
KubeCon
CloudNativeCon
Europe 2023
TiKV

Build Your Own Path in the Cloud Native Ecosystem

Rich Burroughs, Loft Labs
Kaslin Fields, Google

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Europe 2023

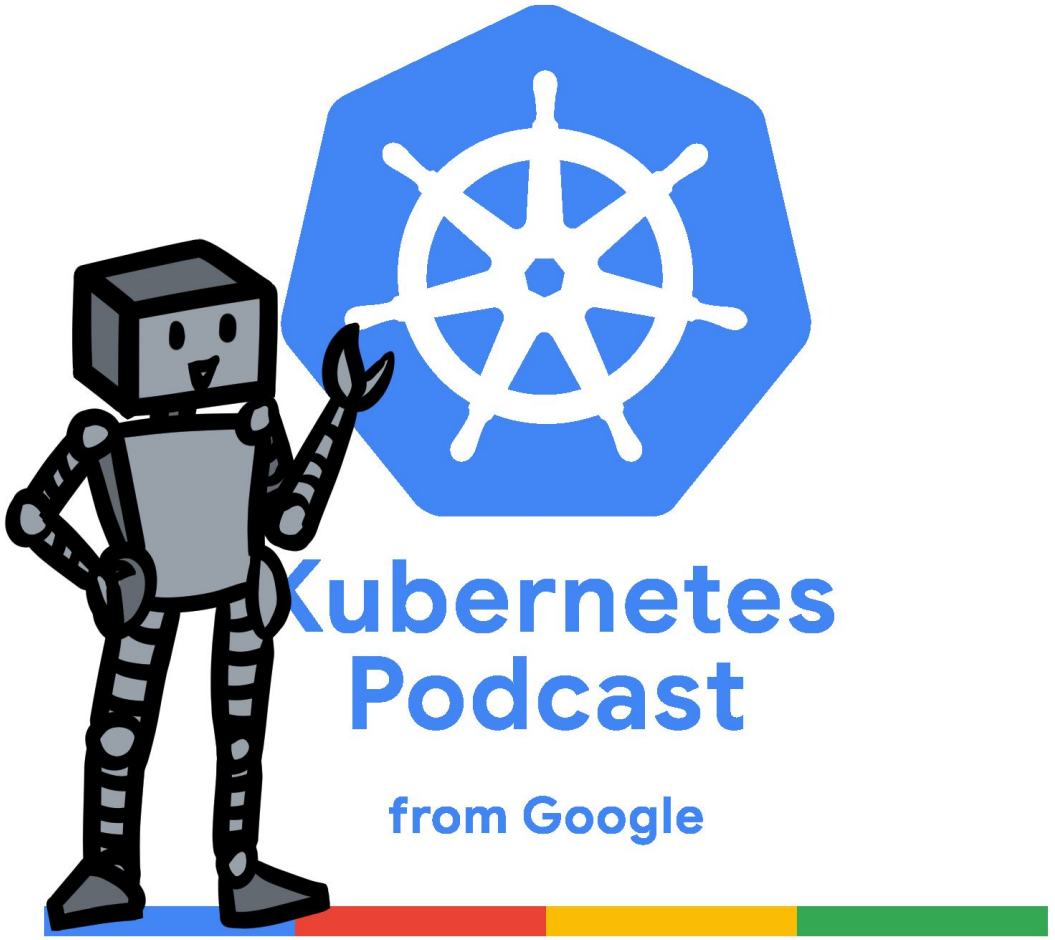
Rich Burroughs

- Developer Advocate at Loft Labs
- Kube Cuddle Podcast Host
- vcluster contributor
- Worked in Ops for 20+ years
- Tweets about ADHD

Kaslin Fields

- Developer Advocate at Google
- Kubernetes Podcast Co-Host
- CNCF Ambassador
- K8s SIG ContribEx Co-Chair
- Cloud Native, DevOps, K8s
- Tech Comic Creator

More About Us - Podcasts



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Agenda

- Understanding Open Source
- Kubernetes History
- Becoming a Contributor
- Security
- AI/ML/HPC

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Understanding Open Source

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Leonard Pahlke

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Why Open Source?

