

Transcript for Steamchat Episode #47: “Gabe Newell 2011 Interview, Part 1”

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Backstepper: Mr. Newell, this question is from Chrome235: ‘In the past you spoke about using biometrics to measure players physical and emotional response to a game. Would this technology only apply to play-testing in order to add better design the games or would it be something that all players would be able to use? If it became an option for all players, how do you see this technology being integrated in a non-intrusive piece of hardware.’

Gabe Newell, Managing Director of Valve Corporation: So, we think bio-metrics are going to be very fundamental. They’re not just a design-time with their run-time feature. When you look at the kinds of experiences we try to create for people, having access to [the] internal state of the player allows us to build much more interesting and compelling experiences. So, we don’t really think that that’s in doubt; the question is really about when and in what forms that takes. Even very simple noisy proxies for player-state, like skin galvanic response or heart-rate, turn out to be super useful and they’re very much at the beginning of the kinds of data that you can gather. Another thing that people are looking at is as the video conferencing is driving improved cameras on PCs and you can look at doing primitive and then more sophisticated gaze tracking and pupil dilation, both of which are relatively non-intrusive. Longer-term, it gets more of science-fictiony. We’re just talking to a company that actually implants

EEG [Electroencephalography] equipment into people's skulls. It's about a [USD] \$60,000 operation right now but it gives you fantastic data that you could use. Eventually you're going to reach the point where it's a reasonable consumer option, as strange as that sounds, and very much reminds me science fiction stories out of the nineteen-fifties about embedded phones and things like that. But at some point there're going to be sort of increasingly accurate, increasingly sophisticated sources of data about what's going on in your body and in your brain.

So, I think that that's just going to happen, in how we get there, what form factors that takes, how controllers and input devices change. That's the thing we don't know - the fact that it's going to occur I think is pretty predictable at this point. We're working on sort of industrial designs ourselves, like we did a mouse design that we've been using here internally. You could also do game controllers and things like that and even the primitive kinds of hardware that a software company does, we're working pretty well. So I would actually be surprised if the next generation of certainly living room devices didn't have some form of that.

Now, one of the surprising things -- well, there's two sort of surprising things. One, once you start getting this data you find that your ideas of how you would use it in order to [simplify] things like make the director more sophisticated, those work really well. The thing that sort of surprised us was how much sharing that data in multiplayer games impacted the social experience. This was not something we were expecting and it's the sort of reason you like to invest in these kinds of research efforts is it's not only the

things you expect it's the things that catch you by surprise. So, we had a debugging tool where we were monitoring everybody's state and it wasn't intended to change the game, it was intended to make sure the hardware was working. So you'd be sitting and you'd be playing *Left 4 Dead* and you could see the other people's -- the specific term we use was arousal state, and that was measuring a specific set of things and filtering in a certain set of ways -- but you could see the arousal state and when you were playing competitively we found that people were incredibly aggressive towards highly aroused players on the opposing team and were very defensive about highly aroused players on their own team. In other words, it was changing how people were feeling about the other people they were playing, and this was a group of developers with what they thought this was a debugging aid, and it sort took us a while to recognize this phenomenon; it wasn't intentional, it wasn't something we were looking for, and it was something we were joking about and somebody sort of said 'Well, rather than it being funny that we were all ganking Mike, that actually is an interesting phenomenon from a design perspective'. It's sort of like this anonymity we've gotten out of things like email and haven't even been fixed by things like chat. So, there's a bunch of studies about stuff like sociology where near-term face-to-face cueing that people who don't have that, there's a certain percentage of the population that just spins out of control that don't manage their own aggressive impulses if they can't see how the other person is reacting, and that's what flaming is and all of these other phenomenon that surprised people when anonymous communication started to happen in the eighties and it seems like even though things like voice chat don't seem to bring that social queuing back, which I would have would have predicted it would and I would have been wrong.

