SEO summer: index waves, sandboxes, and more!

John Mueller: [00:00:00] Welcome everyone to the next episode of Search Off the Record, a podcast that we’re trying out. Our plan is to talk a bit about what's happening at Google Search, how things work behind the scenes and maybe have some fun along the way. My name is John Mueller, I am a Search Advocate on the Search Relations team here at Google in Switzerland.

[00:00:31] I'm joined here today by Martin and Gary who are also on the Search Relations team. Good morning!

[00:00:31] John Mueller: [00:00:31] Welcome.

Gary Illyes: [00:00:37] What do you mean, 'Good morning'? Do you wish me a good morning or mean that it is a good morning whether I want it or not? Or that you feel good this morning or that it is a good morning to be good on.

Martin Splitt: [speaking foreign language :)]

[00:00:48] John Mueller: [00:00:48] Yes!

Martin Splitt: [00:00:51] There's no such thing as a good morning,

Gary Illyes: [00:00:53] You said, 'yes'. What does that mean? What does that mean, john?

John Mueller: [00:00:56] You gave me a bunch of options with or in between. So the logical answer is yes if one of those is true.

Gary Illyes: [00:01:04] That's the opposite of logic. This is the worst day of my life.

John Mueller: [00:01:10] So far.

Gary Illyes: [00:01:11] And it's 4:00 AM.

John Mueller: [00:01:13] So far, Gary.

Martin Splitt: [00:01:14] In Gary's time zone that is, right?

John Mueller: [00:01:17] Alright, Martin, do you want to take us off?

Martin Splitt: [00:01:20] Sure thing! Speaking of logic and fantastic things: do you remember when we were introducing the two waves of indexing? Like two years ago.

John Mueller: [00:01:30] Yes,

John Mueller: [00:01:31] yes.

Martin Splitt: [00:01:31] I was

John Mueller: [00:01:32] involved with a lot of that back then. We worked together, I think with Tom Greenaway who is also on the Developer Relations team at the time, to talk about rendering and indexing for the first time.
And I think we introduced the two waves metaphor there.

Martin Splitt: Thanks for that. That's great. I think I understand where that's coming from. And if I remember correctly, basically I joined the team right before you did that presentation at I/O 2018 and I was convinced back then that, yeah, that's a fantastic way of explaining how things work in rendering and indexing and crawling because it's such a complicated process with lots of things happening in parallel.

But I got to say, I kind of have to deal with the fallout from that metaphor because it invites misunderstandings and people are like basically relatively frequently asking, 'So, how long does it take for the second wave to happen?' or, 'How do I deal with my website being indexed before the second wave happened?'

And these kinds of questions, which I think given the metaphor make sense. But given the way that the process actually looks like is not helpful for them, or is not like leading to the right results. And I really try to like phase out this metaphor, but it keeps coming back at me. And yeah, I mean, the way that we are seeing it, most cases, and basically that's nearly a hundred percent of the cases, your website gets crawled and it gets rendered and then it gets indexed. There are certain situations where that isn't true, like when the rendering fails multiple times or when we have other signals that we can pick up from the initial HTML and stuff. So it isn't necessarily that everything gets rendered, but pretty much practically every website gets rendered before it gets indexed.

And. Uh, yeah, so I wonder how long I'll have to, I dunno, swim through these two wave metaphors to get, to safer land. Uh, there's going to be fun times.

John Mueller: So do you think we should not have introduced it like that? Or do you think we just need to be clearer in what is the current status.

Martin Splitt: I think we should have introduced it like that, but explain that it's a simplification, it's like a mental model for people to look at and that it's not literally that.

I think people took it quite literally and that causes a few confusing moments, I think, where I would say like, if you look for a simple mental model, assume: crawl, render, index. And then if you are seeing really weird things, then you might actually look into what's going on more specifically, or ask us more specific questions for your specific case where that might not be the case, but I think the metaphor was okay.

It's just, people took it a little too literal.

John Mueller: I mean, all of rendering and JavaScript is, is pretty complicated. So it's probably hard to find a middle ground that explains where the problems might be coming from and what they need to be doing.

That is true.
But I think you’ve been here a couple of years now and you see how when you say things once on our side, it sticks around for a really long time. So...

Yeah.

