

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

PELOTON INTERACTIVE, INC.,
Petitioner,

v.

NEC CORPORATION,
Patent Owner.

IPR2023-01239
Patent 8,752,101 B2

Record of Oral Hearing
Held: November 22, 2024

Before MICHAEL J. STRAUSS, CHARLES J. BOUDREAU, and
CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

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The above-entitled matter came on for hearing Friday, November 22, 2024, commencing at 12:10 p.m. EST, via Video-conference.

P-R-O-C-E-E-D-I-N-G-S

12:10 p.m.

MS. LOTT: Good morning, all, we are now going on record with IPR2023-01239. Judge Strauss, it's in your hands.

Judge Strauss, you have to unmute, we can't hear you.

JUDGE STRAUSS: Okay. I guess it went on. Okay. We'll try it again. Good morning, everyone, or good afternoon depending on where you are. We are convened for oral arguments on IPR2023-01239, which pertains to patentability challenges to claims in US Patent 8,752,101.

I'm Judge Strauss and also appearing is Judge Boudreau and Judge Ogden. Sorry about that. Let's get started, I'm sorry we're running a little bit late, but we'll get started with appearances of both parties for those who will be arguing today including our LEAP practitioner. If anyone else is attending remotely with you today but will not be speaking, please identify them as well. For example, please state if your client is attending.

Following the hearing please confer with the court reporter to ensure there are no questions regarding the spelling of names or terms. We will start with appearances for Petitioner. So please go ahead and introduce yourselves.

MR. WEIDENFELLER: Thank you, Your Honor. This is Scott Weidenfeller on behalf of Petitioner Peloton. I'm here with my colleagues, Anupam Sharma and Rajesh Paul, who will be arguing.

Mr. Sharma will be arguing about the Chou reference. Mr. Paul will be arguing about claim construction. Also listening in on the public line are Janice Jabido and Derek Tang from our client, Peloton.

1 JUDGE STRAUSS: Thanks very much Mr. Weidenfeller. And
2 Counsel for Patent Owner now, introduce yourself.

3 MR. KNIERIM: Yeah, thank you Your Honor. This is Michael
4 Knierim from Baker Botts on behalf of Patent Owner. I'll be handling the
5 argument today. Also on the line with me is Eliot Williams, who is lead
6 counsel in this matter, also from Baker Botts.

7 And on the public line I believe we have several client representatives
8 listening in, although I do not have the names of those listening in handy.

9 JUDGE STRAUSS: Okay. Thank you very much. So I'm just going
10 to go through some standard information. I want to take this opportunity to
11 address counsel and their clients before we begin. As an inter-parties review
12 is a contested proceeding, today's hearing provides you an opportunity for
13 counsel to orally advocate for your positions on the patentability of the
14 challenged claims as raised in the Petition.

15 We understand that in every case that comes before us the parties,
16 both the Petitioner and Patent Owner, have a lot at stake. The judges before
17 you today take our role in deciding this dispute seriously. We have
18 reviewed the briefs and evidence, and we are prepared today with questions.
19 These questions and their answers will help us to decide the issues in the
20 case.

21 In the interest of fairness and due process, we must limit our
22 considerations to the arguments and the evidence already presented in the
23 record. We have the briefs and evidence available to us on our computers.
24 So if we look away from the camera during the hearing, we may be
25 consulting the documents in the record or taking notes.

1 Please know that we are paying close attention to your arguments and
2 carefully considering the case. And if we interrupt you, I apologize in
3 advance, but we do so to be able to ask you questions that may be essential
4 to our resolution of the issues, or to keep the hearing on track with time.

5 Recording of any PTAB hearing is prohibited. The court reporter will
6 provide a transcript of the hearing that will become part of the record in the
7 proceeding at a later date. To ensure that the transcript of the hearing is
8 clear, we ask you to identify yourselves before speaking, to speak directly
9 into the microphone, and to identify specific slide numbers, numberings and
10 figures, and any other pertinent identifying information when referring to
11 demonstratives.

12 Please mute yourself when not speaking. If you encounter any
13 technical difficulties please let us know immediately. And please also note
14 that this proceeding is being streamed online to enable public attendance. If
15 any of the parties wish to discuss confidential information please notify us
16 before discussing anything confidential.

17 To prepare for oral arguments we have familiarized ourselves with the
18 record and issues in the case. Our role as judges on the panel is to assess
19 your arguments and evidence, and weigh those in accordance with the
20 burdens established by our rules of procedure and presidential authority. I
21 remind the parties that Petitioner has the ultimate burden of establishing
22 unpatentability by preponderance of the evidence.

23 Per the hearing order, which is Paper 33 in this proceeding, each party
24 has 60 minutes total time to argue their cases. We received Petitioner's
25 request for Mr. Paul to participate in the oral hearing under the Legal
26 Experience and Advancement Program, or LEAP. So Petitioner will receive

1 an additional 15 minutes of argument time during the oral hearing, bringing
2 their total argument time to 75 minutes.

3 We remind Petitioner that the LEAP practitioner must have a
4 meaningful and substantive opportunity to argue during the hearing today.
5 That said, there's no time -- set time requirement for their argument. It may
6 be longer or shorter than 15 minutes.

7 Petitioner will open the argument and may reserve rebuttal time which
8 may not exceed more than half of Petitioner's total argument time. Patent
9 Owner will then respond to Petitioner's arguments and may reserve sur-
10 rebuttal time, also not to exceed more than half of Patent Owner's total
11 argument time.

12 Please remember that your arguments should be limited to only those
13 arguments previously presented in your briefs. Please make it clear which
14 challenges and claims you are addressing at all times. We ask that the
15 parties hold any objections regarding a party's arguments until it is time to
16 speak.

17 I will maintain a clock and endeavor to keep each party time -- I'm
18 sorry, to give each party time warnings as you near the end of your allotted
19 opening argument and near the end of any reserved rebuttal time, but it
20 would be helpful for the parties to also track their time.

21 Are there any questions at this point? Okay. Petitioner, do you wish
22 to reserve any rebuttal time?

23 MR. SHARMA: Yes, Your Honor. This is Anupam Sharma. We
24 request, we reserve 30 minutes for rebuttal.

25 JUDGE STRAUSS: Okay. Very good. Okay. Very good. You may
26 begin your arguments when ready.

1 MR. SHARMA: We've prepared some demonstratives. I am sharing
2 my screen. I hope the Board can see them.

3 JUDGE STRAUSS: Yes.

4 MR. SHARMA: Okay. This is Exhibit 1043 for the Petitioner. As
5 Mr. Weidenfeller mentioned, Your Honor, I will be discussing disclosure of
6 the Chou reference, and my colleague Mr. Paul will be addressing all issues
7 pertaining to claim construction.

8 We are on slide 2 right now of Exhibit 1043 that lists all the grounds
9 that were listed in our Petitions. Today we will be discussing ground 1
10 pertaining to Chou, and ground 3 pertaining to Chou and Nobuyoshi.

11 With respect to Chou-based grounds -- NEC's objections pertain to
12 Chou reference only. So as a result we will discuss Chou reference and all
13 the arguments regarding the ground 1 based on Chou also apply to Chou
14 plus Nobuyoshi combination.

15 On slide 3 right now, there depicts a traditional framework for
16 streaming video. As shown over here, there's an encoder on the left-hand
17 side that encodes video which is then stored on the video server. The video
18 server then transmits the encoded video to a decoder then displays the video
19 on the screen. There's a transmission network between the video server and
20 the decoder. And that transmission network is unpredictable. You can't
21 control when exactly the frames will arrive from the video server to the
22 decoder.

23 As a result, practitioners have come up with several solutions to deal
24 with that unpredictability. One of them is buffering. In this case, sufficient
25 amount of video is stored at the decoder buffer so that if there are any delays
26 in the network, the decoder can play frames on the buffer.

1 Another technique is controlling the code rate. In this case, the code
2 rate of the frames that have been set from the video server to the decoder can
3 be controlled. For example, if the decoder buffer's running low and there's a
4 risk of under flow, then the code rate can be reduced, and more data can be
5 transmitted from the video server to the decoder in the same time duration.

6 And all of these techniques regarding buffering, streaming video, and
7 using a controlled -- using a code rate to control the buffer duration were
8 known in prior art well before the priority date of the 101 Patent.

9 On slide 4 right now, slide 4 has the excerpt of claim 1 of the 101
10 Patent. Claim 1 of the 101 Patent pertains to a distribution system. The
11 claims have several limitations, but however, NEC disputes only one
12 limitation, that's limitation 1D that's shown on the screen over here.

13 And this limitation 1D is present in all of the other independent claims
14 that we have challenged so the arguments we provided about limitation 1D
15 also pertain to all other independent claims that have the same limitation.

16 As shown over here, limitation 1D is about determining the code rate.
17 And the code rate is determined based on two things. One is the remaining
18 time, and the second one is the available time. Now the terms are longer
19 over here, but for brevity I'll simply refer to remaining time from sub-
20 limitation A, and available time from sub-limitation B.

21 One thing to note over here is that in claim 1, beyond the language of
22 the claim, there's no other requirement on how the code rate is determined.
23 The claims don't say where it is determined, if it will impose any temporal
24 requirement, they simply have one requirement that code will be based on
25 remaining time, and it's also to be based on available time.

1 Moving on to slide number 5. What we have on the screen is an
2 excerpt from the Chou reference that's Exhibit 1004. Chou is a published
3 application that was filed by Microsoft in December 2004. It was published
4 in June 2006. As a result it is prior art to the 101 Patent. And the Chou
5 discloses a technique to control the code rate in order to manage the buffer
6 duration at the decoder.

7 Now figure 2 is an excerpt from Chou. And it shows a network that is
8 very similar to the network we saw two slides ago. There's a decoder left
9 inside that encodes the data and sends it over the network. The data is then
10 stored in the decoder buffer, and then shown on the screen by the decoder.

11 And Chou talks about how do you control the duration of the decoder
12 buffer and does so by managing the code rate of the data, or the frames that
13 are flowing from the encoder to the encoder. And if you look at the abstract
14 it confirms it, and I'm just going to read from the abstract. In the first
15 sentence it says, a system and process for controlling the coding bit rate of
16 streaming media is presented.

17 And then it specifies how that code rate is done. It says, this coding
18 bit rate control involves dynamically adjusting the coding bit rate to control
19 client buffer duration to prevent buffer from underflowing.

20 And the client buffer duration refers to the buffer in the decoder buffer
21 208 shown in figure 2. So that's in the abstract. Chou makes clear that the
22 invention is about adjusting the bit rate to control the client buffer duration.

23 Now we are on slide 6. We have some excerpts from the summary
24 section of the Chou reference. The excerpt, paragraph 19 and diagram 20 of
25 Chou. And the assembly also reflects, or reinforces what is mentioned in the
26 abstract. In the first sentence of summary section, on paragraph 19, Chou

1 mentions that the present invention is directed towards a system and process
2 for controlling a coding bit rate of streaming media data that has been sent
3 over a computer network. Now in the remainder of the summary section,
4 Chou then describes this at a high level, and then gives us more details.

5 So for example, in the second sentence of paragraph 19 Chou states,
6 in general, this coding bit rate control involves adjusting the coding bit rate
7 of the streaming media. And at the side over here, in the second sentence
8 Chou says, in general this coding bit rate control. In this case Chou is
9 referring to the invention of controlling the coding bit rate.

10 Later on in the summary --

11 JUDGE BOUDREAU: This is Judge Boudreau. I have a quick
12 question about this paragraph. In the system and process that's being
13 described here, is the control being exerted by the transmitter or by the
14 client?

15 MR. SHARMA: Yeah. So the Chou reference, Your Honor, is
16 agnostic. The descriptions talk about this being done by the decoder. But
17 the last section, paragraph 130, Chou specifies that it can be done by the
18 client, or it can be done by the server.

19 One thing that Chou is very clear about is that whoever does the
20 control, it is based on the data time of the client buffer. So for example,
21 paragraph 130 says the control can be done by the client, but then when
22 Chou says you can do it by the server, in that case the server would use GCP
23 IP protocol to infer the status of the decoder buffer. And based on the
24 information the server may make the decisions too.

1 But the code rate is determined by the client in one embodiment, and
2 then sent over to the server, and the server then responds with a new data
3 with a new code rate.

4 JUDGE BOUDREAU: And to be clear, in your mapping to the
5 challenged claims, you're relying on the client's performing the --

6 MR. SHARMA: Yeah. For the claim, for the performing client, we
7 do map on the client for the claims that requires server. We do cite to
8 paragraph 130 of Chou reference to show that Chou contemplates that the
9 operations can happen at either location.