“I got into open source during my bachelor's. I was working for a company mainly focusing on AWS. So I was kind of already in this cloud space and uh, a couple of colleagues were very into Kubernetes and cloud native in general. And some of my colleagues were just showing me Kubernetes and this entire space, and I think it was like super interesting to see how cloud native technology can be used anywhere.”

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Leonard Pahlke

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Why Open Source?

“It's not like, uh, dedicated to any provider. So I thought this would be like an interesting step besides AWS. And because everything is open source technology, I got introduced into open source with that, which was great.”

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Divya Mohan

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Imposter syndrome

“So, um, most of the times I'm like, hit by these waves of imposter syndrome wherein I'm, I'm like, okay, I might not be the best person in this, you know, universe to talk about it, but I sure can get my perspective in. So I think I approach it from that perspective. I, uh, that's how I learned to calm my bad voice in my head that says that I don't deserve it.”

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Divya Mohan

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Imposter syndrome

“I'm like, everybody starts off somewhere. And that's how, you know, I try to calm myself down. But I definitely agree with you that it's like a little harder for folks starting out, and I think our community in general does a fantastic job of allowing for a safe space for these people to come in and ask questions by saying that, you know, we have a model of there's no stupid questions.”

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Carolyn Van Slyck

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Open source is empowering

“I think it is incredibly empowering from the standpoint of saying I'm more distinct from my employer. The people I work with, if I change employers, are still people who matter in my network beyond just the next job recommendation. I'm still working with them. If I switch from one company to another, if I'm still working on Kubernetes or if I'm still in the CNCF ecosystem, those relationships still matter 'cause I'm, you know, that's probably the only consistency I have sometimes, when you switch.”

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Carolyn Van Slyck

KubeCon CloudNativeCon Europe 2023

Open source is empowering

“And I think that's really powerful and you get a chance to work with, I think, some of the people who have the right idea about how to attack life and technology and what we're trying to do. Uh, 'cause I found that in the Kubernetes ecosystem especially people are extremely focused on fostering a healthy, inclusive community and not just, leet code or, oh gosh, whatever you want to call it. So I, I value the relationships I've made in open source so much, almost more than the license.”

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Kubernetes History

Joe Beda, Craig McLuckie, Brendan Burns, and Kris Nova
(right to left) at a Docker Meetup in Seattle in 2018

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Joe Beda

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Scaling in the early Kubernetes

“There was a lot of shade thrown around the early versions of Kubernetes around then. We didn't target scaling beyond say, like a hundred nodes. And that was a conscious choice 'cause we knew we could solve that eventually. But the thinking was, let's make sure we get the experience right because nobody's gonna be using this past a hundred nodes early on anyway. Um, but, you know, but that led to a lot of people throwing shade.”

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Joe Beda

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Scaling in the early Kubernetes

“And so we eventually decided to focus on that. And that led to the first SIG, uh, because we, we sort of forked off a set of folks to start looking at that. And that ended up becoming SIG Scalability. And that idea of being able to sort of carve off groups of people to focus on something led to sort of the way the project is organized now around SIGs.”