Sometimes that’s challenging

And things just keep changing and that’s kind of fine because in the end, most of the changes are implementation details that have not matched impact, but then people kind of like latch onto them and be like, ’Ooh. So is this a big thing?’ And I’m like, no, it’s fine. It’s okay. Don’t worry about it. And then also there’s ranking involved. It’s like, ’Oh, my website, didn’t get indexed.’ And I’m like, actually it is indexed. It’s just not ranking for anything. Yeah. Fun times! It’s always fun. And then people are like, ’Ooh, Is this because the website only gets out of the sandbox once the JavaScript has been processed,’ I’m like, no, that’s not. Yeah. It’s tricky.

Sandbox. Yeah. Well, I guess since we talked about waves and sandbox, it is almost like a visit to the beach, you know, I don’t know...

Ooh, vacation theme.

The sandbox is probably one of those topics that’s similar to, I guess, the two waves of indexing in the sense that people talk about it once. And sometimes when it comes to SEO, everything is so complicated that you try to look for simplifications and you cling to those simplifications for a really long time and sandbox and honeymoon period are kind of two other simplifications that keep coming up over and over again. Is that something you’ve ran into as well with Martin or?

Oh yeah. So I recently did this tech SEO Reddit AMA where people were asking me questions and not only did the two waves come up multiple times. I mean, it’s vacation time. I think people are taking their mind to the beach. So that’s that, but also the sandbox and honeymoon periods came up and it struck me as weird because kinda one precludes the other.

It’s like, if my website is new and I get all this traffic, why does the traffic then drop off eventually? And then this is the honeymoon period kind of situation? And then the next person’s like, well, my website is new and I don’t get any traffic or don’t get any ranking in Google. Is this the sandbox?

And I’m like, so what is it? Do we have a sandbox? Do we have a honeymoon period? What’s going on?

I always find it interesting when someone on the team asks these kinds of questions as well, because… It’s not that you can go into the internal Google documentation and look for the sandbox. Does it exist? Because you probably won’t find a lot of useful things there, but I think the general problem there is really more a practical thing.
And the names are a bit, I don’t know, simplified? But the practical problem is really that if you have a new website, we generally don’t know a lot about it if it’s new, because we can look at the content, we can kind of see what’s written on there, but we don’t really know how it’s accepted within the whole web ecosystem.

So from a practical point of view, our systems essentially make some guesses and we make some assumptions trying to figure out where should we position this site in the search results? How competitive is kind of the search results area in general, for the queries that we think we might be showing the site for.

And based on all of these different factors, we try to figure out like where could we position this website until we know more about it? And that’s essentially this period of time, which people externally sometimes simplify into a sandbox or honeymoon period where maybe we will position it in a way that is very optimistic and say, ‘Oh wow, this looks really good. I guess it'll perform really well in Search. And we’ll get lots of really good signals over time.’ or we could look at that and say, ‘Well, it’s a very competitive environment. There are other sites that have been working on this area for a really long time. And they’re really well accepted on the web’. We might need to be a little bit more critical or I don’t know watch out a little bit more with regards to how we position this site. And that’s something that is not like an algorithm that’s built in that says, like we should hold a site back or we should show it even more visibly for a certain period of time. It’s really just, we don’t know how to show this site in Search.

So we have to make some guesses. We have to make some assumptions. And over time as we figure out how we should be showing it, kind of, when we have more signals to show and we use lots of signals in Search, of course, then we’ll be able to show it a little bit more reasonably. And that could mean that maybe we were showing it over-optimistically in the beginning. And as we learn more about how it’s accepted, we have to kind of pull that back a little bit. It could also mean that we showed it a little bit too pessimistically in Search almost. And we need to show it a little bit more visibly, but these are all things that happen over time anyway. And in particular, when a site is new, that transition from not knowing a lot about the site to knowing more about the site is sometimes a bit jarring. It’s a bit more visible compared to kind of the traditional changes that happen with a site over time. So that’s kind of, I guess, where this sandbox and the honeymoon periods come from, usually when people externally bring up one or the other, they focus on just that one aspect and telling them, or showing them how other people are talking about exactly the other side, but the exact opposite of that, that makes it a little bit clearer to them that it’s not just like one thing or the other, it’s actually kind of a balance between the two things. So I don’t know. I don’t think it’s a topic that will go away because there will always be new people who make websites on the web. And they’ll always run into this situation where they find someone saying like, ‘Oh, you have to write about this topics and you will rank well.’ And they do that. They follow those instructions and they don’t rank well, or they rank particularly well, they’re really enthused about doing more on the web and the next website they do, it doesn’t rank that well. So I suspect that will continue to follow us around for awhile. Maybe longer than the two waves of indexing. I don’t know.
Martin Splitt: Hmm. I think it makes sense that these kinds of things come up because it's not very easy to understand or debug this from the external point of view. I think we can look at what signals we have and then see, 'Oh yeah, we don't know that much about the site. And this is an area where we are more optimistic for new things coming in.' But, yeah, it's interesting that you can explain it like that and it makes perfect sense yet people are falling back to the simplification and I think that's also what happens with the two waves of indexing. So. Yeah, except that two waves of mixing is a much more niche topic, I guess. So that's, that's helping.