10 JUDGE BOUDREAU: Thank you.

11 MR. SHARMA: So just coming back to the summary on slide
12 number 6. The reason I emphasize in general and this sentence over here is
13 there is dispute between NEC and Peloton as to what this sentence means.
14 We read that this sentence over here, in the second sentence of summary, it
15 refers to Chou's invention and talks about how Chou describes the system at
16 a high level.

17 Later on, later in the summary then Chou says there are more specific
18 techniques that we use, and that's the linear quadratic optimal control
19 technique. And it also mentions the leaky bucket technique.

20 NEC's view is this sentence over here in general describes prior art.
21 That, we believe is incorrect position because the summary section and the
22 abstract, they use the same text. It makes it very clear that all the description
23 in paragraph 19 is about controlling the coding bit rate of a client based on
24 the duration of the client buffer.

25 On the right-hand side is paragraph 20, also from the summary
26 section. And that again reinforces the idea that the client is controlling the

1 buffer, or the algorithm of Chou is about controlling the size of the client
2 buffer.

3 So for example, in paragraph 20 Chou describes the problems with the
4 network and so on, but then says in the middle, this issue is resolved in the
5 present system process by controlling the size of the client buffer over time.
6 And it says more particularly the client buffer target level is adjusted to start
7 small and then grow slowly over time.

8 And finally, the paragraph ends with a very important sentence. The
9 client buffer management is a key element affecting the performance of
10 streaming media system. So in this case the system, it could be client or the
11 server, is controlling the status or the duration of the client buffer. And how
12 is it doing that? It is basing it on the size of the client buffer, looking at
13 whether it needs to grow bigger or it needs to grow smaller.

14 NEC has taken a very different view on this one. They believe that
15 yeah, if you can control the duration of the client buffer, but that is done not
16 based on what's happening in the client but based on what's happening on
17 the server. Their view is the system will look at what's happening on the
18 server, we will totally be ignoring what is happening on the client, and then
19 control the client buffer duration somehow.

20 As you go through the slides it will show that that is totally incorrect
21 and it's based on not only misinterpreting some disclosures of Chou, but also
22 ignoring some of the explicit disclosures of Chou.

23 We jump to claim limitation 1D, sub (b), available reproduction time
24 on slide 7. And I will discuss how the available time is disclosed in the
25 Chou reference.

1 I'm on slide 8 right now. On slide 8 we have shown figure 5 from
2 Chou reference. And this figure 5 shows various parameters of the client
3 buffer. There is a staircase graph in the middle. This is the arrival schedule.
4 This shows when the frames arrive at the client. And then on the top is the
5 playback deadline. That shows the times at which the frames will be played
6 at the client. And the Y axis is client time, that's the time at the client -- or
7 the decoder over here.

8 And Chou references figure 5 and says, the gap between frames
9 arrival time -- that's the staircase pattern -- and the playback deadline --
10 that's the top line labeled playback deadline -- is the client buffer duration at
11 the time of frame arrival.

12 So client buffer duration for frame n is shown as a solid red line and
13 obviously as things progress the durations change. So client buffer duration
14 for frame n-1 is shown in the dotted line.

15 Now, when the frames arrive they are put in the client buffer and
16 when the frames are decoded they're taken out of the client buffer. So the
17 client buffer duration captures the status of the client buffer at that instant of
18 time.

19 JUDGE OGDEN: Mr. Sharma, this is Judge Ogden. I wonder if you
20 could explain to me where the playback deadline comes from. Is that -- who
21 sets that up? Or is it calculated from some other value? From, for example
22 the client buffer, or is this just something that is set by the requirements in
23 the system?

24 MR. SHARMA: Yeah. Your Honor, the Chou reference mentions in
25 paragraph 67 that the playback deadline is set. It does not specify how it is
26 set, but it is implied that, it says that it is set when discussing the client, is set

1 by the client. And paragraph 67 Chou reference, in document figure 5 Chou
2 mentions that in paragraph 67. In the same plot, the playback deadline is
3 shown, which is a time $t_{d \text{ sub } n}$ at which frame n is scheduled to be played
4 after instantaneous decoding.

5 And then mentioned in the paragraph over here, the gap between the
6 arrival schedule and the playback deadline is the client buffer duration. So
7 even though Chou does not provide all of the explicit details, it is assumed
8 that the client, knowing when the system has to be played, will set a deadline
9 and they will try to match that deadline.

10 JUDGE OGDEN: So would it be fair to say then that the client buffer
11 duration is derived from those values, the difference between the playback
12 deadline and the arrival schedule? It's not something that -- the client buffer
13 itself is not something that's set, it's something that is calculated.

14 MR. SHARMA: Yes, Your Honor. You are right on that. Yes.

15 JUDGE OGDEN: Could it be calculated?

16 MR. SHARMA: Yes. Sorry, did you finish your question? I didn't
17 mean to interrupt you.

18 JUDGE OGDEN: No. That's it. Thank you.

19 MR. SHARMA: Okay. So yeah. In paragraph 67 of Chou reference
20 it mentions there, the playback deadline and how things will be played. But
21 then later on, in paragraphs 74 through 77, Chou explains how to set the
22 target schedule and how to set the client buffer duration.

23 It mentions that there are two different techniques over here. One is
24 based on the logarithmic technique on paragraph 76, and a two-piece linear
25 technique set in paragraph 77 where the target schedule is based off the
26 playback deadline and then defines the client buffer duration.

1 JUDGE STRAUSS: Counselor, this is Judge Strauss. Just to make
2 sure I understand. So the playback deadline is what is required that the
3 video keeps streaming in a normal mode if somebody's watching it in a
4 normal mode so that they have enough information. So if it's a video file,
5 that the video doesn't stop, or it doesn't fast forward ahead to catch up. It's
6 going to be at a normal rate, whatever's selected, you know, normal, one
7 times or whatever.

8 And the stair step is how the information comes out of the
9 communications and when it's available to the device. So the stair step
10 arrival schedule is when the information actually arrives so it can be
11 decoded. So the vertical arrows are the difference between when you
12 receive information and when it's going to be needed to be displayed or
13 reproduced. Is that correct?

14 MR. SHARMA: Yes. Yes, Your Honor. That's correct. And that's
15 described in paragraph 67 of Chou.

16 JUDGE STRAUSS: Okay. And the target schedule then is an
17 idealized time so that you have enough in your buffer if you were to, if the
18 stair step were to stop. So you had an interruption in communications then
19 you have the target schedule, which you want to make sure you have
20 additional information in case the communications breaks down. Is that
21 correct?

22 MR. SHARMA: Yes, Your Honor. That's correct. And that's said in
23 paragraph 70. When the Chou talks about the playback deadline, it says we
24 need a margin of safety. And margin of safety is for things like network
25 delays that could be problems and so on, so you want to have a buffer so that

1 the decoder can keep playing uninterrupted while you have some protection
2 against network delays.

3 JUDGE STRAUSS: Okay. So that's a desired minimum amount of
4 time that would be in the buffer?

5 MR. SHARMA: Yes.

6 JUDGE STRAUSS: Okay. Thank you.

7 MR. SHARMA: Yeah. And then in paragraph 74 to 77, it tells you
8 how you can set the target schedule. Later on it also tells you how you can
9 change the target schedule if conditions change. But that's like, it defines --
10 the difference between playback deadline and target schedule defines the
11 buffer duration you are aiming for.

12 And then as you said Your Honor, in the staircase pattern, it tells you
13 the time after the frames arrive, and the vertical line tells you the time at
14 which frames would be played by the decoder. So they enter the decoder,
15 and the staircase pattern, and they get out of the decoder at the playback
16 deadline.

17 JUDGE STRAUSS: Thank you.

18 MR. SHARMA: Your Honor, this issue was, we briefed it in our
19 Petition, the institution decision states the Board found that this disclosure of
20 client buffer duration was sufficient to meet the limitation of available time.

21 And the decision on page 41, the Board noted that the Chou's coding
22 bit rate is adjusted in response to or based on maintaining client buffer
23 duration at a target level. So the client buffer duration is shown in red over
24 here. This is the actual one, but the goal of Chou is to make sure that it stays
25 close or as much as in sync with the target duration.

1 I'm moving on to slide number 9. This simply says that Chou comes
2 up with a system, but Chou also mentions that you should account for a one-
3 frame delay. That simply says that if I'm a frame n , frame n has just arrived,
4 earliest frame for which I can decide the code rate is frame $n+2$. Like there
5 is a one frame delay in that one. And that's mentioned in paragraph 81 of
6 Chou.

7 Likewise, if I'm frame n , the code rate of frame n would then be
8 decided by frame $n-1$ because there's a two -- one frame delay on each side.
9 If you account for one frame delay, the available time is shown on slide
10 number 10.

11 So here I have to decide the coding rate for frame n , earliest I can do
12 is when frame $n-2$ arrived. Code time $ta(n-2)$ shows the arrival time of
13 frame $n-2$, and the red arrow shows the client buffer duration at that time.
14 And Chou will use this value to calculate the frame rate for frame n . In that
15 case, once you calculate the code rate, the frame code will go back to the
16 server and the server will send the frame n at the new code rate.

17 Now NEC may argue that this is a new theory, but it is not a new
18 theory. We always consistently said in our Petition and our Reply that the
19 client buffer duration maps to available time and client buffer duration at
20 any time is the difference between arrival time and the playback deadline.

21 Now NEC has two problems, two criticisms of available time. The
22 first mentions that it does not reflect client buffer duration. It is not a value
23 that is based on what's in the client. And second they say even if it is based
24 on that, you don't use -- Chou does not use what's in the client buffer.

1 NEC's position is that code rate is based on what's in the server, and
2 they say it's independent of what is in the client buffer. And NEC is wrong
3 on both of those.

4 Let me first mention that in paragraph 67, that we saw just now, Chou
5 mentions explicitly that the arrival time and the playback deadline define the
6 client buffer duration. That's happening in the client buffer. So by itself it
7 shows that the client buffer duration represents the status of the client buffer
8 because only the client knows when the frames arrive, and only the client
9 knows when the frames leave.

10 Now the second issue NEC complains about is Chou does not use
11 anything from the client buffer. NEC's position is that Chou uses data from
12 the encoder buffer, from the server site to determine the code rate. And that
13 is incorrect.

14 Now I'm on slide 11 right now which shows some figures from Chou
15 figure 4, figure 5 as the excerpts. Before -- first I do want to point out one
16 thing about Chou's scheme. There are two parts of Chou's scheme. One is
17 the buffer tube, we'll talk in a minute, and second is what we mentioned
18 earlier is the margin of safety.

19 When talking about buffer tube, this scheme is used to take care of or
20 to compensate for instantaneous code rate changes. It has nothing to do with
21 delays in the network buffer. And the Board noted that in the institution
22 decision on pages 24, 25 the Board noted that the benefit of the leaky bucket
23 model is that changes in buffer duration due to natural variations in the
24 instantaneous coding rate are not mistaken for changes in buffer duration
25 due to network congestion.

1 So in this case the Board acknowledged that there may be changes in
2 the buffer duration because of two factors. One is instantaneous changes in
3 code rate, while you have video, video is coded, and there are action scenes,
4 scenes which are really, not much action's happening, therefore you get
5 some changes there. That may impact, but the other changes also, that's
6 because of natural delays and so on.

7 So I'll go through the process, the buffer tubes take care of the first
8 step, that is changes in buffer duration due to changes in coding rate. And
9 I'll show you in a minute that margin of safety takes care of the network
10 duration. So the Chou scheme considers these two factors to come up with
11 available time.

12 So with that let's look, start with figure 4 on slide 11 which talks about
13 -- shows the buffer tube. Now buffer tube has both the encoder and decoder
14 in there. Because Chou mentions that at this stage in the buffer tube you can
15 assume they are complementary. They can be in one tube. And there's a
16 buffer tube for every code rate. So the server is able -- or the system is able
17 to transmit video on six different code rates. Chou mentions you may end
18 up having six different buffer tubes, one tube for each code rate.

19 And now in figures 3 and 4 Chou describes what they are. In figure 3
20 and 4 Chou mentions that the staircase pattern D, is the encoding or the
21 decoding schedule. These are the schedules at which packets are decoded
22 from the client buffer.