This other thing is where you just have this bar on the side of your screen going up and down showing somebody else's arousal state actually seems to bring that sense of connection back, like your brain is flexible enough to actually internalize that as sort of a replacement for a bunch of the face-to-face cueing that we've lost. So that's an example of something where we were completely caught by surprise as a side-effect of doing this biometric research so we're going to do a lot more of that and we're sure that a lot of other people will discover a lot of other interesting things about it, but I think there's a lot of untapped opportunity in the biometrics space.

Now, I said earlier that we were sort of heading in a more science-fictiony direction. The thing that is also really interesting is that there's a bunch of research right now in using, it's called TMS [Transcranial magnetic stimulation], and essentially it's using magnets you can increase and decrease the activity levels in parts of your brain. In other words, rather your brain being read-only there're noninvasive ways of making your brain read right, so we're tracking on that research pretty closely, like there're a bunch of rat studies where learning, and by learning they mean it in the behavior science sense not in the 'I'm taking a algebra two test on Sunday' sense, that learning has improved if you stimulate certain region of the brain and that's a really interesting or be it somewhat scary phenomenon. A simple sort of evil thing you could do is you could make people incredibly afraid of the colour red in a game and you would be able to amplify that very strongly. Now, at that point you're really into some strange areas but that technology is real in labs today in animal studies, where we're ten years away from seeing a game

controller that is actually affecting the relative -- probably about ten years. So it's 2011 now, by 2021 we'll have stuff that will cause us to change how your brain reacts to the experience you're getting and that's a fairly strange thing to be thinking about as a game designer or as an experience designer. So, yeah we see this as very fruitful and very long-term and something we're both tracking on and trying to make progress in getting it into customer's hands.

Backstepper: Very interesting topic! To the next question from Vic: 'Will you ever, ever return to Prospero?'

Newell: Well a lot of the ideas for Prospero have sort of influenced our other games subsequently. So, you know, whether or not we actually go back and do that specific game I don't know, it actually has a lot of appeal to us, we're all sort of fond of it. Nothing ever really dies here, it's just a question how long until we get around to doing it. We just have so many opportunities to do so many different things. I mean I even get emailed from people saying 'What about *Ricochet 2?*', which is kind of astonishing. We actually have twenty six people who's first Valve game they ever bought was *Ricochet* on Steam so like I said nothing ever appears to ever really die, you just haven't gotten around to doing it yet so I'd put Prospero into the camp. And even further back than Prospero, the other game that Mike [Harrington] and I were talking about before we'd even had anybody other than us working on it was a submarine game. Mike was absolutely certain there was an opportunity to create fantastic underwater visuals and

gameplay, so if people want to know the even furtherest back thing we have haven't gotten around to shipping yet it would have to be the unnamed submarine game.

Backstepper: The next question from Born Acid: 'What was the last game that scared you? Furthermore, has a game ever made you cry? *Half-Life: Episode 2* hits me in a strong way and I know I'm not the only one.'

Newell: I was sort of creeped out by the *Silent Hill* games, I can't really say I was scared. I think I *Resident Evil* had this awesome moment where this thing runs by a window and it's completely unannounced. The key thing was that it wasn't in the existing game syntax so I didn't know what it meant and I found that to be really disturbing until it resolved when the liquor pops out of the ceiling later.

Doom scared the hell, right, I didn't even realize how scared I was when I was playing *Doom*, but I can't really say that other games have really done a super great job of scaring me. Part of the problem though is that I'm a game developer and that really changes your relationship to these kinds of things, you know a lot of times you're thinking about the craft and the design and it sort of puts a layer between you and the experience that makes it harder -- you're sort of running a simulator in your head all the time to sort of think about how other gamers are experiencing it and that makes it harder for you to have the same kinds of peak highs and lows that somebody who doesn't build the games for a living would have.

Backstepper: From RedBadger: 'What was one of the biggest challenges you and the other developers had to face with *Portal 2*? Was the challenge ever accomplished? Was there something you wanted in the final product that could not be achieved for whatever reason?'