Gary Illyes: Also if I remember correctly, the sandbox thing that's been around for like 20 years now.


Gary Illyes: Yeah. That's a very long sandbox. It's probably more like a beach in Brazil.

John Mueller: Do you remember how that initially came up?

Gary Illyes: Well, if I recall correctly, we used to have this batch-based indexing system, right? And then that did have this weird effect because... how was it? I think we rebuilt the index every month, but only once every month. And then that meant that if you created a website at the wrong time, as in farthest away from when we built the index, then you had this long wait period. And in... during that time, you couldn't do much with that site because, well, we were not indexing things from your site.

And then somehow that indexing sandbox, I guess, transformed into a ranking sandbox in people's minds as well. Which was probably not that helpful. And then we just got to enjoy talking about it for like 20 years.

Martin Splitt: Another thing that you probably enjoy talking about, Gary, now that we're talking about indexing already is probably...

Gary Illyes: Cookies?

Martin Splitt: About cookies is one thing but another thing that I want to bring up is we recently published the second episode of the SEO Mythbusting and we talked with Alexis Sanders about crawl budget...

Gary Illyes: Cookies?

Martin Splitt: Actually, we talked about kimchis and crawl budget, but not cookies. I'll pick up the cookies today. I know that you have another batch for me ready, which also feeds back into the batch-building of the index probably, but there is still like a lot of chatter about crawl budget.

And I think that has been around forever as well, right?

Gary Illyes: Can we just talk about cookies instead of crawl budget?

Gary Illyes: [00:13:49] Are you...?

Martin Splitt: [00:13:50] Okay. Here's the thing. You talk about the crawl budget now, and then we can talk about cookies. How about that? As like a reward.

Gary Illyes: [00:13:56] Sounds awful. Let's do it. Okay, crawl budget. We published quite a bit about the crawl budget, I think, lately or the past couple of years.

We've been pushing back on the crawl budget, historically, typically telling people that you don't have to care about it. And I stand my ground and I still say that most people don't have to care about it. We do think that there is a substantial segment of the ecosystem that has to care about it. That's why we publish more on that topic and talk a little bit more about it, but I still believe that - I'm trying to reinforce this here - that the vast majority of the people don't have to care about it. Everyone wants a number, basically how big your site has to be when you have to care about crawl budget. But I don't think it works like that. And I remember when we were writing one of the help center documentations, Josh, our help center tech writer, was also asking this question, okay, let's define this.

Like how many pages do you think, or how many URLs on the site you have to have to start caring about crawl budget. And we were working with the Googlebot team on the documentation and both the Googlebot team and us - Search Relations or whatever we are called nowadays - were saying that well, it's not quite like that. It's like you can do stupid stuff on your site, and then Googlebot will start crawling like crazy. Or you can do other kinds of stupid stuff, and then Googlebot will just stop crawling altogether. And, eventually, he did convince us to give a number, which I don't remember, but I think it's around a million, I would say, URLs on the site and that's our baseline. So basically if you have fewer than a million URLs on the page, on your site, then you don't really have to care about crawl budget.

So what is crawl budget? Is it like how much money you have to pay Google to get crawled?