23 And then schedule C, according to Chou is the upper bound on the
24 arrival time. And this upper bound on the arrival time Chou explains is to
25 take care of instantaneous coding bit rate changes. And Chou says these are
26 based on the video itself, nothing to do with the video network. Chou can

1 predict beforehand what the staircase pattern would look like. It says that I
2 can have upper bound on it, that's schedule C, and therefore if I can have my
3 video arrive before schedule C, all the changes due to the instantaneous
4 coding bit rate would be accounted for.

5 And then Chou mentions that the gap between schedules C and D
6 represents the size of the decoder buffer. That's in paragraph 60 of Chou
7 and as shown over here on the top.

8 This figure also shows very briefly I'll say, $F_{d,n}$, $F_{d,n}$
9 stands for, according to Chou, buffer -- decoder buffer fullness. That's on
10 the top right corner of figure 4.

11 Likewise Chou also shows encoder buffer fullness $f_{e,n}$. And the
12 total buffer is the sum of the decoder buffer fullness and the encoder buffer
13 fullness. And what's shown over here is how to measure the decoder buffer
14 fullness, $F_{d,n}$. On the top and side it says two values, g_n , and b_n .
15 b_n .

16 B_n stands for the frame, the buffers or the frame that came in or
17 that was decoded in number of bits. And g_n is the size or the status of
18 the decoder buffer.

19 So right here Chou is showing us that g_n and b_n are the values
20 associated with the decoder, where g_n is the status of the decoder buffer.

21 Same equation 4 also shows how to calculate the size of the decoder buffer
22 using g_{n-1} . G_{n-1} likewise is the status of the decoder buffer for frame $n-1$.

23 So in the building foundations of the buffer tube Chou shows that
24 there are gaps, or different size in bits that pertain to the decoder buffer.
25 Now the figure 4, the foundation, then Chou moved to figure 5. And figure
26 5, if you notice the difference between figure 4 and figure 5 is the Y axis in

1 figure 4 is in bits. So it's showing you the size of the decoder buffer in bits.
2 In figure 5 the vertical line, the Y axis is in client time. And Chou says I can
3 take schedules C and D, divide them by arrival rate, and I'll get an arrival
4 schedule and upper bound. And that's described in paragraph 67 of Chou.

5 Now when you translate it, as you saw earlier, the red staircase pattern
6 becomes the arrival schedule. There's the schedule at which the frames
7 arrive at the decoder, and that's in client time. Also the green line over here
8 in figure 5 becomes the upper bound. This is the guarantee. Chou says the
9 frame should arrive by this time so it can get rid of the instantaneous
10 decoding changes.

11 Now NEC believes that Chou's algorithm starts and begins with the
12 buffer tubes. That is not true. Chou starts over here, but he extends the
13 schedule to have a margin of safety.

14 Slide 12 simply an excerpt of paragraph 27 which simply says Chou is
15 aware of network changes. It says it has to take jitter, delays, and
16 throughput changes and has to account for them. And how does Chou
17 account for them? It's shown in slide 13.

18 It says over here, paragraph 67 it shows a playback deadline, that's the
19 line, purple line shown on slide 13. And then paragraph 70 Chou says to
20 introduce a margin of safety that increases over time a target schedule is
21 introduced as illustrated in figure 5, and whose distance from playback
22 deadline grows slowly over time. That's shown in figure 5 and we have
23 highlighted the portion between playback deadline and target schedule to
24 show how it grows.

25 So when obviously when the movie starts, or when the video starts,
26 there's nothing in the buffer so playback deadline, target schedule are on top

1 of each other. But as time goes on Chou says you can grow the buffer
2 duration, and you come to a steady state. And Chou believes whatever the
3 steady state is, it's sufficient to take care of irregularities of the network and
4 so on.

5 So in sum --

6 JUDGE OGDEN: Mr. Sharma?

7 MR. SHARMA: Yes, sir.

8 JUDGE OGDEN: So just so that I understand, you're saying that the
9 client buffer is that distance between t_d and t_a , and the decoder buffer is the
10 distance between t_b and t_a , so that's just a part of the -- the decoder buffer is
11 a part of the client buffer?

12 MR. SHARMA: Yeah. Your Honor, the client buffer and decoder
13 buffer are the same. What is happening is the sort of playback or targeted
14 deadline is the goal you are trying to achieve. And what's happens is
15 obviously the frame arrive at different times, you don't control them. What's
16 happening is between -- well it's between the playback deadline and the
17 staircase schedule. That shows you actually what is happening.

18 And the portion that we highlighted over here is the goal that Chou is
19 trying to achieve in order to avoid underflow. So you have the entire client
20 buffer, the client buffer duration, a portion of that would map to what is the
21 target. Sometimes you may be below the target, sometimes you may be
22 above the target.

23 JUDGE OGDEN: So you're saying then that as you move from the
24 embodiment in figure 4 to figure 5 the client buffer is still the decoder
25 buffer, it's just that in figure 5 you have an extra margin of error?

26 MR. SHARMA: Yes. Yes, exactly Your Honor.

1 JUDGE OGDEN: Included in the decoder buffer.

2 MR. SHARMA: Yeah. So in this case, in figure 5 and figure 4, let's
3 ignore the playback deadline target schedule. It simply shows in yellow, if
4 you are to look at the decoder buffer which is the -- I'm sorry, the yellow
5 portion that is there to avoid the instantaneous changes and so on, you'll
6 have the portion between the red and the green. That's the decoder buffer.

7 But I mentioned earlier, Chou's algorithm takes care of two things. It
8 has taken care of the instantaneous coding rate changes, that is down here.
9 Then it has to it a playback deadline and a margin of error. So the two
10 completely from the playback deadline over here, to the portion over here, is
11 the client buffer duration. That's the status of the decoder buffer at any
12 instant of time.

13 JUDGE OGDEN: Thank you.

14 MR. SHARMA: Okay. Yeah. And I think one thing over here, Your
15 Honor, is that all the values over here, playback deadline, target schedule,
16 upper bound, arrival schedule, all are known to the client and the client is the
17 one making the decisions to control the coding rate.

18 Now I've mentioned, in paragraph 130 Chou mentions the server can
19 do it but the server has to have access to these values. And paragraph 130
20 says the server will look at the time stamps, will look at user TCP protocol
21 to infer the status of the decoder buffer so that it can make decisions.

22 Normally if you are controlling something it makes sense, you know
23 what it is so that you know how to control it. So for example, if I'm going
24 from Washington DC to New York, I have to know that I'm going north
25 before I can course correct myself. If I don't know if I'm going to Atlanta I
26 need a bigger course correction. If I'm going to Cleveland I need a lesser

1 course correction. So you have to have some idea what the client buffer is,
2 how big the buffer is, how it is growing so you can control it.

3 These are some questions we asked Dr. Cooperstock who's NEC's
4 expert. He agreed that all these values and everything are kept on the client
5 side, let's skip to there.

6 And finally, Your Honor, all the information at the institution decision
7 level, and the Board agreed with -- thanks.

8 Now I just want to jump to one thing over here and I'll go a bit out of
9 order slides here. I'll jump to slide 32 for a minute. Slide 32 is the same
10 slide that shows figure 5 again. There's a couple of things to point out over
11 here. It's in paragraph 70 that you saw earlier, Chou explicitly mentions that
12 it derives certain equations, called equation 18, and uses those equations
13 then to create a target buffer, an entire client buffer duration. And that is
14 said over here, margin of safety.

15 And one thing to note over here is that Chou specifically mentions
16 when it has created the margin of safety, it has created buffer tubes. It says
17 by regulating the coding bit rate it has attempted to control the buffer tube
18 upper bound so that it tracks the target schedule.

19 So it looks at the upper bound and the target schedule, makes sure
20 those two are equal and that's how it's controlling the buffer duration. It's a
21 little bit of an indirect manner, but it's really clear that it's controlling the
22 buffer duration.

23 And there's a portion over here on the bottom of paragraph 70 that I
24 referenced earlier. Here also, just like paragraph 90 of Chou and also in the
25 institution decision that the Board authored, Chou mentioned that by taking
26 a leaky bucket model into account it is possible to establish control that

1 allows instantaneous coding bit rate to fluctuate naturally. And that's the
2 part contribution of the buffer tube and then the contribution for natural
3 delay is the margin of safety that's mentioned in paragraph 70.

4 JUDGE STRAUSS: Counselor, this is Judge Strauss. I do have a
5 question, just to make sure I'm tracking along.

6 MR. SHARMA: Yes.

7 JUDGE STRAUSS: So I don't know if this is shown in figure 4 but
8 it's kind of my understanding as far as this margin of safety, so what happens
9 is you start sending bits. When you get a certain minimum number of
10 frames so you feel confident you can start reproducing, whether it's the
11 entire first frame or whatever, you start reproducing. That's that playback
12 deadline now is set. Okay.

13 And now you know that you have to keep getting one second of video
14 in for every second you're going to play back. Now you want to start getting
15 some -- building up your buffer.

16 So maybe you had one frame before, and you were just doing things
17 in time. Now you need to -- you would like to have two frames in there in
18 case you miss for you know, because of delays. So what you're going to do
19 is control the bit rate so that not only are you getting things on time but
20 you're also building up this backlog or stock of frames available in case your
21 communications has some jitter in it.

22 Is -- did I get, understand that correctly?

23 MR. SHARMA: Exactly, Your Honor. That's correct. Therefore if
24 you see the -- and Chou mentions that in paragraph 70 to 74. And then also
25 in the startup mode, in paragraphs 89 to 90, that when you start out
26 obviously the buffer is empty and is zero. And as you grow with time you

1 control the coding bit rate to make sure that your buffer is growing slowly,
2 slowly over time.

3 Once you have enough frames, you may say five frames or ten frames,
4 you can say okay I have enough now, I can start playing and you run this
5 portion of what you're already on. But then the control rate, the algorithm
6 that Chou has set through and control the target based on the target schedule,
7 it will grow so that you're growing this area to a steady state. That you
8 know this is enough now that I do not have any underflow.

9 JUDGE STRAUSS: So you might start out at a very detailed picture,
10 where it's a very high bit rate where you're saying a lot of bits per frame or
11 per second of audio, whatever it is you're sending. And then you might say
12 well we have to get less bits per second of display video or audio because
13 now I want to build up a buffer.

14 So you might ask for a lower bit rate just so you could build up your
15 buffer. And then once you get back on track maybe you go back to the
16 higher bit rate if the communications would support that.

17 MR. SHARMA: Yes, Your Honor. And then Chou mentions that it
18 keeps track of the buffer as you move forward. So it happened that your
19 arrival schedule over here, your network slows down and packets start to
20 arrive late. Your buffer will become smaller.

21 In this case Chou will say well I need to dial down the code rate so I
22 can get more data in, more play time in.

23 JUDGE STRAUSS: Okay. Thank you.

24 MR. SHARMA: Yeah. And it may be a situation that your network
25 is very good, you can get a very high throughput and so on, the buffer gets
26 bigger. But Chou says okay, now buffer getting bigger I can go to higher bit

1 rate. It means I have a better quality video and I switch to a higher code
2 rate, so it is a much better user experience to see that.

3 JUDGE STRAUSS: Okay. And I'm showing you have about seven
4 minutes left. You get 45 minutes, you're reserving 30 minutes.

5 MR. SHARMA: Okay.

6 JUDGE STRAUSS: So you have about seven minutes left.

7 MR. SHARMA: Yes, I will wind up, Your Honor. I'm going to jump
8 over now to remaining time. We are on slide 17 right now, and we show
9 what is remaining time. The patent, the 101 Patent describes remaining time
10 to be a time from where you are at the moment to the time when you're going
11 to play back the video.

12 And Chou mentions that obviously, that when your frame $n-2$, you
13 can determine the code rate for frame n . From the present moment is the
14 arrival time of $n-2$, that's shown as time arrival, $n-2$, which we noted to be t
15 present. T present is not something Chou uses, but we are using it to show
16 that's the present moment.

17 And for frame n , this is a time we're trying to decide where the coded
18 arc to be. And you know that frame n will be played at time $t_d + n$. So the
19 gap between the two is remaining time. And as to what is remaining time
20 there is no dispute. If you look at Petitioners -- I'm sorry Patent Owner
21 Response at page 33-34, they agree that this is remaining time. The dispute
22 between the parties is, is remaining time -- whether Chou uses or relies upon
23 or bases the code rate on remaining time.

24 And on this one NEC's arguments are largely claim construction
25 driven. They argue remaining time has to be a number, has to be acquired,
26 and then input or used in some manner to clear the code rate. And I think

1 my colleague Mr. Paul will be addressing those claim construction
2 arguments. But suffice to say now the claims are not so limited. Everything
3 has to be based on.