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Kelsey Hightower

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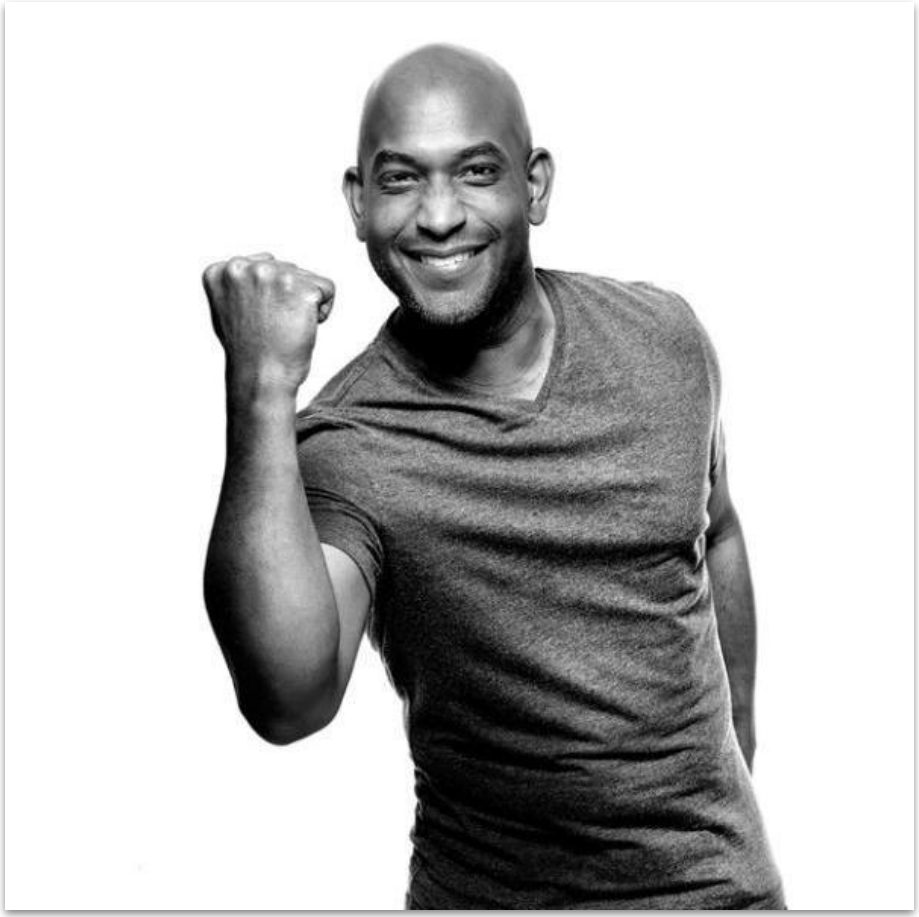
Kubernetes the Hard Way



“I think a lot of people, we always talk about make something easy, make something easy. And I always ask for who, right? So maybe someone that is just going to use Kubernetes, I agree. You should just make it easy. Something like GKE Autopilot is cool. The cluster's hidden. You know, Fargate has similar ambitions. That's cool, but if you are a platform team or you're the person responsible for fixing it when it breaks, then you need not necessarily easy, you want understanding.”

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Kelsey Hightower

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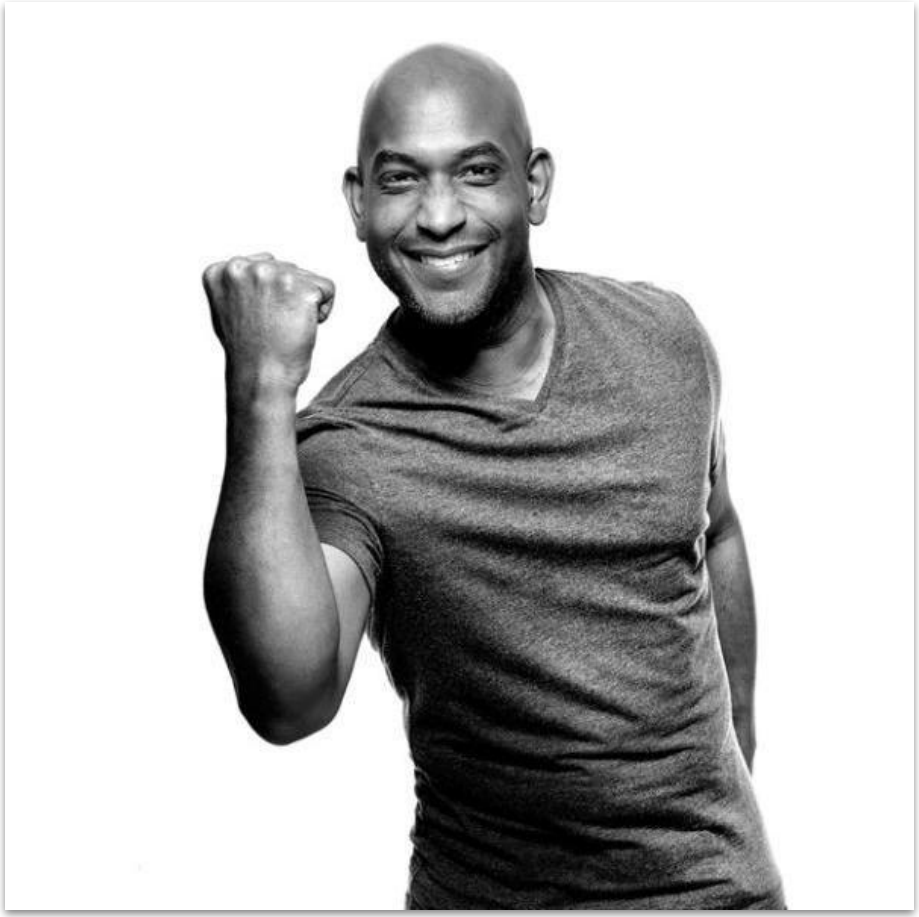
Kubernetes the Hard Way