Gary Illyes: [00:15:58] Oh, wow, you didn't?! That was a big buzz. Thank you. You can't pay us money and get crawled. That's not how it works. It's never how it works. Crawl budget is essentially an external made up term, which we tried to define as the number of URLs that Googlebot can and is supposed to crawl or instructed to crawl. The instructions come from indexing. Basically we have a system called crawl scheduling, which tries to estimate which pages need to be re-crawled, for example, not Rick rolled, but re-crawled and Martin is making a face. You can't see this, but it's beautiful. He's almost face-palming, I think. I love that. And the crawl scheduler also tries to estimate which sections of the site have to be discovered, essentially. Where do we have to do discovery crawls. Discovery crawl means that we think that there are URLs in a particular section of a site that has undiscovered URLs or has new URLs. Something like that. So that's what the crawl scheduler does. It instructs Googlebot to crawl more and also what to crawl. And then we have a pure discovery crawl where Googlebot can just go crazy on the site and hop essentially from one
URL to the other and push stuff to indexing. Then, how much can Googlebot crawl? We try to be good citizens of the internet and we try not to crash servers.

[00:17:48] Not crush, crash, crash servers. Yes. Yes, that's better. And we do have enough crawl capacity to essentially crash parts of the internet, but we don't want to use that power. With great power comes great responsibility. Right. As we learned from a very smart man, and we try to go slow as possible, but still discover and crawl enough from sites.

[00:18:21] We don't want to harm sites with crawling. Nonetheless, sometimes it happens and then we have to back out. Basically we look at signals from the site that tells Googlebot that we have to back out from the site. Back off. Well, we actually internally call them back off signals. So for example, if the site starts sending us 429 or 500 whatever status codes.

[00:18:48] Or if it slows down considerably, then we would back out and Googlebot starts scrolling slower. And if the signals continue, then slower, slower, slower, slower, and eventually it can even stop completely because it may perceive that the site is too overwhelmed to be crawled. I don’t remember this happening or seeing escalations about this, but it can happen.

[00:19:16] Yeah. So that's the crawl budget. How much Googlebot can crawl and is willing to crawl or is instructed to crawl. I forgot. What was the topic?

[00:19:26] **Martin Splitt:** [00:19:26] Crawl budget.

[00:19:28] **Gary Illyes:** [00:19:28] Okay. I have covered the crawl budget. So now we can talk about cookies?

[00:19:32] **John Mueller:** [00:19:32] So, how can you tell if you’re like running into crawl budget issues? Like you have 1,000,005 URLs on your website...

[00:19:41] **Gary Illyes:** [00:19:41] ...and this is one more reason why we didn't choose a number or why we didn't want to choose a number because then, okay. So 1,000,005 is too much or that's still fine. Well, I would look at, I have no idea. What would I look at? Probably URLs that were never crawled. That's a good indicator for how well discovered, how well crawled a site is. Of course, that also links to the structure of the site. Like for example, if you have orphaned pages, then that's very hard for us to crawl because we can't see them - unless you tell us about them, somehow. So I would look at pages that were never crawled. For this you probably want to look at your server logs because that can give you the absolute truth. Then I would also look at the refresh rates. Like if you see that certain parts of the site were not refreshed for a long period of time, say months, and you did make changes to pages in that section, then you probably want to start thinking about crawl budget. So how can you actually influence a crawl budget? Well, one thing is that you want to send us...

[00:20:55] **John Mueller:** [00:20:55] ...cookies?

[00:20:56] **Gary Illyes:** [00:20:56] Yeah. Not cookies. I tried that. It doesn't work. I have this site - spammyguy.com - and it’s... Stop laughing, Martin, or...

[00:21:05] **Martin Splitt:** [00:21:05] Sorry.
Gary Illyes: Are you?

Martin Splitt: No.

Gary Illyes: That's what I thought. So I have this site, spammyguy.com, and when I launched it, it's basically gibberish content with, I think, one link to mattcutts.com. And what I'm trying to do with that is observing how Googlebot, for example, behaves, let's say I generate a bunch of URLs and, and I see that Googlebot goes crazy with those URLs, super excited and starts to crawl like crazy.

And if I publish on another section, some good stuff, something that I do think that should show up in the index, it's not gibberish. Then basically Googlebot is wasting time on the gibberish side because it's auto-generated gibberish content that is linking infinitely to other pages and it's spending time on that stuff instead of going to the good section of the site.

And if you think about it, then that kind of makes sense. Like if you remove, if you chop, if you prune from your site stuff that is perhaps less useful for users in general, then Googlebot will have time to focus on higher quality pages that are actually good for users.

Back out signals or back off signals. If you send us back off signals, then that will influence Googlebot crawl. So if your servers can handle it, then you want to make sure that you don't send us like 429, 50X status codes and that your server responds snappy, fast.

Yeah, I guess that's it. But in general, I would, unless you need to, I wouldn't worry about the crawl budget.