Newell: No I think *Portal 2* is pretty much everything that we want it to be. Most of the challenges on *Portal 2* were personal development of the people who were working on the project. We sort of used *Portal 2* as an opportunity to have a whole bunch of people take on more responsibility they had in the past, and that was great for us in the long run but it set some people's hair on fire, but everybody who worked on it did an awesome job. *Portal 2* is pretty much nails just everything we try to do and does it really professionally. I mean I would have liked -- like on a project like there are some things that I wanted more music in the game than we ended up getting, but that's sort of nit-picky. Every game can be longer and every game can have more stuff, but that's a pretty minor thing. That's more aspirational than it is a negative. I think that people are going to be totally psyched by *Portal 2*.

Backstepper: Can't wait to play it! Next question from Lugaloco: 'Has Valve made any strides in signing technology for deaf people for their upcoming games or has been any development of the idea at all? Last time I saw any news on the subject was back in 2009 watching some YouTube videos of you.'

Newell: We haven't made any interesting progress, it's something we want to do but we keep bumping into things that cause us to think harder of the problem. We're definitely going to be doing work in that space but I can't say that we're happy with anything -- we don't have anything we're ready to ship out to people yet.

Backstepper: Thank you. The Killsmith asks: 'Valve has to be aware of the graphical bugs with the recent *Half-Life 2/Episode One* engine update: everything from screwed up skyboxes to missing facial animations to strange pseudo-HDR behavior. Will you guys be fixing these issues and when? We would like to play *HL2* and the episodes again in their full glory before you release *Episode 3* next month.'

Newell: (laughs) Ah yes, we're going to fix them. When Erik [Johnson] gets he can be more concrete about the delivery date for that since he's the one who would know. Yeah, we always are going to be keeping these things up to date and fix problems that either arise or that we create ourselves!

Backstepper: In the previous interview you said that you would be interested in creating develop commentary for Half-Life. Is this still be considered for a possible future endeavor?

Newell: So the issue there is that there's like a large tax with updating the older games, I mean like a bandwidth tax in terms of how much content we'd have to shove down to people so we're trying to gather a couple of those things together at one time so we

don't have to update the entire game multiple times and have people have to go through that, so there tend to be a tend a set of points around -- you tend to have to make these sort of cliff-like decisions around things like DirectX support and hardware support so those kinds of opportunities we'll take advantage of one we have to do we have to do an update just to keep it current with graphics hardware.

Backstepper: MasterGir asks: 'Will Valve ever update the source SDK, especially Hammer?'

Newell: Oh yeah, we're spending a tremendous amount of time on tools right now. So, our current tools are... very painful, so we probably are spending more time on tools development now than anything else and when we're ready to ship those I think everybody's life will get a lot better. Just way too hard to develop content right now, both for ourselves and for third-parties so we're going to make enormously easier and simplify that process a lot.

Backstepper: Mama Luigi wants to know: 'What is your favorite memory of working on *Half-Life 2*?'

Newell: My favorite memory is being able to show the finished product to people who really wanted to play it, I mean that's sort of everything sort of pays off; the project is done, you're really proud of what you and your colleagues have done, and all the waiting is over and people can play it. That's the best part.

Backstepper: Steve W. wants to know: 'What do you take consideration when looking at a résumé and hiring someone at Valve?'

Newell: So one of the most important things that we look for is the ability to ship something to a group of customers, get feedback from those customers and then make changes where you measure the consequences of those changes. For us, that's the key to being a successful developer nowadays. It's not about what school you went to or what classes you took, it's that ability to take feedback and iterate that's the most important thing and it's a solid thing where iteration cycles and being able to be responsive to customer demands is the critical long-term ability that you have to have to be successful in the game space. For anybody who's interested, like 'I'm finishing up high school, what's the best pathway to take as a game developer?' Well what you want to do is actually put up a game, create a website, put up a game, get ten of your friends to play it, have them post on the forums so there's sort of a public record of that, what they think and make a set of changes and then have some way of saying 'Here was the impact of those changes'. It could be as simple as a poll, right - eight out of ten people thought that the problem with dark levels has been resolved. And then do that process for a while and show that you can internalize customer responses to what you're doing and iterate towards better solutions. That's the thing that we look for and that's the thing that will make you best prepared to take advantage of whatever you do next.

