Ray Rogers (00:06):
I'm Ray Rogers.

Annie Evans (00:07):
And I'm Annie Evans, co-host of today's episode.

Ray Rogers (00:10):
You're listening to Fix This, a podcast exploring tech ideas and solutions to some of today's largest challenges. Every day, millions of people around the world turn to movies, videos, and shows to learn, dream and immerse themselves into new worlds. But global audiences crave global creators who can produce authentic, diverse content, and Netflix, one of the world's leading entertainment services, is up to the task. Netflix delivers for more than 200 million members in more than 190 countries who enjoy 125 million hours of TV shows and movies each day.

Annie Evans (00:46):
Netflix uses Amazon Web Services (AWS) for nearly all its computing and storage needs including databases, analytics, recommendation engines, video transcoding, and more. Hundreds of functions that in total use more than a 100,000 server instances on AWS.

Ray Rogers (01:02):
In addition to powering much of its backend functionality, Netflix also builds solutions on AWS that help it reach new voices, create connection between creative teams, and enhance workstreams to allow for seamless collaboration—despite someone's geographical location.

Annie Evans (01:17):
By improving its internal capabilities, using cloud-based solutions and introducing flexible tools like Content Hub, NetFX, and virtual workstations, Netflix is able to deliver quicker, more authentic content to its far-reaching customers without sacrificing the creator's experience, which is at the center of it all. To learn more about how the cloud is enabling artists and redefining cross-team collaboration, Ray chatted with Naz Pethani, head of product for Netflix media technology and Steve Kowalski, director of engineering for production infrastructure at Netflix. Take a listen.

Naz Pethani (01:52):
Hi, my name is Naz Pethani.

Steve Kowalski (01:54):
And I'm Steve Kowalski.

Ray Rogers (01:55):
Can you describe how your two teams actually work together on a day-to-day basis?

Naz Pethani (01:59):
Our primary sort of ecosystem that we are building around is called Content Hub. As the name mentions, it is the singular hub of content and connectivity for media and Netflix. Everything all the way
from the first piece of footage to visual effects, models, cuts—everything is sort of delivered into the singular system where our users across the company can go in. They can discover content and then they can take this content and distribute it for a wide variety of functions. So that sort of forms the base of everything. And then around that, we have individual products, applications, tools, infrastructure systems for a lot of workflows that connect into Content Hub.

Steve Kowalski (02:42):
Beneath Content Hub, there’s something called Studio Orchestrator, which is a workflow automation platform that’s designed to make it easier for developers and other users within the studio to access Netflix infrastructure. We have Netflix workstations, which is an on-demand remote workstation platform that helps get creatives connected with each other. And for the content that's stored in our systems at Netflix, we have creative compute and storage, which is infrastructure at the edge specifically targeted towards creative use cases. And then another group, media systems engineering, which engineers specific solutions for specialized creative functions at Netflix. So, we’re really managing everything and vertically integrating from AWS up through the application layer.

Naz Pethani (03:37):
So, when I view that supply chain, you can see that when footage is shot on set, there’s a digital imaging technician or a camera card technician that is offloading camera cards. It starts from those users all the way through to visual effects (VFX) supervisors, who along the journey are getting things in and out. Data IO operators at a lot of studios we work with, internal studio users. So, our post team, our visual effects (VFX) team that are managing this process, editors that are logging into these systems to edit content, all the way down the chain. You can even, we even think about it at the studio, we touch it in the post and VFX teams. Then we touch it again when we try to launch a title on the service and then all of the subtitling marketing, dubbing, publicity, all of these teams need access to that content. So, it spans a wide breadth of users.

Ray Rogers (04:30):
During the early days of the pandemic, what was that transition like for your teams going from in-person collaboration to primarily virtual collaboration?

Naz Pethani (04:39):
During the early days of the pandemic, from a Content Hub perspective, our 5-year roadmap essentially became a 6-month roadmap, and it turned into how can we enable our productions to move files across the globe really quickly? So, we had productions like La Casa De Papel that needed these tools to move files and media around the globe.

Naz Pethani (04:59):
We had times when a shot was happening in a different part of Europe, the imaging technicians and the teams were based in Spain, the editors were based in different regions. So, what we really saw from a product perspective is there was this huge spike of data transfer in and data transfer out into Content Hub. So, in order to support La Casa De Papel and shows that really needed to move media around, we had to [use] Content Hub workspaces, which we thought not a lot of people were using, but in the face of the pandemic, it flipped to become the most important product for a short duration of time while shows figured out their workflows. The prioritization went from, can you save time using this workflow? To can you get this workflow even done with the artist working remotely? So that aspect of the
prioritization changed, but it also did remove a lot of barriers. The adoption was a lot easier when there's no other alternative way of getting things done.

Steve Kowalski (05:59):
We had only targeted our internal VFX group to use the platform. And quickly, we found that our animation studio, who was very much rooted in working traditionally in an on-prem type environment [needed it]. So, we quickly made a bet: Try to get the product out to them that they could use, and we would time the release at the same time as what we were releasing for the VFX company.

Steve Kowalski (06:28):
One of the things that we learned really quickly was most folks, the bandwidth that they have coming into their homes is asymmetric. So while we could stand up solutions to get people connected with traditional computers, sitting on their desks at home, and that they could download the content they needed to do their work. It was very difficult for them to push it back and to be able to collaborate and share with someone else. So, a remote workstation platform where really we're only moving the pixel information that's changing on their monitors was really well suited to those kinds of workflows. It really unblocked people quickly and I think that explains the quick and fast piece of adoption and just the appetite for this platform.

Naz Pethani (07:17):
Now you could pick the best creative for the task at hand regardless of, are they based in LA, can they travel to your office? Are they going to sit in traffic for two hours one way? So, it sort of democratized that ability for people to join into the content creation supply chain.