There are better things to worry about. Like if your site is still not mobile-friendly, for example, then you could, you know, catch up with 2003 and have a mobile site already.

John Mueller: So, Martin. Martin, does crawl budget also play a role with JavaScript?

Martin Splitt: A little bit because if you are already crawl-budget-sensitive, and as Gary said, that's not very many websites, like most websites that talk about crawl budget issues, turn out to not have crawl budget issues. But if you do, then depending on how you build your JavaScript, you might actually end up having more requests than if you do like a server-side rendered version or a static version of your website.

As an example, if you have a client-side rendered website, the website loads, it loads its JavaScript, and then the JavaScript makes five API requests to fetch the actual content. Then all of these five extra API requests do count against your crawl budget in a way. And that can then easily scale. It's like every page that you have on your website and you have 10 million of these pages, then there's like 10 API requests.

Then that does add up quite quickly. But normally that should be fine. As Gary said, most websites have other lower hanging fruit than crawl budget to reap first. But yeah,
if you are crawl-budget-sensitive, then the way that you build your JavaScript or architect your web application, that does might have an impact.

[00:24:13] Gary Illyes: That was a very good point. The JavaScript and resources and stuff, because every single URL that we crawl on the site will chip away from the crawl budget. So basically if we have to crawl alternate versions of the site, let's say that you have 170 language variations of a page, then all those will chip away from your crawl budget.

[00:24:36] It's not like, 'Oh, these are just a variation and we don't count it in the crawl budget'. We do have to crawl them. And if we have to crawl them, then that means that it will chip away from your crawl budget. Basically we will have less time on something else.


[00:24:51] John Mueller: Does that also include things like CSS files or images which usually don’t change?


[00:24:58] Martin Splitt: But... we do have caching in place.

[00:25:02] Gary Illyes: Oh, that's what I wanted to say.


[00:25:03] Gary Illyes: Damn it, Martin.


[00:25:05] Gary Illyes: No, you go.

[00:25:06] Martin Splitt: Right. So let's say you have one style sheet for all your pages and then we crawl one URL and then we make the request to that URL. That's one request and your crawl budget gone. And then we crawl the CSS file. Let's say like uh, I don't know, main.css or something like that. That's the second one. And then maybe there's like one image on this one page that we just crawled. That’s the third request. And we see the next page. That’s the fourth request, but we would not request the CSS again because we already have it in the cache. So that would not count again against your crawl budget and the cache is relatively aggressive.

[00:25:41] John Mueller: Aggressive cache! Okay. It kind of makes sense to use cash :) when you’re talking about a crawl budget, right?

[00:25:49] Martin Splitt: You didn't. Oh my, ah, so punny!

[00:25:54] John Mueller: Okay, so sorry.


[00:25:56] John Mueller: It sounds like the two ways of indexing and the crawl budget - or both - kind of complicated topics where people try to simplify them into ways
that are a little bit easier to understand, but when you really dig into them, it's a lot of 'It depends' in there. And it's not like this clear yes or no type answer that you can just easily give, right?

[00:26:18] **Martin Splitt:** There are rabbit holes. You can dig quite deep into each of them, but I think it makes it even more important to just at the surface level, understand how your site is doing and what your site's doing and where to spend the time to look further. If your site has 10 pages, it's very unlikely that you'll suffer crawl budget issues per say. If your site uses it like a regular JavaScript framework and you are not ranking well, then that's very unlikely to be primarily a JavaScript issue unless you see that we are not rendering your content. So you want to very carefully find out what's causing the problem - if it even is a problem - because sometimes what looks like a problem really isn't a problem, depending on the tools that you use. It's like this website doesn't rank for the top a hundred keywords that this tool thinks are important. It's like, yeah, but your website is in a completely different industry or niche, so why do you care?

[00:27:17] **John Mueller:** Yeah, I think it's interesting because there are always new people that jump into SEO, and they start working on small sites sometimes in the beginning and they hear all of these complicated things and wonder what they should be watching out for. But it sounds like the two waves of indexing and crawl budget, if you're working on a smaller site, you probably don't have to care about it at all. And you can kind of grow into that over time. If you, we start working on different kinds of sites, more complicated JavaScript sites or really large websites.

[00:27:46] **Martin Splitt:** Yep.

[00:27:47] **John Mueller:** Cool. So...

[00:27:48] **Martin Splitt:** Start with the basics, always start with the basics and then build up from there.