Whether you go to university, all a sudden a lot of the coursework that you take will suddenly make sense and will help you either say 'Oh, that's a waste of time' or 'No, I can totally use this, I'm going to go back to my dorm room and apply it right now to this thing I've got people using'. Or, if you decide to go into building mods or if you decide to try to get an entry level position in QA or in testing at something like that at a large publisher, all of those choices are going to be made more valuable if you've been through the experience of shipping and iterating and measuring the impact of what it is that you've done. You know, don't wait to start making games - if you want to make games, start making them now and keep your projects as constrained as possible, right. The first thing you should do should only take you a day, and I know that sounds weird like 'How can you do anything useful in a day?'. Well, it's a lot easier to do something useful in a day and make it better over several days than it is to do something over several days and not end up going awry. So, those are just a set of suggestions that I would make to people.

Backstepper: In a way, this question already got answered. Zable wants to know: 'What are you able to learn from experimental psychology and the use of EEGs or heartbeat monitors?'

Newell: Well the nice thing, well I mean experimental psychologists, you know, have -- so Mike Ambinder, you know, came from, he had a research background and he brings a lot of precision to his thinking about these classes of problems. Like, most experimental psychologists are game designers even though they don't call themselves that and it's

remarkable how many of the skills that Mike was using - just his ability to statistical analysis is a Godsend for everybody here, right. He can take tremendous amounts of data and extract more useful information from that data from that information than just anybody else here, and he's also really good about teaching everybody else about how to think that way so that they're developing the same sets of mental tools that he has. And he's good at experimental design and more and more of what we do looks like you have to approach that in the sense of how do we discover new and interesting stuff, not how do we just simply copy the same kinds of things that we've been doing for the last twenty or thirty years as an industry. Hiring Mike was a little bit of a speculative investment on the company's part, and it's just paid off incredibly well. I mean, Mike makes everybody else in this company better at what they do and that's the hallmark of, you know, it's exactly the kind of effect we love to see people have when they join the company.

Backstepper: Axiom wants to know: 'Valve has mentioned before that they like to attract new consumers by giving free updates as a source of income. Then why suddenly introduce micro-transactions in TF2, and where the prices of some in-game items are even more expensive than the game itself?'

Newell: So, what we're trying to do -- so the way to think -- okay, so, there's this question in of how do you make money so that you can pay everybody's salaries so you can make more stuff. The term is monetization. A lot of times pricing is thought of as a way to extract the greatest amount of money from poor, unsuspecting consumers, right?

So, you know, 'Hey, we can charge \$39.95. Yeah, we can also charge \$49.95! Isn't that better?' The answer is that is a really broken way of thinking about pricing. Pricing is a service, right? It's an opportunity to increase the value of the thing you do by giving each person what, for them, is the optimal combination of benefits and components and costs, and each person is going to have their own optimal way of doing that. Some people are willing to have ads, and some people don't. Some people want the least upfront cost, and some people want to know that they have finished paying for something they don't ever have to pay for it again. Those are just simple examples of what you really want to do is to allow each person to craft and design their own custom option. Now, having transactions or incremental marginal content is one way of giving lots of people more flexibility in sort of putting together what for them is the best set of, you know, features and costs. And we're always going to be looking for ways to give each person there more and more control over what it is that they most prefer and that it's not going to look like what the person next to them does.

Part of what we did with some of the pricing was to find out how people would react and would people buy really expensive items and how would they react to it, how would they feel about it after a month later? How many people would actually be wearing those items who purchased them? The interesting data we saw was that when we launched the Mann-Conomy that the highest selling item on the store was the most expensive item, the second highest item - the second highest volume - was the least expensive item. So you look at that and you say 'Hmm, people are trying to tell us something', what is it that they're trying to tell us? So we're very much at the beginning

of understanding what it is that we're learning from this. We certainly can't say that we have this clear idea that what we're doing is the right thing that's optimal for all of our customers, we are looking at this very closely all the time and trying to figure out ways to learn more about what it is that people like the most and what it is that people don't like, what are the things that we should avoid? It will be interesting and entertaining to watch us fumble around trying to understand what the best thing to do is, and hopefully people remember that our long-term goal is to create as much value and as many happy customers as we possibly can.