“So Kubernetes The Hard Way is really about saying, as I learn more about Kubernetes as the project updates and changes, let me keep that document up to date. So as newcomers come in, or anyone that wants a refresher, they can step through it. It's tedious on purpose. It's like building a 10,000 piece jigsaw puzzle. But it's tedious so that way you know where all the pieces fit, so when you're done, you can step back and see the big picture and say, I built that.”

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Kelsey Hightower

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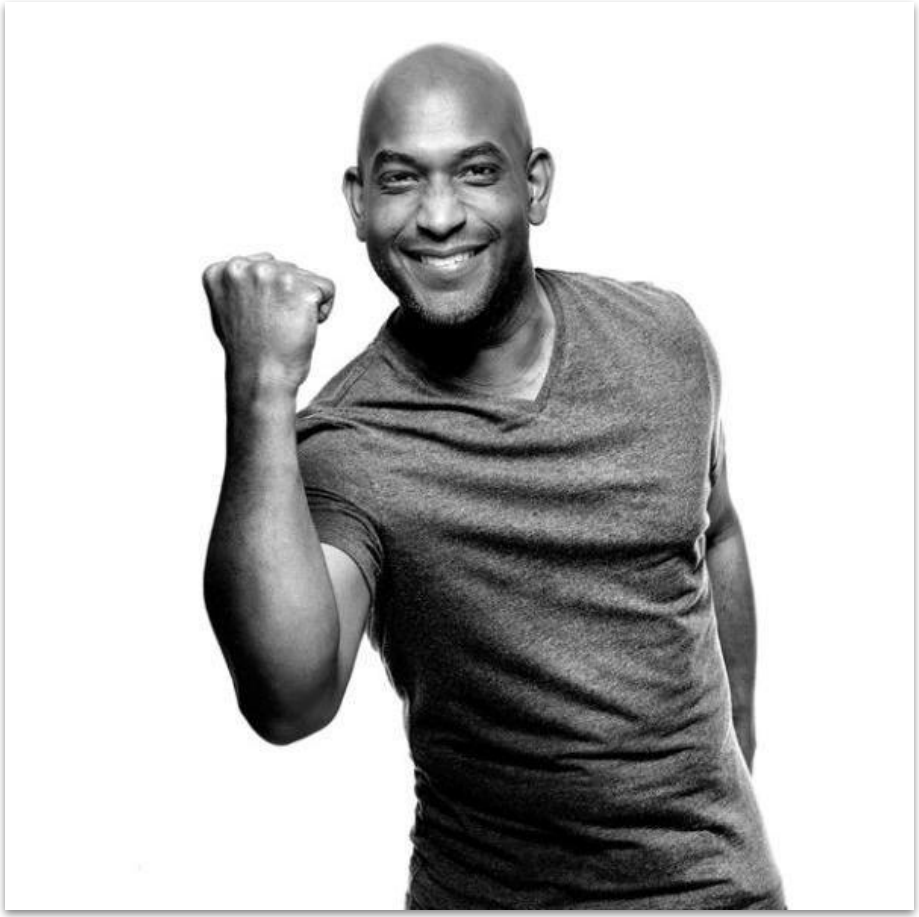
Kubernetes the Hard Way



“And that instills a different level of confidence than clicking the automation button and having something else do that.”

