### network\_week2\_lec2\_2-20240912

说话人1 00:00  
This is the power service provided by internet, wherever, and the ttt is usually the giving or whether payments that consists of objects be carefully. Object have many, maybe is not stored in the current domain. This part in the different with the server. What kind of object? Now can you write the html files? You have jpd file. Image is right. You have javascript. You have a video, you have apdf whatever often is. Individual one is different. You I put somewhere that's called objects. A single web page always consists of a base htmr if you want a brother particular page, you offer the first, they support a base html then the objects reaching the object region as well.

So usually expressed by uil for example, this particular picture. This is the home address, and this is we can show you how it works. For example, if I just look at this for myself, right? You can take a lot of my address. I just show you this one. This is particular on my own page, right? This is you are is htmar written. But if I see a little application, this is host of my paper. For example, pdf this is not necessary. This server, rather than the city on the other server as well. That's each of these is an object. You can see this picture, this context, and all of these things, different part, you've got different things. So where was the one? Always is hkmfi in terms of http how we doing communication, http the formula half has the transfer formula.

Suppose this is a several running a a page. I think if you are the create your own service, you probably do not have because this is a free software. You just download it. This already your computer and you can run business. Why not ok so these two different kinds of client, why is it use the fire? Stop? The rather ok first of all, you can fly. You send a request to the server server always turn on waiting a lot of http particle response to your request. For example, you request that particular jjpp image they can handle. Certainly, you can, the server can put the multiple one, for example, another guy. From the mobile phone, you send a request. The server also can respond to your request. The http in the molecule is built up under this one tcp tcp we will talk about this data, as I say, the tcpudp is call in target particle.

Most of the the the simple there was adjusted information is to have a particle in the that the transport data, as we say, that each time client initial gct connection actually read sockets, but not just the socket.

At that time, you also create a process because the socket, you'll be the sovereign side, and you support a similar ipipsip the total number, this http total number of every in the internet is 80 is right.

So once you the server accept the use of the connection from line, this indicator, this is so I just come on. This is ready for service. If you have no response, maybe the server broken down so that you cannot be on the subject connection. Right? The message means the user communicate with the server ok i'm proud of this. With me. I click on this. I don't know something. Now I need to tell another one. So you need the secondly, all of these is communications through the message between the climb and the silver. So the traditional one, once you feel the connection, each time you only allow some of the one single object that is current. Tcp connection close.

The next one, for example, I look at my only page, the first I got the htma file. In my side. You look at that you already comfortable to your side and i'm sorry that puts the hong kong, right?

So there's the one download one by paper and use pdfok so in this traditional one, the initial hand sitting already closed, I need handshake again and none of them again, this kind of worship we called httpv is 1 . 0. Where is your version? Right? Ok http is a steadiness. What called steadiness means probability. You don't forget you first line, you have this come out, then you second, you want to reuse. That's already done. You need the time. Okay? This is a traditional innovation in the public. There are no record in the either side, client side, and the solar side. Once you done this part or not, come you need, we start again. One issue, if I want, is a clear record. I doing this doing that. Certainly you make our order in the internet. For example, I buy clothes a and bc and then to suddenly is crossed.

So I want to recover start from there. All right. Is that called state? You keep your past records? The pure education is not this one. I'm not sure in the manner in hong kong. If you want to go particular website, usually they said I have a booking. Whether you are set up cooking, you will accept the payment, please. That you ever accept. If you do not accept the cookies, they do not allow you continue to. Probably you didn't assure you that's by law. Law in a different region of different law. If you go to europe, there are further seminar the the company's window and you do that.

So you want to make any pdp for your help of state memorize. That's about cooking. We want to talk about the data. The pure one is no, or the standard is no memory. No. Recall once you do that. Okay. There are 2 kinds of httv 41. Why is it called low president? Persistent one. Just I mentioned traditional one. You have three steps for the step. Do you have to shake it? Is it actually open? Then you download or communicate one object, send from servers out to you, then close. If you have multiple objects, you want to in the service that you to repeat these three steps. This is a 1 . 0 version called new persistent one, so called persistent one.

First time you will have a shaking is right. Ok the very first object must be this html this file on them. All of the other object, reference object that you are addressed stuff, so then you can follow them doing the point of all other objects, one by one online. In the end, you are closed. So this one is the benefit rather than every each time you have a shaking call one, the next one, and the next one. This is the persistent version. We call the 1 . 1.