Backstepper: And the community also gets money from it.

Newell: Yeah! Right now, we think that that's worth touching on. It's like, we think that it's an incredibly important step so that the value that the community is generating, that they're able to vote with their dollars and say 'This person has created something that's more valuable than anybody else, and I'll prove it by giving them money' - whether it's a map or it's models or whatever, and we think that that's a critical characteristic not just of *Team Fortress* but just about any game going forward is to create a framework in which the community can actively participate in the creation and monetization of entertainment experiences.

Backstepper: Niall M. C. wants to know: 'Is the incoming release of *DOTA 2* a sign that you feel that you are ready to move on to concepts outside of first person genres

and is there a chance that there will be more titles coming from Valve in the future that explore other genres?

Newell: Well we did Alien Swarm and we did Ricochet and those were non-first-person and so we've always wanted to do -- we always want to do everything, right, they're people at Valve who want to do fighting games, RTS games, MMOs; you name it, and it's really a question of time. We spend more time thinking of all of the things we don't have time to do than we do worrying about -- the biggest competitor to an idea at Valve are other ideas, right, and I personally am really glad that we're doing *DOTA 2* because I'm addicted to the game and so it's great for me personally but there's sort of criteria that we always have to apply when we're looking at 'What do we work on next?', and broadening our range is certainly one of the things we look at as being a plus for any given project. So, yeah, we like the fact that it's not first-person and we're hoping to do more.

Backstepper: Looking forward to see that! ThatoneJeff wants to know: 'Would Valve be interested in using facial animation technology similar to that of *LA Noire*. Or would you rather stick to manual animation.'

Newell: We have a lot of people here who're pretty sophisticated in the technology and science of faces and facial animation, so Bay Raitt works here, Jeff Unay who took over from Bay's work at Weta Digital and did *Avatar* is here now. So, we're pretty

comfortable pushing that technology forward and I think that we'll see some fairly large steps in the future with regards to facial technology with our future games.

Backstepper: Sounds great. Alex M. wants to know: 'How do you think a good workplace ethic like at Valve helps to engage developers and artists when making a new game?'

Newell: So, I was very lucky when I was at Microsoft - when I joined Microsoft it was the third largest software developer on the east side of Lake Washington, and then several years later everybody who was my cohort at Microsoft, we were all filthy rich and did never have to work again; felt very weird, like, none of us sort said 'Ah, I really deserve this', most of us were like 'Well that's... kind of strange, it never occurred to me that' - this was back before the whole generation of IPOs and internet startups and all that, this was back when software was this weird thing that ran on crazy hobbyists' computers. But what it did was put me into a situation where I had to think really hard about what I wanted to do with my myself, simply because I could do anything I wanted - I didn't have the excuse to say 'Oh I have to go to work because I have to pay my car bill and my house and pay my mortgage' because I didn't have a mortgage and I already paid off my car you're sort of like 'Why am I, what am I doing? Should I just quit and get into a sail boat and sail around the world? Is that going to make me happier? Should I devote myself to philanthropy?' So the answer was actually what I really enjoyed doing more than anything else was working with really smart people, building cool products and then shipping them to millions of customers who valued them highly.

That's just like a huge amount of fun to do, so when I think about the other people here I sort of assume that there're in the same position I am, or I was, or that they will be. Our goal here is to make everybody rich enough that they don't have to work, so we just take that off the table for them.