4 On this one we have taken --

5 JUDGE OGDEN: Mr. Sharma, yes I just wanted to ask a question
6 about this figure. You've identified two regions there, one between the
7 playback deadline and the target schedule, and then between the arrival
8 schedule and the lower t_a at $n-2$. I understand that you're trying to get the
9 target schedule and upper bound to be near each other, but it seems like
10 there's a gap there. How do you account for that in obtaining this full range
11 that you identify as the remaining time?

12 MR. SHARMA: Yeah. Yes, sir. In figure 5 is an idealized view of
13 the system over here. If you look at equation 20 of Chou, it takes two values
14 which is the difference between the t_t and t_d . T_t being the target schedule,
15 and t_d being the upper bound. That's the gap over here between the two.

16 And Chou says the goal is to make the two on top of each other. And
17 that's how the equation 20 is set up, and that's the cost function. So when
18 Chou tries to find the upper bound, it finds the upper bound that matches the
19 target schedule. And that's how Chou equations operate.

20 JUDGE OGDEN: So what I'm worried about here maybe is that you
21 have a number of different ranges here that you're putting together. Can you
22 explain why -- so there's three ranges I guess here. There's the t_d to t_t ,
23 there's the t_b to t_a at $n-2$, and then there's that gap, if it exists, between the t_t
24 and t_b .

1 Can you explain how putting these three ranges together isn't sort of a
2 hindsight driven combinate of multiple things that you're picking and
3 choosing from Chou?

4 MR. SHARMA: Your Honor, it is not hindsight. It's how the Chou
5 system is operating. So I had mentioned earlier that -- each of those in turn
6 over here. The first up is the td minus tt . That's the margin of safety Chou
7 mentions. That's the deadline, playback deadline and the target schedule. In
8 paragraph 74 to 78 Chou explains how this deadline is set. There's no
9 hindsight over here. Chou is telling us how to create this margin of safety.

10 Second, on the middle deadline, tt over tb , Chou mentions that the
11 goal of the equation, or goal of the algorithm is to make sure that upper
12 bound matches the target schedule. And that's mentioned in paragraph 70,
13 and also mentioned in paragraph 72, and equation 20.

14 It says that the deviation of the buffer tube upper bound, that's tb , and
15 the target schedule, tt , are penalized. So the Chou system is set to make sure
16 those two values land on top of each other. So that's again specified in Chou
17 in paragraph 72 and equation 20.

18 The last one is the upper bound minus ta . On this one, Chou mentions
19 a target of 81, but there is a one frame delay. And it says specifically on
20 paragraph 81, it says at time ta , that's the available time of frame, and the
21 controller's job must be to choose coding rate for frame $n+2$. And that's in
22 paragraph 81.

23 So instead of saying frame n , and $n+2$, we're simply saying we are
24 taking a -- subtracting it, so instead of saying frame n to $n+2$, we are simply
25 saying frame n to frame $n-2$. So in this case Chou mentions in paragraph 81,

1 80, that you can determine the code rate for frame n when frame $n-2$ arrives.

2 And that's the duration on the bottom over here. So again --

3 JUDGE OGDEN: I see where you get each of these ranges, but what
4 I wonder is does Chou itself treat the distance between t_d and t_a and $n-2$ as a
5 separate concept. Does it give any sort of teaching with regard to that whole
6 range as a whole, as a cohesive whole? Or is -- does it just teach each of the
7 little parts here and then you're the one that is putting these together as a full
8 range between t_d and t_a and $n-2$?

9 MR. SHARMA: Yes, Your Honor. Chou does not mention
10 remaining time per se, nor does it specify that you have to subtract t_d minus
11 t_a of $n-2$. So it does not mention that you need to subtract these two, but the
12 claim is based on requires you to be -- the code rate to be based on the
13 remaining time. The claims don't say that you have to relate it, or you have
14 to input into formula. You simply have to base it on the time duration.

15 And Chou does that through equation 20. It does do it in two steps
16 because equation 20 looks at t_d , that's the target schedule, and calculates the
17 buffer duration. And also Chou specifies when you are determining it. So
18 yes, that part is -- and looking at Chou and how a person of skill in the art
19 would understand Chou to be.

20 Just to give an example Your Honor, like Chou mentions all different
21 ways you can create the buffer -- the target schedule. So if this duration
22 over here were to change, like Chou were to say I'm going to have a bigger
23 duration or a lesser duration, the code rate would change accordingly.

24 Likewise, if the frames n and $n-$ frames were to arrive at different
25 times, earlier, sooner the duration below, that is upper bound and arrival
26 time would change and therefore the code rate would change. So in that

1 case, these two, these values over here are in fact in the code rate, but they
2 are doing that in a two-step fashion.

3 If the Board does not have any other questions I will pass on to my
4 colleague Mr. Raj Paul who will address all of the claim construction issues.

5 JUDGE STRAUSS: Okay. Please go ahead.

6 MR. PAUL: Your Honors, can you see my screen?

7 JUDGE STRAUSS: Yes. You have slide 19 up, right?

8 MR. PAUL: Yeah. So thank you Mr. Sharma and good afternoon
9 Your Honors.

10 So I'll briefly discuss a claim construction dispute between the parties
11 which is the meaning of "based on" as used in limitation 1D. And "based
12 on" is a commonly used term. There's nothing ambiguous about it. And
13 what NEC is trying to do to avoid invalidity is advance a narrow
14 construction of that term. But there's nothing in the intrinsic record to justify
15 deviating from the plain meaning.

16 So on slide 19 here we have an excerpt of Patent Owner's Response
17 on the very first page. They say upfront that "based on" requires that
18 available time and remaining time are two variables that need to be used as
19 an input to the code rate determination process. In turn, they argue that
20 those two variables must first be calculated, determined, examined, acquired,
21 et cetera.

22 And their expert made clear what their position really is, which is that
23 direct use of the values representing available time and remaining time is
24 needed to meet limitation 1D. Now in their Sur-reply they try to walk this
25 back, and now ask the Board to construe "based on" to mean, used as an
26 input but it really means the same thing.

1 And just to come back to slide 19 I want to be clear about something
2 which is that NEC hinges their entire response on this claim construction
3 position. So as you can see here at the top portion where I've highlighted,
4 they lay out their claim construction position at the very first couple of pages
5 of their Response. And then in the next sentence they say accordingly the
6 Petition fails because -- and going to number two, even if Petitioner showed
7 available time and remaining time they don't serve as the basis for the code
8 rate determination. Again, that's according to their construction that two
9 values need to be determined, acquired, calculated, et cetera.

10 Now you'll hear from NEC shortly. They're going to argue that they
11 are not hinging their response on claim construction and that Chou fails to
12 disclose limitation 1D even under Peloton's construction. That's actually not
13 true. Because even when they purport to be adopting what they say is our
14 construction, they're actually still applying their own construction which
15 presupposes that available time and remaining time must be values that are
16 explicitly calculated, determined, acquired, et cetera, such that you could
17 plug it into some mathematical formula.

18 And just as a reminder, the Board already considered and rejected
19 NEC's argument. And that's because, as shown on slide 21 here, NEC made
20 that argument in their Preliminary Response last December. And as you can
21 see, shown on the left, they criticized Chou for not disclosing calculating or
22 determining what Petitioner had mapped to as to the available time. So it's
23 the same argument that they're making now.

24 And in response to that the Board, in its institution decision, made the
25 following observation: that examining buffer fullness and calculating a value
26 with a difference between the playback deadline and the arrival time, which

1 again is what Petitioner mapped to as available time, that those don't appear
2 commensurate in scope with claim 1, which merely requires that a coding bit
3 rate be determined based on an available reproduction time.

4 And the Board observed, as Mr. Sharma just discussed, that the fact
5 that Chou system adjusts the coding bit rate to try to maintain the client
6 buffer duration or available time to a target level, that means that the code
7 rate determination is based on available time. And the Board was actually
8 spot on in its understanding of what the plain meaning of "based on"
9 requires.

10 We demonstrated this in our Reply. The Masimo versus Sotera
11 Wireless cases is instructive on this point. The patent at issue there involved
12 an adaptable alarm system for a medical device. And the term at issue was,
13 trigger a second alarm based on exceeding the second alarm threshold.

14 The Patent Owner appealed the PTAB's written decision arguing that,
15 much like NEC does here, that the quote, unquote based on language means
16 that the second threshold must directly trigger the second alarm. And the
17 Federal Circuit disagreed. And in doing so it made two observations.

18 Number one, that the plain meaning of based on is broad. And
19 number two, that it does not exclude the use of additional alarm thresholds
20 for other conditions. So in other words, based on does not create a mutual
21 exclusivity.

22 So in this case for example, there are parts of Chou's disclosure that
23 says that its code rate is adjusted in order to attempt to match the buffer tube
24 upper bound, tb, to the target schedule, tt. Now that's not inconsistent with
25 saying that Chou's code rate determination is also adjusted based on the

1 client buffer duration or the difference between the playback deadline and
2 the target schedule, or sorry, the arrival schedule.

3 And this is serving the ultimate goal of maintaining the client buffer
4 duration level over time just as the Board said in its institution decision. So
5 when we say that some event or occurrence is based on one or several
6 factors, it simply means that those factors have some impact or influence on
7 that event occurring.

8 We have another case instructive on that, that supports our position.
9 In the interest of time I'll jump now to what NEC relies upon in support of
10 their narrowing construction. So first they point to dependent claims 2 and 3
11 but those claims recite more specific requirements. Obviously those claims
12 don't warrant a narrower construction for the independent claims which do
13 not recite those specific requirements. The Applicant chose to include broad
14 language, use broad language in claim 1, not specific language.

15 And secondly they point to an embodiment in the specification which
16 happens to use a mathematical formula. That's equation 5 shown here. And
17 for how code rate could be determined using explicit values that correspond
18 to available time and remaining time.

19 But NEC's own slide deck is revealing on this point because in slide
20 10 of their deck they point to the same passage that I've shown here, but they
21 have cropped off this top portion which makes it clear that this entire
22 passage is referring to an exemplary embodiment. So this is not the sole
23 embodiment. And even if it were, there's no lexicography. There's no clear
24 and unmistakable disavowal of other potential ways in which code rate
25 determination could be based on available time or remaining time.

1 So what they're, NEC is doing effectively is importing limitations
2 from the specification and from the dependent claims into the independent
3 claim 1. That's a cardinal sin according to longstanding Federal Circuit
4 precedent.

5 And one thing further I'll just note. You're going to see a lot of their
6 slides have testimony from their expert, Dr. Cooperstock. And what the
7 Federal Circuit has said is that extrinsic evidence including expert testimony
8 is of a limited value in claim construction. So a Vitronics case for example
9 in 1996, only if there was some genuine ambiguity in the claims after
10 consideration of all the available intrinsic evidence be able to -- extrinsic
11 evidence.

12 So there's no ambiguity here based on it's a straightforward term, and
13 it's not a technical term of art. So in the interest of time, that's all I have for
14 now unless the Board has further questions, we'll reserve the remainder of
15 our time for rebuttal.

16 JUDGE STRAUSS: Okay. Thank you very much. So you'll have 20
17 minutes for rebuttal. Okay. So at this point Patent Owner, do you wish to
18 reserve any time for rebuttal?

19 MR. KNIERIM: Yes, Your Honor. Fifteen minutes please.

20 JUDGE STRAUSS: Okay. Then you'll have 45 minutes, and I'll try
21 to give you a warning five minutes before. But you may proceed.

22 MR. KNIERIM: Thank you, Your Honor. Can you see my screen?

23 JUDGE STRAUSS: Yes, I can.

24 MR. KNIERIM: All right. So I'd like to start with the available time
25 limitation as well. And I'd like to start with what the Petition says about it.
26 But before I do I just want to get our bearings here and look at the claim

1 language. You can see that on slide 11, claim 1, limitation 1D says that you
2 determine the code rate based on two things.

3 One of those things is the available reproduction time, and the claim
4 further clarifies that that is based on the content data stored in the storage
5 device of the reception device. And what it doesn't say is that the system
6 determines the code rate in order to affect the available time or the content
7 data stored in the storage device. It says to determine the code rate based on
8 the available time and what is stored in the storage device.