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Benjamin Elder

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Steering the Kubernetes OSS Project

“Yeah, so the Kubernetes Steering Committee is the top level governance body for the Kubernetes organization, the project. When we say that we mean, because the Kubernetes project has established documents and governance for how everything is handled from the CNCF owns the project, who they delegate to Steering, then Steering delegates most things down to special interest groups for different horizontals or verticals in the project.”

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Benjamin Elder

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Steering the Kubernetes OSS Project

“So Steering doesn't make technical decisions, but Steering does help be an escalation point for things and interface to the Cloud Native Computing Foundation, who actually hosts and owns the project and all the code and trademarks and everything. So we sort of advocate for the project with our host organization and partners, and we establish the governance for the rest of the project. But things like how a particular portion of the project is administrated are handed off to the SIG groups.”

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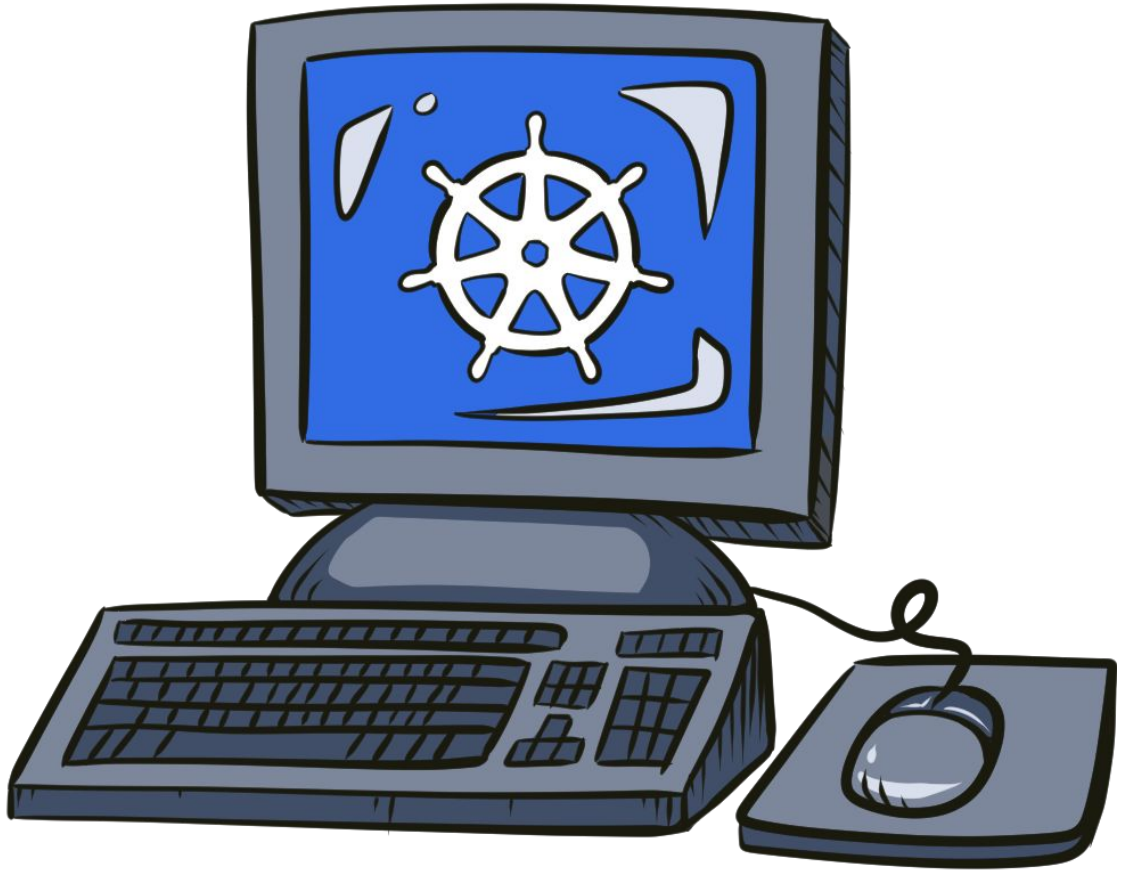
Becoming a Contributor