[00:27:51] **John Mueller:** Cool. So when it comes to the crawl budget, I heard you have to give Gary cookies and then you get more crawl budget. Is that right? Or like, how does that work?

[00:28:00] **Martin Splitt:** I haven't gotten more crawl budget, but I have gotten fantastic cookies. I'm really looking forward to the next batch.

[00:28:05] **John Mueller:** Oh, wait, he gives you cookies. You don't have to give him?

[00:28:08] **Martin Splitt:** Yeah. Gary had a ridiculous amount of oatmeal in his pantry apparently. And as like, what do I do? And I'm like: make cookies! And so I got two batches of cookies and they were delicious.

[00:28:21] **Gary Illyes:** Somehow I still have, I think, maybe one pound worth of oatmeal. Well, actually more like one was two pounds... Yeah, actually one was two pounds of oatmeal.
Martin Splitt: How much is that in real measurement units?

Gary Illyes: It's like one kg.

Martin Splitt: Oh, okay.

John Mueller: Is that like 27.5 cups?

Gary Illyes: Yeah. Let's not talk about that.

Martin Splitt: How many caterpillars is that?

Gary Illyes: At least seven.

Martin Splitt: I think that's right.

Gary Illyes: Yeah, I have no idea how I ended up with so much oatmeal, but it was occupying way too much space in my pantry, in my cupboards. And then I was trying to figure out what to do with them. And I just searched for something like 'what to do with lots of oatmeal'. And then one of the first results was, well, 'make cookies, you dumb idiot'. And then I actually have no idea how I ended up with, because I'm making vegan cookies now, but I don't remember how I ended up with vegan cookies based on the oatmeal.

I think it was like most of the recipes that I found that were using oatmeal for cookies were vegan.

John Mueller: Wow.

And also I could never, in my whole life, managed to make good vegan cookies. Like I can make vegan food, but I could never make good vegan cookies.

Martin Splitt: That's no longer true.

Gary Illyes: Yeah, no longer. True. But I always had problems with like either the fat part of the cookie was not right or it had a... acquired taste that was like, well, disgusting.

John Mueller: Acquired taste.

Gary Illyes: I don't know how to say it nicely. It was disgusting. So yeah, this is the first time actually I managed to create good vegan cookies and I'm very happy about it. That's not true. I'm just like, okay about it.

Martin Splitt: You are very happy about it. And it's also actually, technically, it's probably the second time because they're in the three batches that I got so far, there were two different types of cookies.

And the first type of cookie was great. That was the lemon cookies that you made.
Gary Illyes: Aww, the lemon cookies were excellent. Those were really, really good.

John Mueller: I wish you would publish these recipes somewhere, Gary.

Gary Illyes: I'm... yes.


Gary Illyes: No, no, I have a new domain name for the cooking site or not the cooking site, the recipe site.

John Mueller: Cookieguy.com

Gary Illyes: Cookie guy! Quick, register that!

Martin Splitt: Cookie overlay.

Gary Illyes: Yeah. Maybe I should have asked you. You have better ideas than I do apparently. Yeah. I will not tell you the domain name, but yes, the cookie site is... It's going to happen eventually. I actually didn't have time to work on it. Now I have two interns that we will maybe introduce externally as well, and they keep me very busy nowadays, somehow.

John Mueller: So cool!

Gary Illyes: Which is good.

John Mueller: What are your interns working on?

Gary Illyes: They are working on the robots.txt parser. I don't want to spoil it yet, but they are doing some really interesting work on... Basically enabling others to build on top of the parser.

Martin Splitt: Ooh.

John Mueller: That sounds good. That sounds good. Yeah. Cool. So it's like the second wave of robots.txt processor..ring?

Gary Illyes: Okay, I'm out from here.

John Mueller: So, sorry. So sorry. Okay. Maybe we should take a break here before things go even more downhill. Thanks, you two, for joining in, it's been fun and entertaining for me, at least. Hopefully for those of you who are listening along as well, stay tuned, I guess, for our next episode, we'll have more of these over time.

And thanks for listening in and hope to see you next time...hear you, wait. You'll hear us next time.

Martin Splitt: Yeah.
Gary Illyes: At one point you will have to figure this out, John.

John Mueller: I'm working on it.

Martin Splitt: This is fine.


Martin Splitt: Bye.

Gary Illyes: Good day.