that fires are up over the rate with the download. The rate slows the download rate that the collective effort and user, this fireside upload by server, this ten customer, each customer rate is 3 . 7 minutes per second, ok so this is doing innovation.

So that's exactly 7,500 and you're second. So in these cases, where are you use? Like and it's okay, also is probably say about the time to do that. Now we test the stability time customer easy give up to 1,000. What happened? The first one design is about 500 thousand seconds. Then the second one, if you just do this there, you only get 20,500, 4087. You can look at here 20. This is one that is roughly 25 times use the client server slower than tr to tr ok so now you can say that is very important about this is not the media groups, rather subtle media in the picture slides. There are also code can say the wine is a a lot of specific rules, and the other one is linear groups. So that you can say, what's the difference? They are probably two different gamma, sydney, kodr management. It's too complicated to compare client and the silver.

Then we look at the question for, suppose anything might be a bigger target client. We are already on the pfpo ones that she doesnt allow other clients to download any data from the whole system. That one about 33 person here, supposing that b is is alice. And occasionally, despite to come outside of our neighbors, or maybe not from here, this around, maybe not god, then she got the, for example, four, and then she maybe not god and maybe not god, and maybe she got three.

This person is wearing. She doesn't want to share with others.

She claimed that by using the whole system, she can join our parents in terms of this free trial and still receive a complicated copy of the share buyer. If is anything that is possible or not, whether she do not want to share any more down the government with somebody else. Initially, she maybe is empty. She just joined in. So she may be received from someone else, right? Because someone become a hard neighbor and sent to her, but she rather cold after mothers up to the agency for anyone.

So if I ask whether alice finally can stand up the entire problem, yes or no? This in your head.

Okay. Two, can you explain to me? Why not you'll be banned by the stone? No, this is not a server. You are here, and there is a free, no server. Everybody, you are contributor, you are also the same one, right? The former I just wanted to see what I don't know about. It are also contributed to anybody else without a reasonable or not. So you can say, yes, so what's your reason? Why? Okay? The system basically say it is possible as long as she just stand over. There is a month you just engage someone, because every 30 seconds you were shifted your neighbors. Some papers, just the company people do not know. You shares his part. So as the documents are always limited.

All right. For example, is under for you just 100, you really every 30 seconds you waited 1 day. That's how many seconds is, right? So you always have a chances, because your level, you someone never all know, you are mean, do not give it to you, but after 30 seconds, you already shifted to other neighbors that the group label may not let you know, you will send you.

Okay? So in the end, she is possible, but all document the condition is she stand there as long as possible ok because editor will be able to come along the this higher. Each time you choose so called top four, the article is sent to you. If she, because she did not contribute anything. So she wouldn't become another one, but however, you should have always occasionally, you got the design to our label, so that level, maybe I guess it doesn't give you exchanging the chart. You do not have one. That's okay. So that is she the consequence she made it very, very long, actually have received all kinds of data. So one issue you can go to the center. If you everybody, swiss, the neighborhood is the probability is equal, also independent. That means. So for giving sign, for example, they decide for it would suffer any, you have any people participate, you able to calculate was a particular person received all documents, or in terms of mathematical probability, how many rounds exchange she or he?

And I get the the whole document expectation. So if you're interested, you can go to think about, certainly, that's you need not probability previously to take out how it works. The first one is unlimited that we consider our time we are linked with our preparations leader is oki first time to do this part. This is basically a test. So a long time talk about our rtt and htmal so that in the transfer, this is about the I you can from this society to this society. You have reading and find the have to do 6 meters per second. Then the transmission rate. This is r as initially they use the same. 150 is important. And the packet size is, it's 100,050. Right? The packet of content only is http again, this is very small. In this case, you only this is real document. You need a transform inflation gdp, but you have some control message.

For example, in that case, they say that Only 200, the control, like a bigger message, only 200 people. There is a model. Assume you have any parallel connection with ecf 1 hour, a better days, what this means. Ok suppose from here, this is how you use this one. The total value is the result of this one. Now, you put the parallel. That means you go up to ten ten people, $10. So that china, because the total of this amount of fair to location, that means if you have a plan, you only share this batteries. One of the tag, this is question about, I suppose each download object is 100 pages object, object size is 100. Okay? This and htmal file containment, exactly ten. So that's why I read my a file ten. How do you have ten objects? This is the object located at the same house. What's the parallel done of this ten parallel instances? No persistent st ml in this case?

For this question, you have to recognize where first we already mentioned classroom, the first one, the second one, rtt and the second rtt then I can go, you start up and htnao five, right?

So there is, no matter how you do is always gonna be here. Then the so called ten, you can object in india, the kind of object. Maybe you thought of the in para you combine.