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Benjamin Elder

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Contributing to Open Source

“In fact, some of the areas that are hardest to contribute to are great areas because if you keep persisting in that and people realize like, Hey, this isn't really being handled, and we have someone else that has shown up and is working on it and trying to take care of it, that first part's gonna be frustrating where inherently this area that isn't already being really well handled and is a good spot for someone to come in and take over because it isn't so well handled right now, it's gonna be hard to get that initial work done and people are gonna be busy.”

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Benjamin Elder

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Contributing to Open Source

“It's just such a huge project. We have so many issues open and features and everything. It's, it's really hard to keep on top of everything happening here. You can't really do all of it, and even if you try to pick some area, they expand over time. But if you can just keep coming back and be persistent about it, people will notice and I'll think a lot of open source contributors will also start to go a little bit more out of their way to try to like help you specifically if they notice that you've really been trying. And try to make sure that you're not stuck forever.”

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Benjamin Elder

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Contributing to Open Source

“It's hard to figure out what is even fair for, like, how much time do I spend reviewing things and where do I spend it, and things like that. But definitely one of the things that I know I pick up on is when someone just like keeps coming back. I'm like, well, I, I feel for them. I don't want them to be stuck forever. They've been trying so hard. Let me make sure that I'm getting to some of that.”

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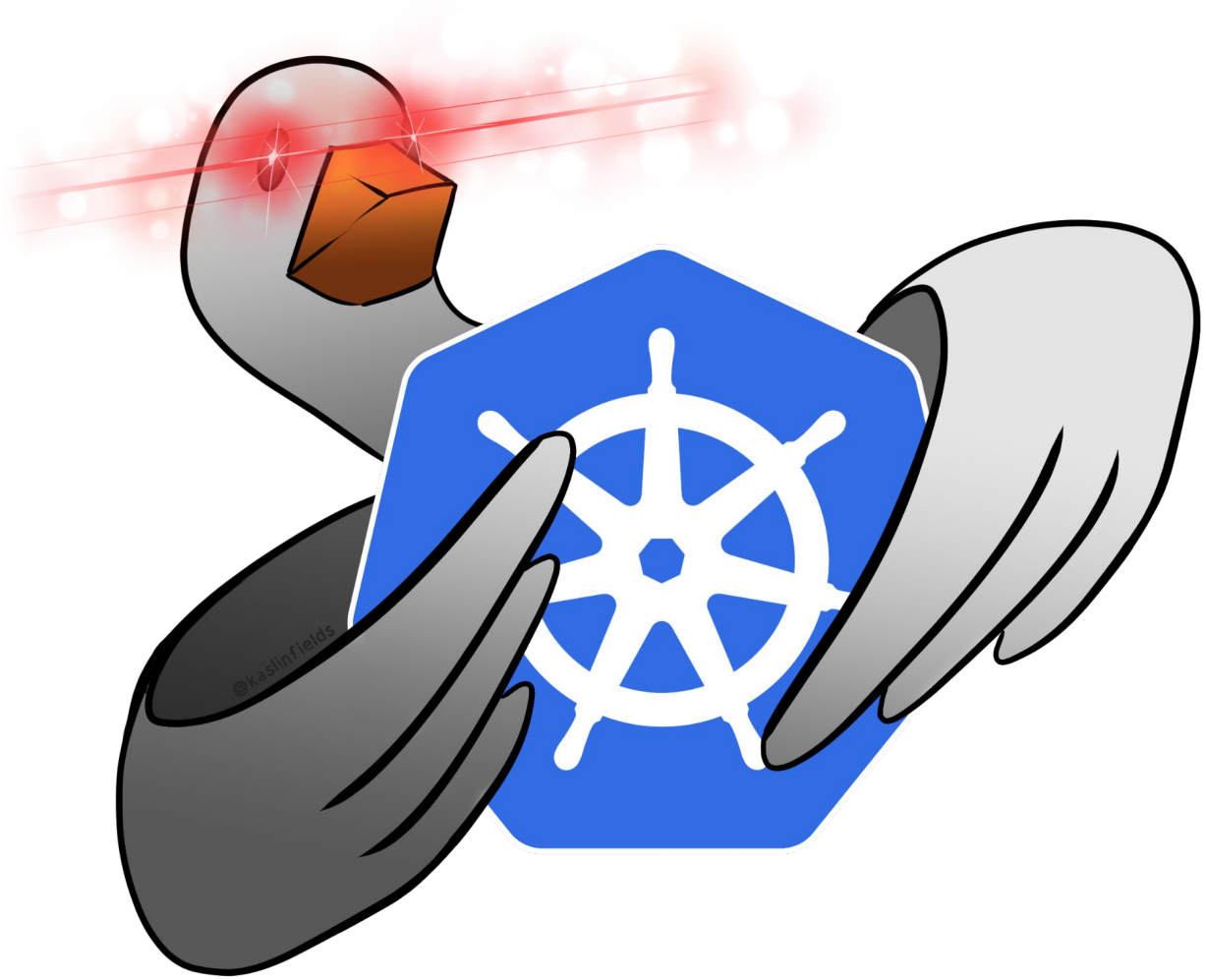
Security