The point was, what I'd like to do working with other smart people, I want to be a fan of the people who are around me. I don't want to spend my time making up for their mistakes, I want to spend my time marveling at how awesomely cool the work they did was and how many problems they've solved so that I don't have to deal with them, and that's pretty much the kind of person that we hire here is the person who thinks that way. The person who's the key person, the whole reason that this project shipped was that guy or that woman, and we want to build a company that's filled with those people one hundred percent across the board. And when you do that it's way more satisfying a place to work. I was asked this question recently in an interview for Forbes Magazine, and I sort of said 'Well, I've had jobs - I worked as a towel boy in Germany in a gymnasium, and I worked as a soda jerk in a really cheesy roadside restaurant, and on and on everybody's had these jobs. Those were jobs, they were miserable and I hated them and ninety eight percent of the things I valued about myself were not being used in those jobs and coming here every day doesn't feel like a job, it feels like I'm having a huge amount of fun. A lot of times I say, I'm flying the world's best fighter jet, is what it feels like to be here. It's just amazing how fast things happen and there are lots of people at the company who's individual contributions would make the company successful, and yet we're all here working together with a shared purpose and it's just a

blast. So, in that environment you are both attracted to really talented people and then they tend to really want to stick together because the reason they go to work each day is not because they get a salary or not because they get written up in magazines, they come to work each because it's just a huge amount of fun to be in an office next to Jay Stelly, Yahn Bernier or Christian Rivers or any of these guys - it's just a blast.

Backstepper: The next question from Norek: 'You recently started using other kinds of media (comics, videos, short movies) in order to provide an opportunity for us to explore the fictional universe of your games or promote an upcoming piece of gaming material (DLC, update, etc). Are you willing to expand further in different media by creating something entirely original that is not connected to your previous games in any way, or you would rather prefer to keep such materials strictly game-related, serving as just an additional content to something that's already established and well-known among the community?'

Newell: So the late nineties and early two-thousands it seemed like your average gamer knew more about how the internet worked than your average marketing vice president. Customers understood that everything about the sort of brick-and-mortar business was going to be sort of overthrown when creators and consumers could be connected, and it wasn't just about moving bits across wires for dollars, it was the relationship and the experience was going to change pretty dramatically, and that's really where our customers seem to be ahead and we needed to build Steam sort of as a result of where our customers already were and where our customers were headed. I think in the same

way we came to this realization that our customers' notion of entertainment was very different from what was convenient for us. It was awfully convenient for us if we could just keep making video games, and I've talked to people in the film business about this and they're worried that it's not going to be possible for them to continue to just think about making movies, and I've talked to comic book people and the same thing; we have these accidents of production technology that cause some companies to be better at some things than others, but it doesn't reflect what the customer experience is.

The customer experience wants these very rich, engaging... things. We don't have a word for them yet, and sometimes they want to be the protagonist and they want to have a strong sense of agency and those things look like games and then sometimes they want the strongest -- well, what you end up coming to the conclusion is that we need to be able to produce a much wider set of media assets so we can start to figure out what it is the richer overall experience it is that people want to have. I think *TF2* is furthestest down the road of our products in terms of exploring this, but I also think that's it's something that every entertainment company is going to have to wrestle with and whether you're Bad Robot, or Valve, or Marvel, you're going to have to figure out how you are going to give people the experiences and the worlds that they want, not the ones that are easy and familiar for you to create. So, we really see this as being reactive to how customers are thinking about what it is that they're fans of today. There's a production component on it and there's also sort of the consumption side that we make it way too hard for people to be fans of a particular property. It's like 'Oh so I have to go to Netflix to get my movies. I have to go to Barnes and Noble to get my comics and my

books. I go to GameStop for the games', the community is completely disconnected from that, and what seems bazar when you say it that way, how can your community which is so critical to most people's experience of these things be completely unintegrated with any of the other ways of participating in or consuming these experiences. So, yeah, we think that we have to be doing this, we think that we're very much at the beginning of doing it and really haven't done anything that's - -it's like we're laying the ground work to do more interesting work later.

As to whether or not you could start a particular property outside of the interactive piece, yeah absolutely. I think that that would be sort of an interesting experiment for Valve or for any game company to do is to start, you know -- I think the interesting thing is to do is to start almost from the forum, right? It's like, take the thing that is most about community involvement and engagement and build out from that rather from building out from the game. You can also build out from a comic or a movie or whatever, but you'd probably learn more by starting with the forum and starting from the assumption of community engagement and building from that, and you'd learn a lot more from going that way. But I do think that this is something that every entertainment company is going to have to wrestle with.