Now we use the very first one to persist, the one you need, a particular customer, the initial basic gdp for connection with the server. So for for example, this the server address this port number. So that means the process in the server side and the server side. And then say i'll set in the. Now you build a connection, both side. The thing is a several processor and client processor in both sides. Then this one, the client concept request. What I think you want to do, first, I know you are there. Now I would want to do, okay, in this content, you are not particularly entity in the fire. So the server received the mathematics response to the customer, right? Then actually, they send you the method, the package of the object, ok once the center up the close conversation ok so despite the customer ten difference, the gdg object is that html five, so the rest, each object, you need follow this, the 45 stop, come on and shady and request and going on.

So this overhead too expensive.

But how to mitigate this bad situation? I think in practice, you use multiple one is client. This is server. So you build a multiple channel. Ok pointed out one. I have 20 k using the http one zero, this also is the same. Each time I use two channels, this doing this force in paradigm. So otherwise you need a handshake. It certainly did handshake handshake because you doing force at the same time that you this maybe is object one, this is for object two ok you can. If you have time object in time, you at the same time you transfer to the time object, maybe 5 times. If you say I have four paragraph, you may be the three round. Each round is for 2 rounds of eight, the last round on the two. This depends on the system saying about that. Basically this is a low persistent one.

Then those persistent when we use the business policy delay, put this problem here, what was look at? Rtd if you do not know, you notice a part of the risk of cost. R is round, go and back ok so you book the ticket around the trip or single trip single from here to there, ok other trip from here to there, and come back the usual, you send the server and server response.

This amount of time called rtt certainly the communications in the message, this is also we called a small packet market. This package not usually the use of data so long, actually is a control package, just given the format.

For example, one indicated your own zero in the case of 1 bit of something very small, the first rte basically, initial tcp connection, build and shake it. You are there. I'm here. Then you send your request, right? The request to say, okay, request I ascend, I start transfer fire, so this is rtv the blue area means your real data you need to transform.

Although persistent, the educated response have so called response time from your salary request until you receive the solution answer. This period of duration, we call the response time. In this case, you have two rt ds, right? And pass this fire transform. No persistent. Now we're talking about persistent one. Just a single kind of shaping all objects can download the problem. Initially, you need the two rt ts, because you must first build a collection with a server on. Then you need some request to give the htm via the object wherever that's right. This one then also overhead for this. It should be collection brother often open module of this number system. Just I mentioned you can put multiple gcd connection with the difference object in parallel.

Look for the persistent one. You only need one, right? Once you got the subsequent httt objects can be doing one by one. So this only need one more rtt for all reasons. Objects. So that's one we really asked, was usually http particle. What's come on? We use the http basically, in several cases, just request at the response clients and requests the server server of response to the request. The request, a message, usually we use asking code. Do anyone know what is sort of that all? What do we stand on after the coke and go? What's the step for the shortcut? This is american standard of the organization made in the 1940s when we are forced to electronic computer deal at the past. The request come on by user, for example, you want to get means from server, you get some fire.

Both you are operating something, even do doing things. So there have we see that every message, you must have a format, each field specifically meanings. So this is the header part for this, because, for example, is get post, et cetera. This you want to find an index file, you use energy be 1 . 1 means you use persistent http so the host we are about this one you get from the university to the massachusetts. Okay? Currently with brother, you use a fire force version, right? So that et cetera, always back to the world are back in, because this is a traditional, these are internet as it is written by the sea. So this is the same language. You return that the pig, et cetera. This is certificate et of field in this message. We do not do more detail, but the data you can have a look. So the post message, similar and gate, et cetera, had a message and get a post and photo is different, probably is just one.

And that means everybody is supposed to able to receive that is including the broadcasting, the response from the server side. Once you got a request, one of these compounds. Right? Servers are getting response. First of all, most, polygram they are taught is advd persistent one 200 means. I'm running this is the subject date at the time is use a green women's car, which is the solar, the power of edge. This is revolution is right, because I had it can updating is which time updated, et cetera. This is the head up. Then the rest is your particular use are useful part of the data. This area, you don't need to stand one able to understand http is somehow it is possible different code.

For for example, you just saw 200. 12 ok is i'm running is though probably is running is mostly those things. One is for the reform not found. You maybe say quite often ok so that means the comment, maybe not there.

Now, maybe originally there are you remove, for example, remove, move the permanently, three, 01501, 0, five means this you got all over the abortion. Party. Your servers are no longer support. So that means another interpreter, what do you really want? All right? My parents, as we said, traditional hdp polygraph is statistics, but how to make it is become a state. You adopt the cookies. You already got, actually, you doing something, some searches on books and someone asking cookie is right, I said or not, if you click or something, you can further. There any stuff is you do they just giving the green area? And no show that just so cookie is basically is a little one. The cookie is exactly what means is maintained some speed between transactions.