Ray Rogers (07:36):
How is this democratization changing the outlook for your teams and for the creatives that actually get to work on and touch Netflix projects?

Naz Pethani (07:44):
Bringing that content into the ecosystem, or bring bringing that content into where we can then process it, touch it, develop new applications, really offers a lot of possibilities from that point on. So, I view it from the lens of flexibility and innovation.

Steve Kowalski (08:01):
It is a fundamental shift in our thinking. And I think like you said, I think we view it similarly, it's here to stay. It's actually a real asset. I mean, we have a lot of work to do in order to make that a really rich experience, but I think that the pandemic has accelerated this, and we've made great strides over the last two years.

Ray Rogers (08:26):
Can you tell us more about how these tools differ from one another and their importance to achieving production work at Netflix?

Steve Kowalski (08:33):
The NetFX is interesting because it’s a full production platform that we’ve put together. It’s all virtual—so virtual storage, virtual compute, virtual workstations, pipelines that we’ve built. It’s a real integrated platform that is very flexible, very scalable, very flexible. We can adjust the size of that infrastructure in minutes. Then, that provides a lot of benefits and a lot of flexibility back to the studio where we can send work to NetFX and they can be up and doing it in a day. The long pole is getting artists onto the platform. These systems all work together in some way, Content Hub sort of sits at the center in, think of it in sort of a hub and spoke type architecture. Things are moving in and out of Content Hub. People are creating things. They're getting pushed back into Content Hub. And likewise, as content is delivered externally or from set or wherever that happens to be, some of that content will then make its way directly onto if it’s the case of NetFX, it goes onto the NetFX platform for artists to begin working on.

Ray Rogers (09:57):
How are each of these tools helping all of the different team members feel included and connected in a genuine and authentic way?

Naz Pethani (10:06):
When an artist logs into that system, they see everything curated for them. So they want this entire version working seamlessly all the way from the lowest level, which is the raw infrastructure that they use, the storage, the compute, all the way through the pipeline layer and all the way through the applications that they consume. So the magic is in connecting across these three layers to curate everything for the artist, so that when they log in, they see this amazing work environment that just makes their life easy.

Naz Pethani (10:42):
And in some ways that inclusion and connectedness can manifest as really small tools along the journey. So, for example, we built out things that allow artists to render really fast and save a lot of time, rather than having to plan jobs, kickoff jobs, and put in a lot of information to do a single render. How do you just make it easy for artists to render? How do you pre-process some of that work and some of the pre-processing is done along the lines of automating a trans code and giving them the kinds of files they need. But some of that pre-processing is done using cutting edge techniques, leveraging AI and ML. So, what are the different ways in which you can prep it all up and set it up for the artist to be successful in their day to day job?

Ray Rogers (11:29):
How is the cloud helping you to think about these tools as you’re building them out, as you’re building the MVPs and envisioning what it could look like for today’s needs while also meeting the needs of your teams 6 months from now, a year from now? What does the cloud look like in all of that?

Steve Kowalski (11:44):
Amazon Web Services being our key infrastructure partner here at Netflix gives us access to essentially the whole Earth and Netflix is producing content globally for a global audience. Our desire is to bring our infrastructure into those markets and give creatives working in those markets access to our systems and services. So really, it’s a great match for us. We don’t want pockets of production happening globally in silos, away from one another. There’s a lot of benefit to us at Netflix to get the leverage of building systems that all Netflix content creators have access to and can use. So, in terms of timing, today we’re in key markets globally where there’s demand. We are working with regional leadership across the globe.
to try to bring our services in our systems to them and where there is strong appetite for folks to adopt those tools.

Steve Kowalski (12:56):
We are meeting them and partnering with them head on. Six months from now, we'll be in additional regions globally. And as we think 2-3 years down the road, not only will we expand our services portfolio for those content creators, but we'll be operating in more global markets. So, it's a really exciting thing, not only for us in engineering, but it's super exciting for content creators globally. Some of whom have never had access to the kinds of technologies that we're able to bring. It really is win/win on both sides.

Ray Rogers (13:35):
Downstream how are all of these tools and changes really helping the teams at Netflix to think bigger and create even more impactful and authentic work?

Naz Pethani (13:44):
The scalability that we get from using AWS is unparalleled. We experimented with giving extra rendering capacity to visual effects artists. We expected, sure when visual effects artists have a little bit more rendering, they will be able to render a little bit more and you might see a little bit of a better output, but it would take longer. We actually even saw things happen a lot faster. We saw anecdotally higher quality. We saw more revisions on that content in that shorter duration of time. All of the scalability that is provided by AWS in the cloud can help transform the way in which the workflows actually work and how the content is created. So in the end, we are trying to get content essentially better and faster.

Steve Kowalski (14:34):
The fact that wall clock time is almost free with flexible compute is a big lever for our creative teams. And so, we are working to try to find more ways to make it easier for them to tap into flexible infrastructure and flexible compute to get better creative outcomes.

Ray Rogers (15:01):
To learn more about Netflix on AWS, visit aws.amazon.com/solutions/case-studies/netflix.

Annie Evans (15:10):
If you liked today's episode, go back and stream episode 51, Diversifying the Tech and Entertainment Industries, to hear how Howard University is working with AWS and Amazon to create a more inclusive world in technology and entertainment. Or episode 61, preserving history with the New York Phil Harmonic, to hear how technology can power solutions that help preserve culture and history. And remember to join the conversation on social media with #FixThisbyAWS.

Ray Rogers (15:39):
A huge thank you to our guests, Naz and Steve. And thank you for tuning in. If you liked today's show, please remember to subscribe, rate, review and share. We'll be here on the next one.