Backstepper: The next question is about the forums. Boff wants to know: 'Have you or any other Valve members, been lurking on forums under a pseudo name. Have they started flame wars antagonizing regulars?'

Newell: (laughs) I think most of everybody at Valve has been, in their own lives, through so many flame wars that the thrill is gone. We're all relatively sophisticated consumers of the internet, plus it's way more fun to troll your own colleagues (laugh) than it is to mess with people's heads outside of the company.

I want to go back to something we sort of touched on earlier since Erik [Johnson] is here. So the question is - there are two questions that I think you might want to address, one is the last *Half-Life 2* update, what are the plans for getting the issues that we created fixed and out to customers?

Erik Johnson: I don't have any data right off the top of my head on that right now.

Newell: Okay, and the second one was I think it would be useful to talk about -- so the issue of developer's commentary came up...

Johnson: Yeah.

Newell: ...and so I said 'Well the problem with developers commentary is you tend to want to bundle it into a larger update because if you're going to have to go and update a whole bunch of content for something you sort of want to do it as rarely as possible'. The point being that it might be useful for people to understand how we make those decisions; how do we decide to drop DX7 [DirectX 7] support or how do we decide bring all of the *Half-Life 2* maps up to the *Portal 2* engine. What are the set of tradeoffs

that we think about, because I think exposing those tradeoffs and how we make those decisions is even more useful than picking a specific issue.

Johnson: Yep. So, we're always internally trying to optimize our time for what we can do to do make the most customers happy, and we always have more things to do than time in the day or the people to do it, that's always been true in the history of the company. So there's some things that we end up not getting done. Part of the problem or the struggle is that customers have a list of things that they definitely want us to, but they don't have the list of everything we're doing and so we have to do a bunch of the evaluation on our side. We have the thing we're doing which is -- say it was *Portal 2* before we announced that versus go back add a bunch of features or move our whole technology base forward to be more current. So we have to look and say 'This is how much work this thing is, this is how much work the other thing is, what's the best thing for customers for us to do in this given time?' But it's something that makes us a little crazy internally because when a bunch of customers are saying 'We want you guys to do this for us, I want you to add commentary to *Half-Life 2*' we have to make this tradeoff with our time that is kind of hard for us to make, so there's always this huge list of stuff we want to get done and there's never enough hours in the day. We have a problem, and I think we've made the problem a little bit harder on ourselves, like we kind of created a problem ourselves as we've shipped a bunch of products, at least by our standards pretty closely together since *Half-Life 2* - we've made technology tradeoffs that make it too difficult for those codebases to interact with each other so...

Newell: Could you be more concrete?

Johnson: Say we introduced a new rendering feature in *Portal 2* to get that rendering feature into *Counter-Strike: Source* is really difficult because the specific thing we would have to do would be bring that entire codebase forward which one of the effects of that would be that *Counter-Strike: Source* would no longer work if it were running in DX8 [DirectX 8], and our products are very long-lived and we want to be able to give as much value to customers as we can over time but those transition where it's like 'Well, the codebase is going to change in a significant way or it's going to support specific type of hardware is going to go away', those are rough and we need to make sure that the thing we're giving to customers is more valuable than that transition cost, so that's how we look at those things.

We have a lot of great tools for that, as opposed to if we had to traverse those ten years ago. In the case of the hardware we can say 'Well how many people have this hardware, how many people have new hardware'...

Newell: In the case of DX8 and *Counter-Strike: Source* it's 2%! (laughs)

Johnson: (laughs) Right, right!

Newell: So, all you DX8 hardware - not DX8 software - all you DX8 hardware *Counter-Strike: Source* users, watch out!

Johnson: (laughs) Yeah!

Newell: You've fallen below the Mendoza Line!

Johnson: (laughs) Right!