In this is not all historical records study. Maybe recent one, but certainly your identity must be in the way is open a new car. You want you back. The first time you will get a lot of repair or verification, take your photos, your I ds, and et cetera. But the second time, third time, maybe you just use your password or a verification in a technical number of se ok so actually they put cookie in your, this is specific customer. What components first cookie header are of htp response message?

So that message is the first time you visited there, they checked their bag and database, say whether this guy from this ipips visit be previously already. If not, you are first beside you, id that id is unique to you, then the responsibility is id in your client side, your brother take this id so next time or next, you send a message. You're already identified, use your cookie id communicate with that.

So then easy to put out the organism cookie id that is my you could cook id to your request. That's the very much in the procedure. We use is a company example to see how it works. Susan supposed to use a brother on her left off with the specifically e commerce side have, for example, to particular side by clothes. All right. When to the initial entity request, certainly you go to the website. Uil is right. The phone number is your http is 80, so you already the other side, when we check the server, check the background back and get away, or father susan, there are visiting them. Previously.

They create a unique idea for susan. This is called cookie for the susan ipfs susan, related information to the bank and database. All right? The server that response to susan request and send the request response back. Certainly. This is not bad included susan ie here we use a background show how it works. This is a particular customer. You already visited e ebay. You you have for the ebay already, for the cookie, for you. So it's 80, 772 74. You made it to the once maybe one more time you accept the cookie. So now the guy want to visit the amazon web service ok so the request of amazon services where first thing is changing his back and get I guess, from this idea address this particular customer with the r with the b previously are not.

Okay, so they find this guy number of visitors. So the create a unique idea for the design, 1678 and put his information in the background back and get away. Then send the response back, but be careful in this is parts. A message. They already include this user for again. Once you the user from here, the brother automatically remember. Keep on record on the idea for that. So the next message, this guy said to here, they are always touch the cookie id unique doing that. Then there is on the service and better always use a cookie id reduce the summer of authentication procedure and setback. This is a current computation, sonora, for example, 1 week after the guy with the on the web service again. But this time you send a message to here, because your brother you already have is good id so this changes the background.

You have a good id so then they said it actually is your response. The cookie added purpose of one is a syndication who you are. This is showing cars, for example, this commercial milk, you like, orange juice. So there may be your website. You rather something they send aok this is particular army juice is very nice or something. Suddenly you are a competition, some of your favorite, sometimes you love this, right? A new cessation, a state. So this is a good thing. Bad thing is that all your activities, your hobbies, they can throw, these cookies can identify you who you are. What's your identity behavior? You do promise ok this is not just the amazon web service, for example, amazon web services maybe is sort of artist how to analyze their customers.

Then the third party for the according you on this id you are not just amazon, you may be able to microsoft, you may be to the other. They just keep tracking you ok so then called your more information ok sometime, you may be benefit your policy. Okay? Leaking the power, how we can see the particle, an environment, and state. So that means you need to the story. Otherwise, how do they believe this? Right? So the province is maybe is the issue learn a lot about you in your site. The worst behavior is a certain topic, persistent cooking, checking your all the common identity, your behavior, your the which is your hobby, and which is your activities in the internet.

Now, we talk about the another important technique is called, we have a test. Sometimes we call a proxy server. So this might be a football sometime in the north american. We call them. So called parliament is right. Every 4 years. They certainly have the year old women. You will have a server to do that because the people from the continent, if everybody goes through that particular and so on and so forth, instead, it's a proxy, for example, as a country in europe, in north america, south america, african, right?

So then the people, so sometimes we call the image, some imagine sometimes we call the proxy, but sometimes people can't give cash.

So the cash purpose is to provide identical service. How do you cheat? Actually, you simplify. So then the primary one send updated to all of the other really kids doing this work. Now we can say what's the procedure? For example, this particular client 1 year got a newspaper new york times since the senate request. This is a local proxy that means in your organization like the cdu you install our proxy, the server less is not a what's up with your ruler in local, not after the ruler? After looking long come from right? So all your requests to underside, first between the local proxy server, say the children with rather have hobby and star and deal different days, for example on the new york times.