9 So how does the Petition map Chou to this limitation? Slide 27 has an
10 excerpt here. And it's very clear, the Petition relies on this gap as you just
11 heard from Petitioner, between the playback deadline and the arrival
12 schedule. And that's given by t_d of n minus t_a of n . So t_d of n is the
13 playback deadline. T_a of n is the arrival schedule. And you can see that in
14 yellow. That's what they're mapping to to satisfy the available time
15 limitation.

16 Now there are several problems with that, but the biggest problem is
17 that Chou never calculates that gap, never determines that gap. It simply
18 states that the difference between those two values can be reflective of that,
19 but it doesn't calculate it, doesn't determine it, doesn't use it. And how do
20 we know that? Well let's look what Petitioner's own expert says.

21 This is slide 29. It gives some quotes from Dr. Reader regarding this
22 gap, t_d of a -- t_d of n minus t_a of n . And he was asked, does Chou
23 anywhere, client or server, disclose calculating a value. And his answer was
24 no. He actually went further. He said that would be like rolling the dice in
25 Las Vegas and that you can't calculate that because you don't know when the
26 frame arrives until it arrives.

1 And we asked him again, does Chou disclose calculating the
2 difference between playback deadline and arrival time, and if so where. And
3 his answer was that the difference does not appear in the equations on page 9
4 paragraph 68. And that's the -- that's the paragraph where Chou tells you
5 how you determine the code rate.

6 And if we could look at actually equation 18, shown on slide 33, how
7 do we know that Chou doesn't determine code rate based on the gap that's
8 identified in the Petition? Well, because Chou tells you how to determine
9 the code rate. He gives you an equation. He gives you multiple equations
10 and none of them refer to any of the variables in that gap. There's no
11 reference to t_d , and there's no reference to t_a at all.

12 We have the equations here, 18 and 19. So, even if Chou were to
13 somewhere calculate a gap, a value for the gap between t_d and t_a , it's clear
14 that it is not being used to calculate or determine the code rate. And what
15 the claim requires is that you determine the code rate based on the available
16 time, which is based on what's stored in the storage device of the reception
17 device.

18 JUDGE OGDEN: Counsel?

19 MR. KNIERIM: Yeah.

20 JUDGE OGDEN: Talking about this equation 18, I believe that
21 Petitioner argued, I think in their Reply, that equation 16 does show a
22 relationship between t_b and t_a , and that at least in that situation there is a
23 reference to that t_a in terms of what equation 18 is calculating. Do you
24 agree with that?

1 MR. KNIERIM: I'll have to go back and just confirm specifically
2 what the values were. But what I certainly do not agree with, and what is
3 not disclosed in equation 16 is the gap between t_d and t_a .

4 If, for example, equation 16 acknowledges some relationship between
5 t_b and t_a , that's a different value. The Petition is very clear. It says the
6 arrival time is met by the gap between t_d and t_a . That's t_d of n minus t_a of n .
7 And that is nowhere in any of the equations.

8 And I'd like to briefly hit on a point that Petitioner raised in opening.
9 And that's what they say in reply and response to this. They point to
10 paragraph 19 of Chou. Actually we can look at slide 6 of Petitioner's
11 demonstratives.

12 What they say about Chou is, they quote this first sentence, first and
13 second sentence of paragraph 19 that says that in general the coding bit rate
14 control involves dynamically adjusting the coding bit rate of the streaming
15 media data to control the client buffer duration.

16 First of all, that doesn't say that you determine the code rate based on
17 the client buffer duration. It's saying that you're controlling the client buffer
18 duration. And the other interesting thing about this is you'll see there's a
19 nice little asterisk at the bottom of the excerpt of slide 19 in Petitioner's
20 demonstratives. We have the full version on slide 30 of our demonstratives,
21 or perhaps not the full version but we at least have the bottom that they cut
22 out.

23 And what Chou is telling you in the same paragraph is that it is not the
24 actual fullness of the client buffer that is controlled. What Chou describes is
25 in general yes, one of the goals of the system will inevitably affect the client
26 buffer duration. But you don't directly control it. What you do is control an

1 upper bound. The upper bound on the time of arrival. And paragraph 25 of
2 Chou explains what that is. I'm sorry, paragraph 25 explains that that's
3 what's used to calculate the code rate.

4 Okay. So I want to --

5 JUDGE STRAUSS: Counselor, this is Judge Strauss. But isn't that
6 just one embodiment? In other words, that's what they would do in their
7 preferred embodiment as opposed to more generally trying to maintain a
8 certain buffer fullness?

9 MR. KNIERIM: I mean, I think that's an accurate statement but
10 there's nothing in Chou that says that you control the buffer duration
11 directly. So what Chou is telling you in this summary, in this overview, is in
12 general it's good that you have buffer duration that doesn't underflow or
13 underflow. So you want to control it.

14 Well that's true of every system, right? You don't want underflow or
15 underflow. And then Chou tells you okay, here's how I'm going to do it. In
16 the present invention, in the present system in process, I'm not actually going
17 to control the actual buffer fullness. What I'm going to do is I'm going to
18 control this concept of this upper bound. And in fact, all of Chou's
19 embodiments control the upper bound. It's not just one embodiment that you
20 know, that's presented as an alternative. That's the invention. That's what
21 Chou says is inventive.

22 I mean, right here on paragraph 19 Chou expressly states we do not
23 control the actual client buffer fullness.

24 JUDGE STRAUSS: Okay. Thank you, Counselor.

25 MR. KNIERIM: Okay. I wanted to briefly touch on this concept of
26 Chou's one frame delay which Petitioner hit on in opening. And as they

1 explained, which I agree with, paragraph 81 of Chou says that if you are the
2 server, or the client, for that matter, the earliest frame for which you can
3 determine the code rate at time t of a is frame $n+2$, right? And so there's this
4 lag between the frame you're determining the code rate for and what frame
5 has currently arrived at the decoder or at the client.

6 And so what the Petition says, or what the Reply says is okay, well
7 even though the Petition mapped to td of n minus ta of n , actually why don't
8 we instead map to td of $n-2$ minus ta of $n-2$. And we can see this on slide 10
9 of Petitioner's demonstratives. I'd like to take a look at that.

10 We saw this slide in opening and there are still -- by the way, this is a
11 new argument. This is nowhere in the Petition. You don't see ta of $n-2$, you
12 don't see td of $n-2$ in the Petition. The gap there was td of n minus ta of n .
13 So this is new.

14 But even assuming this were proper, there are still problems with it.
15 And the first problem is what they quote here from slide -- from paragraph
16 70 of Chou on the bottom does not support the conclusion. Again, what this
17 says is that by regulating the coding bit rate it's attempted to control the
18 buffer tube upper bound, so it attracts the target schedule.

19 You can see those values in figure 5. And by the way, they're not td
20 of $n-2$ or ta of $n-2$. If you look at the buffer tube upper bound, there's a
21 value given there at time τ of a as t sub b . And the target schedule is t sub
22 t . So that does not support the conclusion there.

23 But there is even a bigger problem with this, and that is that there's no
24 explanation in the Reply or the Petition, Dr. Reader's declaration or
25 otherwise explaining why or how a person of ordinary skill in the art would

1 do this. Why they would look not at td of n minus ta of n , but of td of $n-2$
2 minus ta of $n-2$.

3 For example, why not look at $n-3$ or $n-4$? And even so, even if one
4 were motivated to look back to that, and use that value, how would you do
5 it? We already have in Chou an equation, multiple equations that are used to
6 calculate the coding bit rate. Neither of them reference either of these
7 variables. Neither reference frame $n-2$ at all.

8 So this is on slide 38. This is what Petitioner's expert says about this.
9 This is all we have. He says that a person of skill in the art would be able to
10 easily modify equations 18 and 19 to account for a one frame delay. That's
11 all we got. That's conclusory.

12 But even if you accept that, that's only one of the three things that he
13 and Petitioner need to prove. At best he's shown that there's a reasonable
14 expectation of success. But that's not enough. Why would you do it?
15 What's the motivation to make that modification? And how would you do
16 it? How would you modify equations 18 and 19? And that's simply not
17 there. That's a failure of proof, and it's classic hindsight. It's classic
18 hindsight bias.

19 Okay. If there are no other questions on the Petition, I want to talk
20 about the Reply's new theory based on g of n . And I'll start on slide 42. We
21 just went over what was in the Petition. I think it was abundantly clear that
22 the gap between td of n and ta of n is what they're relying on to satisfy
23 available time. They've apparently recognized a problem with that.

24 You can see the Petition on the left hand side here and the Reply on
25 the right hand side. They are now relying on this gap, g of n , and I will
26 admit during Counsel's opening presentation I was unclear about what they

1 were saying about g of n . Are they relying on that as the available time or
2 not? If they are, it's certainly improper and it also fails on the merits.

3 I think the Board is quite capable of ascertaining whether or not this is
4 a new argument, so I won't spend a tremendous amount of time on it. But I
5 do want to show slide 11 of Petitioner's demonstratives which I think is
6 useful here. And you can see on slide 11, you have figure 4 and figure 5
7 side by side. And although they're not annotated the same way you can see
8 what the original gap was in the Petition in slide 5. That's t_d of n minus t_a of
9 n .

10 And in figure 4 you can see gap g of n and g of $n-1$. Those are plainly
11 different values. And so the question is, well which is it? G is definitely
12 different. If you're relying on g of n now, it's a new argument. It still fails,
13 I'll get to that in a minute. But what are you saying? Is it t_d of n minus t_a of
14 n ? Or is it g of n ?

15 JUDGE STRAUSS: Counselor, this is Judge Strauss. So my
16 understanding between figure 4 and figure 5, I don't know if this goes to
17 your question or argument, is that figure 4 is showing bits as a number of
18 bits whereas in figure 5 we're talking about everything is done in time. So
19 it's not how many bits you have there, but it's my understanding, it's how
20 much reproduction time that number of bits will produce. So it is -- does
21 that show the relationship, or does that make a difference in the relationship
22 between the two arguments? Or it's just one, an argument based on a
23 number of bits as you know, so many mega-bits as opposed to 5/16 seconds
24 of programming left in my buffer?

25 MR. KNIERIM: Yeah, so you raise a great point, Your Honor. That
26 is a separate argument, right? Figure 4 is based on bits. And g of n is given

1 in bits, and that's not a time. Right? The claim requires available time to be
2 a time value.

3 But that's actually a slightly different point than the one I was trying
4 to make here. I'll get back to that in a minute. The point I'm trying to make
5 here is if you look at Petitioner's own argument, they've highlighted this
6 yellow sheeting as what allegedly reflects the size of the decoder buffer,
7 right? And so even if you ignore the fact that figure 4 is in bits and figure 5
8 is in client time, there's no way that g of n is the same value as t_d of n minus
9 t_a of n because that value expands way beyond what is highlighted and
10 shaded in yellow.

11 And so it's unclear to Patent Owner what their theory is regarding g of
12 n . If they're saying that it is the available time in the claims, that's both a
13 new argument and fails for reasons that I'll get to very shortly.

14 But I want to make sure that answered your question. Does that
15 directly address our question, Your Honor?

16 JUDGE STRAUSS: I think in part it does. In figure 4, that line c is
17 the bits leaving the com channel. So c is the bits as they're leaving the com
18 channel I believe. And in figure 5 that top line is the requirement when
19 you're going to be reproducing based on those bits.

20 MR. KNIERIM: Yeah. I mean, I think you're correct that what is
21 described as schedule c is when the bits leave the com channel. Figure 5 at
22 time τ_a of n , the value t_d of n would be when those bits would play.

23 JUDGE STRAUSS: Okay. Thank you.

24 MR. KNIERIM: Okay. So let me get back to another reason why, or
25 why the theory based on g of n fails. And I'd first like to look at slide 30 of
26 our demonstratives, Patent Owner's demonstratives. Just to refresh the

1 Board's memory about paragraph 25 of Chou. It says that the client employs
2 encoder buffer parameters and the upper band gap values to determine on a
3 frame-by-frame basis the coding bit rate.

4 So you've got two things described in paragraph 25 that are used to
5 determine coding bit rate. On slide 44 you can see another excerpt from
6 Chou, and this is paragraph 24. What paragraph 24 tells us is that that upper
7 bound gap that we just saw in paragraph 25 as being used to calculate the bit
8 rate, reflects the number of data bits that the servers and coder buffer can
9 contain over the bits currently contained therein, dot dot dot.

10 The point here is that Chou right upfront is telling us that the
11 determination of code rate is based on encoder side parameters and encoder
12 side variables. And if we look at paragraph 69 and 113 of Chou, this is on
13 slide 45, Chou explains that g is transmitted, this variable g is transmitted
14 from the clients to the server.