So that means this you can pollute because you can this one in parallel. But in terms of the very first two, you cannot pass the sequential only. You got the hkm and fiber, this kind of objects. This part is the kind of object in the current location. What's the parallel one? Make this? How long does it takes? This is how I want to. What's the solution? First of all, we need to figure out that because sometimes we ignore the time propagation. Propaganda delay is a physical one, nothing to do with transition later. You don't know, packet side rather than the very close to be the single speed. Like if you use light speed like optical or cable, is that if you use copper one, that's the little have a note here. Basically, the reason is per second 300 times 10 to 6 meters, we just calculated one direction.

Okay? From the heel to heel one direction. And then you go back. And this is the other direction. Maybe the same into the propagation rate. We have a goal. You have this first look at the length ok this is a time return, right? Divided by 300, 5 to 10 to 26. That means you got easily calculate this, right? Because of this zero, that's 10 to 5, then the 10 to 5. This is the 2, 10 ~ twenty seven one third. Then then is marker second. Margaret is one mark, 1 second equals one equals 10 to 6 microseconds. Yeah, that's right. So this is a the propagation delay. Okay? Each object can be done with one package, so I will go to the best one first with the download. The buyer, what do you do? First, 200 ÷ one hundred and fifty two hundred, basically, the control, you set the signal. The shift is right and here. So the other side of 200 bit, the the transmission rate is 150.

By the way, transmitter is 150. So you said that this transmitter rate is a small gate, give to the fire instead from our prime skill and plus a preparation of vacation time is tp is right.

Then you receive this acknowledgment is also small. It is transmission time and the last rotation time. Then there was the third one, but once you have a check, is published to send your request, right? You has the html file. So a this is a second of the first reply. Second. This is the third one. Then this transmission that the package htmlok is here. This is transformation is one. I'm four. Once you, because the confirmation also through the channel, because you're supposed to have tp is propagation and each top of propagation. This one is you got the best part, okay? What's that? You have time objects, time objects for most of the time, because each of our objects, first of all, this we got here.

We have ten, right? Because we know the system to persist around for each of them. First, you have sent, hand, shaking and back. And the second one, you send a request, then you can submission data. That is for each of these, because the panel object, we have ten channels we can do in parallel. That's why you have 200 this control message. You said here. 200 ÷ 150 is great. Be careful why we do the divide by ten, because entirely limited made of this 150. Right? So we already said this. You have then object. It's above the end. So that's why you you just share this 155 prepare. This is seven request. This have a shaking and this reply from the other side. But this way you need to add propagation delay, then this one, this sentence that's done, often is a particular object.

Then this is an object done of each of all of these divided by ten. So after this, you can calculate the total is eight, tp and thousand 337. So that's for this one. You need to make sure because long, persistent one will you each of the object that you need and shaking and download and finish them? Close the connection, something like that is real for everyone.

Now we've got the last one. I did a tricky. He has said that you have a family power link with provocations, because we are soon that one, the all conditions same, consider persistent one without parallel financial. So now be careful. Now we do not have. This is ten, just a single in the form of this side to that side. Okay? Is 150 meters per second. Okay? So then let's have a look. Do you have a significant gain overall over system 10 k so let's have a look. First of all, as we mentioned that the base fire that's a sequential one ten, you have to send back to back on your pipeline is seven beginning ok so the first tcp collection packaging is right. Then you passed the base fire and the base fire is possible, get the base of the fire.

So the first providing the best file we already calculated in the previous one is this amount of time you cannot ignore whether you use persistent one way persistent, okay? We add the pattern. This the package because once you initial open, this connection is just doing this. You power line and I have finished you close, not the open, maybe tcp connection, things compare. So that's why. But how to be careful. You send, youve got a pen, it's right. You send your request back to request to be careful. When these each of these request, take how much time then this is come from s and t only 30 seconds. But however, you download the very this first object you download among the time is 100,000 divided by because of the total amount is 150. This taking about 667 seconds. The total of each of these requests at the time you passed, send out only take 30 seconds. That means this time and this time is overlapping. This is 600 more second that's send to these are only twenty, 30/2 once the first object finished.

So actually all requests already received. So the the reservoirs are just the capability is right? Because the request about the other side, the first object hasn't finished download yet. So that means around before the first finish. So therefore, they just you calculate the is one. Can you ignored this time? Because the risk of life request is overlapping with this one, then you got a ten. A total is ten, object is taking this time as a the tcp just a very important one, the rest just the following. You don't need tcdoa so thats total how much time you require.

So this total you can see the original one is aattp is right. Plus, this is 6,000, 668 original one. You can see the here, 7,008. So this is larger than here, you do not use a parallel connection, things. That's the initial phase one plus in a second request and the first request that the risk of request, because of this first one you still are needed is right. The double the risk because of the objective to objective and has the overlapping is forced another time.

So you just the first time, each of these one by one. So you get this amount of time is clear for everyone. Do anyone have any questions? Ok if, for example, if the first one earlier and the second one, then you need to do to calculate the sector, all they said, then you can doing contribution. Otherwise, this one becomes the first one take a much longer time, so you can do a lot of risk once you finish it. The second question already, you can download and so on. All right. So we can run it out is already 27,011 today. And I finished, if you haven't done in your first time and you should be, how are the same data? Is this sunday?