As news I request actually doing their protocols radio check. Nobody question yet. So then the behavior of you because the original one and send back to you actually go through this point as well. They intercept and put a copy locally. Okay? So then the second student also want to look at it here. So the senate later, so you go through here, all over there about coffee already. So they do not put to the new ok website. Today is rather than locally to today's. So that means so called proxy purpose. The purpose, you can see this server, they serve two blocks. Why is the client? If each client couldn't find an object, you need to go arranging those things. You send a request there you are applying. If you already start our talking, the risk, for example, this guy that requested, you actually, you are the the server is right. So you passed these original should go there, because you already have topic. You just look. They have double roles and server at the time.

And so at the same time, the servers are reading from the best decline. They are also kind of regional server, passion by isp each university company, the special isp that.

Why would you wear little cash? That's one simple case. You can closer to client that makes a response time to short. For example, from here to new york, you may be taking 3 minutes to get your the packet, but in cpu here, just the middle seconds, you rather a fraction of second, the things. Right? The second issue reduce traffic on institution or access available. For cpu you have ranking some isp that's the approval. If you are the out of aggregate is that there are only where you are the charging. Your cost in the university is right, also increase the internet traffic. If you just in the city while you go outside, so you can see the cost economically or the environment friendly, because that's the electricity and consumption, et cetera, that it's best, it's cash.

So this is almost reasonable size. The organization always have a cash, so the service cannot get hold on this supplement. We use one very simple example to demonstrate why we put the passages make sense. Suppose this is a local network in cpu right? Inside. We use estimated you access as and that is a local area network. You access speed and the transmission rate is one gigabyte per second. This is your roof, this is a server. For example, you want to look at the amazon web service.

They have multiple You. This is like undergoing the excess limit, for example from here to qingdao, they installed your service data center qingdao ok the access meter speed is 154 minutes per second. All right. Soon. And you need to say that your hand shaking is right from this side to here, kcd handshake was in 2 seconds. Just the two is it? The web the data side will be 100 gonna be here is ok this object. You want to do that. The server rate is 15 per second. That means every second 15 packet goes through. But some of this information is, yeah, some is the other you and you need to digest.

This is a context book. The pair evidence we have, the average they have made brother is from here to here is 1 . 5. This for a second. This is about the physical parameters. This is we measure the internet behavior of what's that? Why is the land target intensity? That means 80 of the local intensity . 0015. Do you know how you get this? The local one, you can see it. Basically, we have one g is right, one g equals 1,000. Megabyte is right.

For a second, this one, but you are a user against the one point above this for a second. Right? This is the total capacity. This is yours. That means you get a 0 . 0015. That means this is what we know is right. So we have this a lot of capacity on it. So that means no congestion. You want to do that. If you, like, having a highway do what they are, you just doing your maximum spin, you dropped outside the door, no congestion. So it's very good.

Then we look at the excess in this capacity and intensity. That means from here go through there. If you send out simple data, the rate is, as we mentioned, is 1 . 5. It is 4 seconds. If I the actual link is just 1 . 54 minutes per second. You got 0 . 97 nearly is one. That means falling duty nine. Only you did not imply is very congested, right? So you almost right on the 80 the space to do that. So that means this is the result in long delay.

So now we can say every time delay, so initially hand shaking, delay, right? But put the energy, then this delay and this local delay. I have a second long is in 2 seconds. This is minutes because a lot of reflect here because you are listening to almost congested. So you may take a simple, got it. Listen, need micro, middle, second micro seconds. The local market second means 1 second equals 1 million micro second. So you can see a million seconds, millions and seconds. The dominant delay is really. So this is not good. How do you do this? One? The problem that is here, right? One issue, we can put investment like from here to singapore, one single table. I put 10 or 100 in parallel doing that, increase this part, the transmission rate. Now from 104 54 500, 154 minutes, you can send pick up, and the rest do not have much change, but here is nearly 0 . 0097. That means no congestion anymore.

You can go through very quickly. There are regions are in this area, and the decay is minutes now is millisecond. Nearer second, 1 second is equal to one side sound in the middle second. That's right. This micro circuit, this is three union, the dominant second is right. This is good. Just I waited 2 or 3 seconds. I get a result from now. Remove the sun, but the cost, as I said, if you use a multiple cable in the way in the of the same bag, that's very challenging. You also minor problem cost to. There are too much cost.