15 And so that makes sense, right? What Chou is saying is we're
16 calculating and determining code rate based on encoder side parameters.
17 The server takes those encoder side parameters, value g , sends it to the
18 client.

19 Now I will note that there are two embodiments as Counsel for
20 Petitioner also correctly noted. There's one embodiment where the server
21 calculates and there's one embodiment where the client calculates.

22 And in the embodiment where the client calculates or determines the
23 code rate, paragraph 113 explains that the client first receives a value of g of
24 n , and then infers the value of g of n for successive frames going forward.
25 That does not mean that g of n is a client side -- decoder client side value. If

1 it were a decoder or client side value, the client wouldn't need to infer it, it
2 would already have it.

3 So the point Your Honors, on this generally is that this new theory
4 based on g of n in Petitioner's Reply is wrong. Because what g of n reflects
5 is an encoder side variable. The claim requires that the available time be
6 based on what is stored in the storage device of the reception device, not the
7 server, not the encoder.

8 I want to touch briefly on an argument that was raised in Petitioner's
9 Sur-reply. And that was Paper 32 at section 3c. What Petitioner says is that
10 Chou's encoder and decoder both simulate leaky bucket models and their
11 buffers each have their own gaps.

12 Okay. And so what the argument is, is since both the server and the
13 client have their own models, whatever happens on the client has to be a
14 decoder side variable and what happens on the server and encoder side. And
15 that's not true. And we can tell that from what's on the screen right now,
16 paragraph 69 and 113.

17 What Chou says, we'll agree that there is a model on the client as well.
18 But what the model is simulating is the encoder. It is inferring subsequent
19 values of g going forward to estimate or infer what that value would be on
20 the server.

21 I'd also like to briefly address another argument that was raised in Sur-
22 sur-reply. And they're in section 3a. Petitioner pointed to paragraph 21 of
23 Chou. And they say that Chou uses encoder buffer parameters during start
24 up, but afterward, quote, the client provides coding bit rate requests to the
25 server.

1 Well that's true but it doesn't establish their point. After start up the
2 client can calculate or determine bit rate, but that does not mean it's doing it
3 based on client side parameters. Because we just saw again in paragraph 69
4 and 113, the client is inferring a value of g after it has been provided an
5 initial value.

6 And what's even more clear is if you look at paragraph 22 of Chou,
7 which is unfortunately not on a slide, but I'll direct the Board's attention to
8 the record, paragraph 22. It expressly states that the coding bit rate
9 computations are based on parameters indicative of the state of the encoder
10 buffer of the server. These parameters are computed by the server and
11 provided to the client along with the streaming media.

12 Okay. So unless there are any questions I'd like to transition to the
13 second problem with this new argument, the argument for available time in
14 the Reply and that's what Judge Strauss referred to earlier, which is that g is
15 a size variable. Peloton admits that, their expert admits that. They say it's a
16 size variable.

17 And he says well okay, it's in size but a person of skill in the art would
18 easily be able to convert that by dividing it by the rate. But what he does not
19 do, and what's critically important here is he doesn't explain why or how
20 they would do that. But sticking with why, there's no rationale or motivation
21 for one of skill in the art to take a value in bits and convert it to time when
22 the equations of Chou already use this value to determine code rate in bits.

23 Equation 18 refers to the variable g . It's in bits. So why would one of
24 skill in the art take this value g , turn it into time, and then how would they
25 use that in equation 18? What modifications would you need to make to
26 equation 18 in order to do that? That's --

1 JUDGE OGDEN: Counsel, Petitioner has pointed out paragraph 7 in
2 Chou that says that, effectively, that the size of the client buffer in bits can
3 be expressed as a number of seconds of content. Can we just understand that
4 to be a teaching that the size of the buffer in bits is equivalent to an amount
5 of time?

6 MR. KNIERIM: That's a great point Your Honor.

7 JUDGE OGDEN: And that one of skill in the art would have
8 understood it that way?

9 MR. KNIERIM: Yeah. So the answer's no, and here's why. In order
10 for you to convert between bits and time, you need to know the code rate,
11 right? And so if the buffer has a number of different frames, each of them at
12 a different code rate, you need to know the code rate for each frame in order
13 to get from bits to time.

14 And so that's not explained either. Their expert, the Petition, their
15 Reply, that's not explained either. How would you keep track of the frame
16 rate for each frame in the buffer? Now we'll concede of course if there is
17 only one frame in the buffer, and you know its code rate that's trivial, right?
18 You just divide. It's simple division.

19 But what that ignores is there's multiple frames in the buffer. That's
20 the way this system is designed to work. And to be able to flip from bits to
21 time you need to know the code rate for each of them. Now are we saying
22 that that's not technically possible? No. That's not our point.

23 Our point here is it's not as simple as just dividing it. And there's no
24 express rationale for why you would do that and how you would keep track
25 of the different code rates for each frame. And so it's a failure of proof.

1 They have not established why or how you would modify Chou to get to the
2 claim language using g of n .

3 JUDGE OGDEN: If Chou mentions this apparent convertibility
4 between the two but doesn't necessarily disclose an exact set of formulas of
5 how to calculate it, could we infer that this is within the level of ordinary
6 skill of a person in the art reading Chou? That they would be able to know
7 how to do that given that there's no explanation currently? Chou doesn't
8 apparently feel the need to explain how to do that. And then if we take that
9 in conjunction with Petitioner's expert testimony?

10 MR. KNIERIM: Yeah. So I think the problem Your Honor, is that
11 Chou does not disclose, or actually he discloses it not using time. What
12 Chou discloses is using the size, the bits, right? And so the question is first
13 and foremost is why would you depart from that? Why would you modify
14 that? And that's what we can't get over here. Why would you depart from
15 using bits and use time instead?

16 And I think what your question is asking, well if there were such a
17 motivation. If there was a motivation for one of skill in the art to convert
18 from bits to time, could one of skill in the art do that with a reasonable
19 expectation of success? And I guess my answer is, we don't really have any
20 record evidence saying one way or the other if that's true.

21 What we've got is Dr. Reader saying it would be easy. That's a
22 conclusory statement. And excuse me, on the other hand we have Dr.
23 Cooperstock saying well, it's actually not so easy. There are a bunch of
24 considerations you need to take into account. We haven't put the pieces
25 together. Petitioner hasn't put the pieces together.

1 JUDGE BOUDREAU: Mr. Knierim, this is Judge Boudreau. I
2 understand Petitioner to be relying on the distance between $t_{sub\ d}$ and $t_{sub\ a}$
3 as being the available time that's reflected in their demonstrative slide 10
4 with respect to figure 5. Isn't this argument regarding $g_{sub\ n}$ just a red
5 herring?

6 MR. KNIERIM: Well I mean, we agree it shouldn't even be at issue
7 because $g_{sub\ n}$ is a new theory. I mean, what the Petition relies on is $t_{sub\ d}$
8 minus $t_{sub\ a}$. Right? And there are other problems with that, but there
9 are plenty of problems with that.

10 But if you look at the Reply, and I think I have this on slide 42, you
11 also have the Reply saying, well $g_{of\ n}$ reflects the client buffer duration.
12 And you just heard from Petitioner spent some time on figure 4 which
13 depicts $g_{of\ n}$. And so I'll agree with you that it is a red herring. We
14 shouldn't be discussing it. It was nowhere in the Petition.

15 But if you do consider it, it is not enough. Or $g_{of\ n}$ does not satisfy
16 the available time. It has problems as well.

17 JUDGE BOUDREAU: Can you address the defects in mapping the
18 available time to $t_{sub\ d}$ minus $t_{sub\ a}$?

19 MR. KNIERIM: Yeah. Yes, I have. And you know I think, just to
20 refresh the Board's memory the biggest problem with that is that it's just not
21 calculated. And even if it were, we've got the equations Chou uses to
22 determine the code rate, and it is not based on that gap.

23 If there are no further questions on that I'd like to move on to
24 remaining time. And I'll use my remaining time to talk about the remaining
25 time term, no pun intended.

1 But as I mentioned earlier, claim 1d requires determining the code rate
2 based on two things. And we were just talking about one of those things, the
3 available time. The other of course, is what we're calling the remaining
4 time.

5 And the Petition addresses this on pages 36 to 37. And I think I have
6 a slide 56 that has what the Petition says about it. And I won't spend a lot of
7 time on this because you'll see here this excerpt from figure 6 of Chou refers
8 to this target buffer duration. And that's the difference between playback
9 deadline and target schedule.

10 Well there are problems with that mapping, but the reason we don't
11 need to address them is because Petitioner is no longer advancing that
12 theory.

13 This is from their Reply. They say Petitioner did not map remaining
14 time to Chou's buffer duration. And so what do they do instead in reply?
15 They come up with a new theory. This is a comparison on slide 59 between
16 what's in the Petition at page 37, what's in the Reply at pages 19 to 20.

17 And you'll see what they did here is they took figure 5 this time, not
18 figure 6, but figure 5, and they drew a line between t_d of n and it's an
19 arbitrary point kind of in the middle of the graph there where they say it
20 would meet time t_a of $n-2$.

21 So to be very clear, our position is that this is a new argument. If they
22 wanted to rely on this they should have put this in the Petition, not in the
23 Reply. But even if you accept this and consider this argument there are
24 again, still many problems with it. And I think, I believe it was Judge
25 Ogden who asked Counsel a minute ago, a while ago, whether they were just

1 picking and choosing pieces of what's disclosed in Chou to satisfy this claim
2 term when Chou doesn't actually talk about this gap as a whole.

3 And that's absolutely right. There's nothing in Chou about t_a of $n-2$,
4 especially as compared to t_d of n . And there's no explanation in, certainly in
5 the Petition, but definitely not in the Reply either, about why or how a
6 person of skill in the art reading Chou gets to this gap, and then how they
7 use it. Right?

8 We know that equation 18 tells you how to calculate the code rate
9 already. Why would you now go back, look at figure 5, pick some arbitrary
10 point at t_a at $n-2$ and then use that? And if you do, well how, how are you
11 going to modify equation 18? Do you need to modify equation 19, 20?
12 What do you need to modify in order to get to the claim language. And that
13 is not explained.

14 It's important to keep in mind, this is an obviousness ground, right?
15 This is -- their argument is that one of skill in the art would find claim 1
16 obvious in light of Chou. And there's no explanation of why or how. And
17 that's what you need. You need something more and it's just not there.

18 JUDGE OGDEN: Counsel, I'm not sure that the time $t-2$ is
19 necessarily arbitrary. I think the Petitioner gets that, as I understand it, at
20 least in part from Chou paragraph 81 where it talks about that at time t_a of n
21 the -- it says, I'll quote it. At time t_a of n the controller's job must be to
22 choose r_c of $n+2$. This one frame feedback delay in the feedback loop must
23 explicitly be accounted for.

24 So isn't that where they get the t_{n-1} -- the t_n minus -- or sorry, the t_{n-2}
25 would be the present moment in this situation and then the t_n would be -- if
26 you're saying that the current time is t_{n-1} , then -- sorry t_{n-2} then t_n would be

1 a time two steps into the future? And it seems like there's at least some sort
2 of basis for that in paragraph 81 and it's not completely arbitrary.

3 MR. KNIERIM: I'll agree with you there and it's also a classic case of
4 hindsight bias, right? I mean, what they're trying to do is find something in
5 Chou that they can use to map to the claims. And you know, they're not
6 saying, well, Chou teaches in paragraph 81 that you need to determine the
7 code rate two frames in advance and therefore one of skill in the art would
8 be motivated to look at figure 5 and work backwards like that.

9 They're gap filling, right? I mean, they're -- they recognize a problem
10 in that if you look at the theory in the Petition, target buffer duration, and it
11 does not reflect the remaining time. So they chose another option. And they
12 drew this figure -- they do point to paragraph 81, I'll give you that, and that
13 is true that paragraph 81 says that the earliest time that you can determine a
14 code rate is -- for frame n would be at $t_{a\ n-2}$, that's true.

15 But Chou says that and still does not say you use this difference
16 between t_d of n and t_a of $n-2$ to determine code rate at all. It's just not there.
17 And for that matter, why wouldn't you use t_a of $n-3$ or t_a of $n-4$? There's no
18 explanation.

19 I just want to briefly note that we did point out that this is a new
20 theory in our Sur-reply and Petitioner specifically requested a Sur-sur-reply
21 to address the issue of whether or not they raised new arguments. And they
22 did not comment on this one, and so we would invite the Board to look at
23 this, make its conclusion for itself that this is in fact a new argument and if it
24 is, since they have not disavowed the theory in the Petition that is essentially
25 dispositive.

1 JUDGE ODGEN: So Counsel, I understand that in the Petition,
2 Petitioner did talk about this target arrival time. And I'm not sure that in the
3 Petition that that was their theory, that the target arrival time was the
4 remaining time because they go on and say that, seemed to say that the
5 remaining time is the -- on page 37 of the Reply, they seem to say that the
6 remaining time is the time from the present moment, the reception of the
7 device at the present moment to the playback deadline which -- and so, I
8 mean, they don't use the particular variables.

9 But I sort of interpret that maybe as at least something that you could
10 understand to mean distance from the present -- from the arrival time at the
11 present moment which would be $t_a n$, and then the distance from that to the
12 playback deadline sometime in the future, two frames in the future which
13 would be $t_d n+2$. Is that a fair interpretation of what Petitioner is saying in
14 the Reply?

15 MR. KNIERIM: That's not how I understand it but just to make sure I
16 understand. What they say in the Petition, as you can see here on slide 59, is
17 that the gap between the time at which Chou's system is determining the
18 coding bit rate for dealing frame to meet target arrival schedule. And the
19 playback deadline for that frame is the claimed remaining time.

20 You know, I think you have to squint really hard to get to t_a of $n-2$
21 from there. It's not what it says. It doesn't cite to paragraph 81, it doesn't
22 cite to t_a , it doesn't even cite to figure 5. It cites to figure 6.

23 And so the way we're reading this is that when they're saying in the
24 Reply that the gap is now between t_{present} or t_a of $n-2$ and t_d of n , that
25 that's different. I mean that's nowhere in the Petition.

26 But did that -- I'm not sure if I fully appreciated your question.

1 JUDGE OGDEN: Well I guess what I'm trying to tease out is that, is
2 it your position that all that Petitioner argued in the Petition was that the
3 remaining time is the target buffer duration? Because I'm not sure that that's
4 true. I mean, they do talk about the target buffer duration, but they go on
5 and seem to say that the remaining time is not the target buffer duration
6 itself, but it is something else which they seem to explain in paragraph 37.

7 So should we be looking at what they say there as what their original
8 theory is in the Petition or is your position that their original theory was that
9 the remaining time is the target buffer duration?

10 MR. KNIERIM: Yeah. I mean, our best read of what they've said in
11 the Petition was that the target buffer duration is the remaining time. If you
12 can -- if you're looking at something on page 37 that may be another
13 mapping that we didn't get from our read, it still must necessarily fail for the
14 reasons we've just disclosed or discussed. And it's certainly not the same as
15 what they're putting forth in the Reply in our view.

16 I mean our position would be look, if you wanted to rely on the
17 difference between t_d of n and t_a of $n-2$ as satisfying this limitation you
18 could have done that in the Petition, but you didn't. It's not there.

19 JUDGE STRAUSS: Counselor, Judge Strauss. I just want to let you
20 know you have four more minutes if you want to reserve 15 minutes for
21 rebuttal.

22 MR. KNIERIM: Okay. I appreciate that Your Honor. And actually I
23 think, let me just check my notes real quick, but I think I will pause there
24 absent any further questions, and reserve the balance of my time. That is
25 what I'll do.

26 JUDGE STRAUSS: Okay. Thank you very much.

1 Petitioner, you have 20 minutes for rebuttal.

2 MR. PAUL: Thank you, Your Honor. Just to touch on a couple of
3 points raised. First, on the argument that Petitioner advanced a new theory
4 regarding available time in our Reply. I'll briefly address that. That's
5 actually not true. As Your Honor appreciated, we have, at all times, been
6 mapping available time to the same features as in the Petition. It's the
7 difference between playback deadline and arrival time, $t_d - t_a$.

8 The discussion regarding -- in the Patent Owner Response they
9 focused on this equation 18, prompting us to respond by providing
10 additional context that they ignored. Chou's additional equations, including
11 figure 4, in order to respond to their suggestion that Chou's equations do not
12 factor the client buffer state in determining code rate.

13 And so, but even without that the Petition establishes obviousness for
14 the reasons the Board found in its institution decision instituting the IPR.

15 And as to the figure 4 and the additional equations and the analysis
16 that we provided there. That's permissible use of rebuttal evidence in a reply
17 brief as observed in the trial practice guide, page 73. And then --

18 JUDGE BOUDREAU: Mr. Paul just to be clear, Petitioner isn't
19 taking the position that $t_b - t_a$ is the available time. Is that
20 correct?

21 MR. PAUL: $T_{sub d}$.

22 JUDGE BOUDREAU: $T_{sub d}$. Okay. Thank you.

23 MR. PAUL: And then briefly on the claim construction point that
24 was established earlier. I heard at one point, you know, that Counsel for
25 NEC said that it will inevitably, the code rate determination process you

1 know, referring to paragraph 19, will inevitably affect the client buffer
2 duration.

3 And his only response was ultimately in regards to the td-ta issue is
4 that that's not calculated. And as I said you know in our opening, that's not
5 necessary for the plain and ordinary meaning of based on. So it's often the
6 case that you have a long term objective and then you can say that that
7 objective has some impact or influence on what you do incrementally,
8 perhaps on a day to day basis.

9 You can still say that your incremental actions are based on that long
10 term objective. I think the Board recognized that in its institution decision.
11 You know, if I'm a high school student preparing for final exams I can say
12 that I'm going to choose the number of hours I study on any given day based
13 on my desire to get into an Ivy League school. Now, on a day to day basis I
14 can choose the specific number of hours I'm studying today.

15 Based on something more precise I can take the number of hours I
16 studied last week, the complexity level of the subject on a scale of one to
17 ten. I can take those factors, calculate how many hours I'm going to study
18 today. But even so, it's still entirely reasonable for me to make the claim
19 that I'm going to base the number of hours I study today, base that on my
20 desire to get into an Ivy League school. That's just a common prevalence of
21 how, quote, end quote, based on, is used in it's plain and ordinary meaning.

22 I don't have to calculate, or determine, or acquire on a day to day basis
23 what my probability is of getting into an ivy league school. That's not
24 necessary. So that's the reasoning that we took from the Board's decision.
25 And I'll leave it to Mr. Sharma to address the other issues.

1 JUDGE BOUDREAU: Just before you move on. I just want to ask a
2 follow-up question with respect to my previous question.

3 MR. PAUL: Sure.

4 JUDGE BOUDREAU: Is Petitioner relying g sub n as teaching the
5 available time?

6 MR. PAUL: Mr. Sharma could address that more. I think our
7 position as he explained is that g sub n is a feature of figure 4. There's an
8 additional margin of safety that's discussed in paragraph 70. That factors in
9 the full range of what we have identified in the Petition and have still
10 continuously relied upon for available time, td-ta.

11 JUDGE BOUDREAU: Td-ta. Okay. Thank you.

12 JUDGE OGDEN: Mr. Paul, I have a question about how the term
13 based on relates to the remaining time issue. Unlike for the available
14 reproduction time, you pointed to disclosures in Chou that at least discuss
15 the idea of the claim buffer size. And you know, maybe reasons for
16 controlling that. But with respect to the remaining time, I haven't seen
17 anything where Chou discusses the, what you define as remaining time as a
18 concept other than you know, various ranges of time that you've put together
19 based on Chou's disclosure.

20 But how can something be based on something that you sort of
21 cobbled together from multiple disclosures in Chou? How can you say that
22 it's based on that whole range? Maybe it would only be fair to say that it's
23 based on the particular parts of that range. Why -- how does, based on --
24 how can something be based on something that's not really a concept that's
25 disclosed as an integral whole in Chou?

1 MR. PAUL: So I can attempt to address that briefly and then turn it
2 over to my colleague. So as we discussed in paragraph 19 it's clear and you
3 know, the goal of the system is to, over time, control the client buffer
4 duration.

5 We have identified what a person of ordinary skill in the art would
6 have recognized as the available time in Chou. It's the range from $t_{sub a-n}$
7 2 all the way to $t_{sub d n}$. And there's a relationship between, you know, the
8 client buffer duration and what we've mapped to as the claimed remaining
9 time.

10 So it's not necessary, we don't believe, to -- that the prior art discloses
11 it in the exact or analogous terms used in the claim. But that's what a person
12 of ordinary skill would have appreciated that disclosure of remaining time.
13 And so it's ultimately you know, slips into the ultimate goal of trying to
14 maintain client buffer duration. That's one way to view it.

15 Mr. Sharma, I think, can address that issue perhaps in additional
16 respects.

17 JUDGE OGDEN: Okay. Thank you.

18 MR. SHARMA: Thank you, Mr. Paul. Just to go back to Your
19 Honor's question, Judge Odgen. The term main time is not a term of art. It's
20 something everybody uses that. And there's no requirement that prior art
21 should use the same terms that are used in the claims. As well somebody
22 looking at claims at issue and also the prior art when we see if those
23 concepts are disclosed or not.

24 And what happens in Chou's algorithm and so on, it does calculate the
25 buffer duration. It does control the buffer duration by looking at the buffer
26 in the client side. But also in doing that, has so many and so on like

1 equations 18, 19, and in equation 20. Most important is equation 20 over
2 here. And equation 20 considers two variables, $t_{sub\ b}$, that is the upper
3 bound variable, and $t_{sub\ T}$, that's the time on the buffer time. And in doing
4 so Chou is considering the entire duration.

5 Is it all right if I share my screen? I'm trying to see if I can get to the -
6 - Mr. Knierim may have to stop sharing his screen so I can show --

7 You will see what we were -- on slide 18. So in determining, or in
8 executing question 18, sorry question 20, the deadline may show that your
9 upper bound reaches the target time. That's how Chou considers or bases his
10 equation, or his calculations based on this remaining time duration.

11 Now the claims don't require that the remaining time should be
12 calculated as unique value be plugged into it. All you need to do is make
13 sure that the coded calculation is based on remaining time. Okay. Based on
14 two portions of remaining time or one unit portion. In this case, person of
15 skill in the art reading equation 20 or the disclosures of Chou would
16 understand that that's how it is impacted here.

17 Now again, as I mentioned earlier that if the target duration changes,
18 and the target time changes, the code rate will change. So it is impacting, or
19 influencing, the code rate. Likewise, if the upper bound changes, or if the
20 arrival time if frame $n-2$ changes, you will see also a change in the code rate.

21 JUDGE BOUDREAU: Mr. Sharma just to be clear, is the remaining
22 time the sum of these two green arrows on slide 18? Or is it the single green
23 arrow that's on your slide 17?

24 MR. SHARMA: Yes, Your Honor. 16, 17 is one arrow. What we've
25 done is simply, for explanation purposes, broken up in two arrows so we can
26 explain the two concepts that are happening with respect to equation 20.

1 The two green arrows on 18 should add up to the same arrow which is
2 shown in 17. That's the remaining time between when frame $n-2$ arrived and
3 then the playback duration or playback deadline for frame n .

4 JUDGE OGDEN: You're saying that they should add up to the same
5 time, but that's assuming that the target schedule and upper bound are the
6 same, right?

7 MR. SHARMA: Yeah. I feel that that's the goal of Chou is that the
8 two would match each other. In that case you are basing your calculations
9 based on the remaining time duration. And that's the goal. Chou mentions
10 that. It would penalize any deviations from the target schedule and upper
11 bound.

12 Will they always match? No. But it will occasionally match, and
13 that's sufficient for prior art to show that yes, in that case the code rate
14 calculation is based on the remaining time.

15 JUDGE BOUDREAU: Even in this figure 5 though, it appears that
16 there's a gap between t_t and t_b .

17 MR. SHARMA: Yes, Your Honor.

18 JUDGE BOUDREAU: If that's non-zero then --

19 MR. SHARMA: Yeah.

20 JUDGE BOUDREAU: -- two arrows here won't add up here to the
21 same as what was shown on slide 17.

22 MR. SHARMA: Yeah. In this arrow it could be a subset of
23 remaining time. In this case we were relying on a subset of remaining time.
24 But as mentioned earlier that this is a system in progress right now. As the
25 system executes, in that case Chou mentions explicitly in paragraph 72 that

1 the goal is to make sure that the upper bound and target schedule match each
2 other. That's also mentioned in paragraph 70 also.

3 JUDGE BOUDREAU: So your arguments are based specifically on
4 an embodiment of Chou where the target schedule and the upper bound
5 match each other.