Now we think aa permanent solution I use local, you see you on the organization, I miss proxy. Okay? So be careful on the property in inside a lot of those. If after you are rule about your contract, you cannot put the proxy after this. All right? So in this case, certainly good ways you are calculating these things, but we need put some assumptions, right? For example, we are soon 40 % user request can answer by local proxy. That means someone first time ask you can remote access. You put there are rest. A lot of students request same person, you can local answer. All right. So 40 % is requested locally, and that means 60 % should go. They vote to answer ok now we look at the rate ok original said, is 1 . 5 omega ok so now that means you, do you use a fraction? They were gonna say, because only 60 %, this is requested doing the other side to this time, that means 0 . 9 limitation for a second.

Then we calculate that we just use original 1 . 5 is original access to me. Now is 0 . 58. That means this link is a hard workload. That means total capacity. Ii in the hard status, so that person may not have congestion at all. So then you calculate the time. So because you need to receive all these 2 seconds, have a shaky. Because if you total is why your body is local, 60 %, so you can put them. 0 . ￡6 two is hand shaking. The rest is 0 . 1. This is the second ok the middle one, for example, is your doing this 014, local one, local is almost zero.

Second, now that you got 1 million seconds, this is seconds. This is 1,000 times in that case. So I have a roughly one on the 2 seconds. The compare the very expensive, one, expensive one, you only 2 seconds, no better than yours. This is why we use local when process. So certainly you guys have one open question. You have can find other alternative way, not use, just like you increase, no better ways. All I use the local privacy. We are on a third way. We economic and we do not spend much money. We can solve this issue. If you put ideas that then we already said is right for the if you have local copy reputation, then you have all, for example, this particular software updating or f you're in the university, you put one. In the south side, they kept going updating, because they do not know who you are is right. Customer, all the customers can request the server in this part.

Then I need to check whether I worship is the after to get on this already out of there. You can send a so called conditional game, come on to do that. So each time you put a copy locally, you put a time step. This version are kind of a big time point. In that case, you can invest whether it's updated version. You'll send the entity repair if you modify. So this one, so the server, I think you send a request. The server, is it? Okay? I use this 1304, a lot of 45, giving this period we didn't want to. So your version is up to date one ok otherwise, if you say that even modified, right? This reply, okay? Two hundred, this is regular. If is this basically say ok is no change. But if they do modify, then they send them a modified version to you after it goes to your local property. For the updated worship over there.

That means we're doing updating.

The last one, maybe I couldn't finish by today is when we pass the plan is finished, right? Only about 6 minutes ago, we just talk about email. Email is, I think now everybody knows that, and you use the user agent means yourself, you combine it, you modify and remove, you put a different category, et cetera. Mail server. I'm not sure. I I here also use microsoft. 365, right? So in terms of silver, this may not necessarily in china and maybe elsewhere. This is a global things are very numbers in australia. We originally was the better 10 years and although already on the source of the model, the original every university you have your mail service. That's the the major option in every university. You have a lot of email, communicate, academic students, et cetera.

But after in the last 10, 15 years, after thousand, so basically is say what I like the microsoft. Cpu in hong kong is also used. Microsoft three up a little bit 365, something like that. Your server actually is not necessary. So local you compose on there actually through a particle. Smtp sent to the mail server ok the mail server becomes for you just send one mail, but for this is so wrong, maybe is even meaning a customer.

So your maybe need a curing in here. Then you have a receiver. The receiver also needs a server, communicate with your mail server, the receiver, we are server. So smp okay? Once we are server, they save the days. They put into the server. In terms of that, you are receiver, they are access, they are server, the server, for example, you you got an email from other gmail to your mail, so you need access to your server. The mail server is a kind of paramount. You don't know this location is right, but you can access. You are male is another group, the problem for the imp or pop we talk about that.

All of these is true, so called simple. They often for popular evidence, just yourself, I said there are many different good brother in that outlaw eyes and they are applied the why is your fire border, bird fire? I have gotten another icon. They are part of you, hotmail, right? Things. The mail server is basically transfer your email from your side to the receiver side and from you to your lab. Okay? Did you hear a server? Send email message? This here we use the example of general. This is not alice use actual software, some use the best, some use the word or whatever. There's something just achieving our markets. You convert our details of all of you here. First of all, she is like a user agent, okay? Convert mail and send it to her mail server ok the more server that the killing ok this procedure is often is using tcdsdnp so how several killing her message?

Then through stmp send it to the zero side, the several side and the ball, they are reading this email through the other particle, is not smtpimgok you can see here, this is procedure, by the way, that is the imap imat is important that they are accessed for you. Or you think of a part qat when only this is, you need to say that this we are, I guess that when you use internet. Okay, I think we stop here next. We can. I guess then when we talk about these stuff in data, all right, it's on the ground.