6 MR. SHARMA: Match each other. Yes, Your Honor. In that case it
7 will be exactly remaining time. If they don't match each other while system
8 is in progress, it still is basing it on what is the portion of remaining time.
9 So it is still basing on remaining time.

10 JUDGE BOUDREAU: All right. I think you may have just said this,
11 but could you repeat where the support is in Chou for that?

12 MR. SHARMA: In Chou? Yes, sir. So Chou is in paragraph 70 it
13 talks about the goal is to control the target schedule to match the upper
14 bound. And then also mentions in paragraph 72 that penalizes the deviations
15 from target schedule and the upper bound.

16 Also -- if there are other questions, I feel that I can address very
17 quickly for Your Honor. Now this is, NEC, part of the issue that we change
18 the query between Petition and the Reply. That is not correct. I think if the
19 Judge Ogden noted, that in Petition, in paragraph 37, we said the gap
20 between the time in Chou systems determining the coding rate for given
21 frame and the playback deadline. And you can draw a straight arrow from
22 what we said before in Petition and what we say now.

23 In Petition we never said anywhere that the target buffer duration is
24 available time. Yes, we did discuss target buffer duration because that's the
25 goal of Chou is to control or manage the target buffer duration. But in
26 paragraph 37, which also is quoted in the institution decision, we see that

1 this is a gap between when the system is determining the coding rate and in
2 the playback deadline. And that's what we clarified graphically in figure 5.
3 So it was in words in the Petition, and it was in figure in our Reply.

4 One thing also NEC has not quoted is what's shown in pages 35 and
5 36. There we again talk about present moment, present time. That's when
6 the frame rate is determined and then the playback deadline when the frame
7 is played.

8 And then Your Honor, just a couple of things. There's a lot of
9 arguments about gn, about bits versus time. I think we are not proposing
10 any modifications to Chou, we're simply relying on disclosures of Chou.
11 Chou talks about figure 4 in bits. Chou talks about figure 5 in client time.
12 Chou's equations in 18, 19 do use bits, but again if you go to arrival rate, ta,
13 upper duration, time. And if you go to paragraph 70 it says -- extended
14 equation 18 to add a margin of safety. And that margin of safety is also in
15 time.

16 So we are not saying that we need to modify this -- there's any
17 motivation to modify, no. Chou only tells you to use bits and time
18 interchangeably. It tells you to use upper bound. So those are all mixed
19 together.

20 Now they make a bit here about how difficult it is and so on, but we
21 cite in our Sur-sur-reply, and we question Mr. Cooper -- Dr. Cooperstock
22 about it. And he says translation between time and bits is simply a matter of
23 dividing by rate. It was all within the person of skill in the art's knowledge.

24 And same thing also we cite in our Reply brief at page 14. We
25 question Mr. Cooperstock on converting bits and time. He said yeah, by the
26 time '101 Patent came along everybody knew how to convert bits into time

1 using coding rate. And he's admitted over here that Chou would know what
2 the frames are. Chou would know what the coding rates are if -- coding
3 rates are. And Chou would also know how these things are put together.

4 Last thing, some confusion about g of $gn-1$ and so on. I want to
5 clarify as Mr. Paul clarified and stress that again. We said the available time
6 is the distance over here. Display time between when the frame arrives and
7 then time when the frame is played, td over a . Now that is sufficient for the
8 Board. Chou mentioned that it's the duration in the frame, and also say that
9 I'm going to control the client buffer duration which is a very important
10 thing to do.

11 And therefore -- and it also mentions in paragraph 27 which is cited in
12 the institution decision. Chou says, okay, if the code rate is above a certain
13 size we'll do something. If the code -- sorry, if the buffer size over certain
14 limit will do that. And that's on paragraph 27, it was cited in the institution's
15 decision.

16 Now once we said this one they came back and said, well, look at
17 equation 18. There's nothing in there to show you are going to calculate and
18 so on. So in our Reply brief we explained that no, equation 18 tells you how
19 to calculate the code rate. It also tells you what factors to take.

20 Now what they're doing, they're looking at only one part of Chou's
21 equation or Chou's scheme and saying oh it doesn't show what you're asking
22 for. As I mentioned earlier, Chou has two parts of its algorithm.

23 One is, how do I take care of what's happening on the instantaneous
24 coding rate, and that's done over here through g of n . And again it's shown
25 over here, g of n . And g of $n-1$ are on the decoder site. But the scheme

1 doesn't end over here. Scheme then goes on to add a playback deadline.
2 And if -- and also target schedule.

3 So if you consider the entire duration where g of n , g of $n-1$ are a part
4 of it, and your margin of error, the whole thing adds up to buffer duration.
5 And that's what our theory is, g of n is only part of it.

6 Now they also mentioned a few things about paragraph 24, 25, it
7 talked about all that you're doing, all the calculations based on the client site.

8 That is incorrect because one thing to show -- maybe I'll take the liberty to
9 work with Chou if I may be permitted to do so.

10 And in paragraph 24, 25, both talks about how you calculate the end
11 code parameters. But it also says that those parameters are calculated using
12 the target arrival time and also using the upper bound. So contained in the
13 paragraph it is using those things on that one. Using the variables on the
14 client buffer.

15 And one last minute I want to point out is in figure 10 of the patent.
16 It's very important over here in figure 10 because this figure 10 shows how
17 you calculate -- how the server parameters come into play. This shows how
18 you're switching from one tube to the new tube, and also shows the old tube
19 in the left, new tube on the right. Paragraph 88, 89, 111, 112 show these gap
20 values are calculated and sent to the client. But paragraph 112 also says that
21 these gap values are used to calculate the new control schedule. They're not
22 used to set the control target rate.

23 So to the extent paragraph 24, 25 say yeah using several parameters
24 and so on, you're using those parameters to control the new code rate and
25 then you start calculating your coding rate base on what's in the client buffer.
26 So that's how Chou talks about there's one embodiment over there, but I

1 would point the Board to paragraph 21, 22 where the Chou mentions how
2 the code rate is calculated using the client parameters.

3 JUDGE STRAUSS: Okay. Counselor, I think your time is up. So
4 thank you very much.

5 And Patent Owner, you'll have 19 minutes for rebuttal.

6 MR. KNIERIM: Sounds great. I think -- there we go. Share my
7 screen. Can you see my screen?

8 JUDGE STRAUSS: Yes, we can.

9 MR. KNIERIM: Great. So we just heard Counsel say that they're not
10 relying on modifications of Chou, they're relying on what a person of
11 ordinary skill in the art would understand reading Chou. That's not true. We
12 have the excerpt here from Dr. Reader. A POSITA would have been able to
13 modify equations 18 and 19.

14 That's important for a lot of reasons, but I think what we were just
15 discussing is, and this applies equally both to available time and remaining
16 time. But I think we were just discussing remaining time.

17 And you know, there's no explanation here. In the Petition, the Reply,
18 anywhere, why you would pick and choose the particular variables that they
19 identify and use them to determine code rate. And, you know, that's the
20 problem.

21 There's no reason other than hindsight to pick and choose $td - ta$, td of n
22 minus ta of $n-2$ for example. Or td of $n-2$ minus ta of $n-2$ for available time.

23 There's just no explanation. Just because those values appear in figures in
24 Chou doesn't mean a person of skill in the art would use them the way
25 Petitioner says they would use them.

1 We need more. We need at least some theory about why. And further
2 after why, okay, well how. We've already got equation 18. How do we
3 change equation 18 and how would you do that?

4 I wanted to briefly hit on slide -- this is on slide 28 of Patent Owner's
5 demonstratives regarding the conversation that you just had with Counsel
6 about, I believe it was t_a of n . And this is a quote from paragraph 70 of
7 Chou. I believe Counsel spoke from paragraph 70 as well.

8 And what he didn't say, and what's important, is that Chou tells you to
9 control the buffer tube upper bound. And it actually expressly tells you not
10 to control the arrival times of the frames, the actual arrival times. So that
11 would be t_a . Right? Chou is telling you, you do not control t_a . And if you
12 do, you'll get very poor quality overall. That's what Chou is telling you.

13 That makes sense. Because if we go back to what -- to share what his
14 own expert says about this. He says that you can't know the value of the
15 arrival time of the frame until it actually arrives. And that's just another
16 reason why their theory breaks down here, right? Chou is telling you not to
17 control the actual arrival time of the frames.

18 The claim language on the other hand, the claim that we're talking
19 about here requires that you determine the code rate based on available time
20 and that is based on what is actually stored in the storage device. Chou is
21 telling you, don't do that.

22 Chou is telling you instead determine the code rate based on this
23 encoder parameters and this upper bound value. It does not disclose
24 controlling based on what is stored in the storage device.

25 JUDGE OGDEN: Isn't the upper bound derivable from the arrival
26 time based on for example, equation 16?

1 MR. KNIERIM: No. I believe what Chou says is that -- bear with me
2 a moment to find it --

3 The upper bound gap is defined as the number of data bits that the
4 servers and coder buffer can contain over the bits currently contained therein
5 after a just-generated frame is fully input into the buffer. It's from paragraph
6 24 of Chou.

7 So Chou is telling you, that's an encoder side parameter. To your
8 actual question, can you derive it from equation 16, I don't have an answer
9 for you on that specifically right now. If there's something in the record that
10 you have in mind I'm happy to look at it again. But the point is that what it
11 reflects, what that value reflects, is encoder side parameters.

12 I just wanted to respond briefly to the argument that Mr. Paul made
13 about claim construction. And I believe he said something to the effect of
14 that our only response was to say that the value of t_d of n and t_a of n is never
15 calculated. That's not true.

16 Just briefly, it certainly is true that that's a dispositive issue, right? If
17 that value is never calculated or determined it can't affect anything, right?
18 Even under their construction, under Petitioner's proposed construction for
19 sum of that a to be based on, it requires that it has some impact or influence,
20 even if indirectly.

21 If you don't have a value for the gap, it can't influence anything. You
22 need to know it. It needs to at least be determined somehow and it's not. So
23 that's our response.

24 But that's not our only response. Certainly, there is a dispute. We
25 think that the term based on means a little bit more, right? Otherwise, the
26 meaning of this term is limitation 1D, is completely vitiated. Every buffer

1 will have stuff on it. Every client buffer will have stuff on it. Just because it
2 has stuff on it doesn't mean that you have an available time. You need to
3 look at it, you need to calculate it. You need to determine it somehow.

4 We are not suggesting that this term be construed to require direct
5 input. That is not what our position is. But it needs something. It needs at
6 least some acknowledgement of the value as it exists.

7 And to Mr. Paul's argument that we have no other response, again,
8 that's not true. Because what we've said is even if you were to calculate this
9 value, even if you could calculate the gap, t_d of n minus t_a of n , you still
10 need to determine the code rate based on that, right? And it doesn't. Chou
11 doesn't.

12 Chou tells you actually not to. You don't control the target arrival
13 time. That's not what you control. You look at the upper bound, t_b , and
14 other variables but not t_d , not t_a , and certainly not the gap. So that cannot
15 satisfy based on either.

16 I would also point out that on that same argument, there's also no
17 reason for one of skill in the art to use or modify Chou to use $t_d - t_a$ given that
18 Chou already discloses the use of other variables to determine the code rate.
19 Again, this is an obviousness ground.

20 Petitioner's arguing that it's obvious based on Chou to do this. And to
21 get to the claim language, to use the gap that they identify you need to
22 modify Chou. You know, equation 18 does not refer to those values. And
23 there's no explanation of how or why you would do that.

24 And I think with that, let me just check my notes one more time. But
25 with that, unless there are any other questions from the Board I think I will
26 rest.

1 JUDGE STRAUSS: Okay. Do any of my colleagues have any
2 questions?

3 JUDGE OGDEN: Nothing from me.

4 JDUGE BOUDREAU: Nothing from me either.

5 JUDGE STRAUSS: Okay. Well I'll let the -- excuse me -- oh, it was
6 just an echo.

7 This is Judge Strauss. I just wanted to thank everyone for appearing
8 today and for answering our questions. We'd like to especially thank the
9 LEAP practitioner for appearing today to participate in the oral hearing.
10 PTAB benefits from your participation so we are very appreciative of you
11 for your willingness to take part. And for your law firm and client for
12 allowing this opportunity. We hope that you gain valuable experience for
13 your participation today.

14 We will take this case under advisement and issue our decision in due
15 course. Thank you very much and that concludes our proceedings.

16 (Whereupon, the above-entitled matter went off the record at 2:26
17 p.m.)

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