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Emily Fox

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Cloud Native Security

“There's just, I don't know, there's so much to consider when it comes to cloud native and it bleeds heavily into just general open source security. Um, you'll see this in a lot of the Security Technical Advisory Group's issues and discussions is, we are starting to get to a good saturation of what is secure practices in the cloud, or secure practices with open source. And where that overlay with cloud native makes it for technical uniqueness.”

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Emily Fox

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Cloud Native Security

“Those are becoming more and more challenging as the lines get blurred because we're seeing more mature security guides from the cloud native ecosystem applied outside of our architectures. So we've done really good, we've gotten ahead and people are using the products and the deliverables that come out of that group. And now we're, we're trying to figure out what's the next thing that hasn't already been covered or where do we point to existing material that is more refined and more use case specific for adopters.”

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Brad Geesaman

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Is Kubernetes secure by default?

“I always say that no matter what you're running a multi-tenant cluster. You have at least two tenants. And by that I mean you have a persona that cares about the workloads and you have a persona that cares about the cluster and its system workloads. And you probably don't want those to cross, uh, paths because, you know, if, if one of the front end facing containers is compromised and you're not doing anything else to protect your other persona, by definition, you're multi-tenant.”

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Brad Geesaman

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Is Kubernetes secure by default?

“And so I think there's a fair bit of work that you tend to have to do to make sure that those set of assumptions are well guarded. So, you know, RBAC, network policy, uh, admission control of some kind preventing, uh, payloads, but also I think what tends to happen is, that advice works for smaller setups. Like it's, it's reasonable to understand when it's just two namespaces and a couple pods here, and a couple pods there.”

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Brad Geesaman

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Is Kubernetes secure by default?

“Where I think the challenge is, is when it becomes a multi-tenant cluster or soft multi-tenant cluster where it's like five teams of similar trust level in the same org and you have things like ingress that are shared, or you have keys or certificates that are shared, like that's where it gets really tricky and I think that's where, when folks say, oh, it's insecure by default, they're saying it's insecure by default for my version of what I want as far as isolation.”

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Liz Rice

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The performance of eBPF and Cilium

“It's very good at efficient networking because we can bypass essentially the host networking stack in a lot of cases rather than having to, well, in a, most pods run in their own network namespace, and that means they have their own network stack. So in a traditional non-eBPF environment, a packet has to go all the way through the host network stack, through the virtual ethernet connection into the pod, and then through the pod's networking stack.”

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Liz Rice

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The performance of eBPF and Cilium

“But with Cilium because we know, ah here's this packet. I know the pod that it's destined for. I can just send it straight into that network namespace without having to go through the host network stack, which gives some pretty significant improvements in performance.”

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AI/ML/HPC

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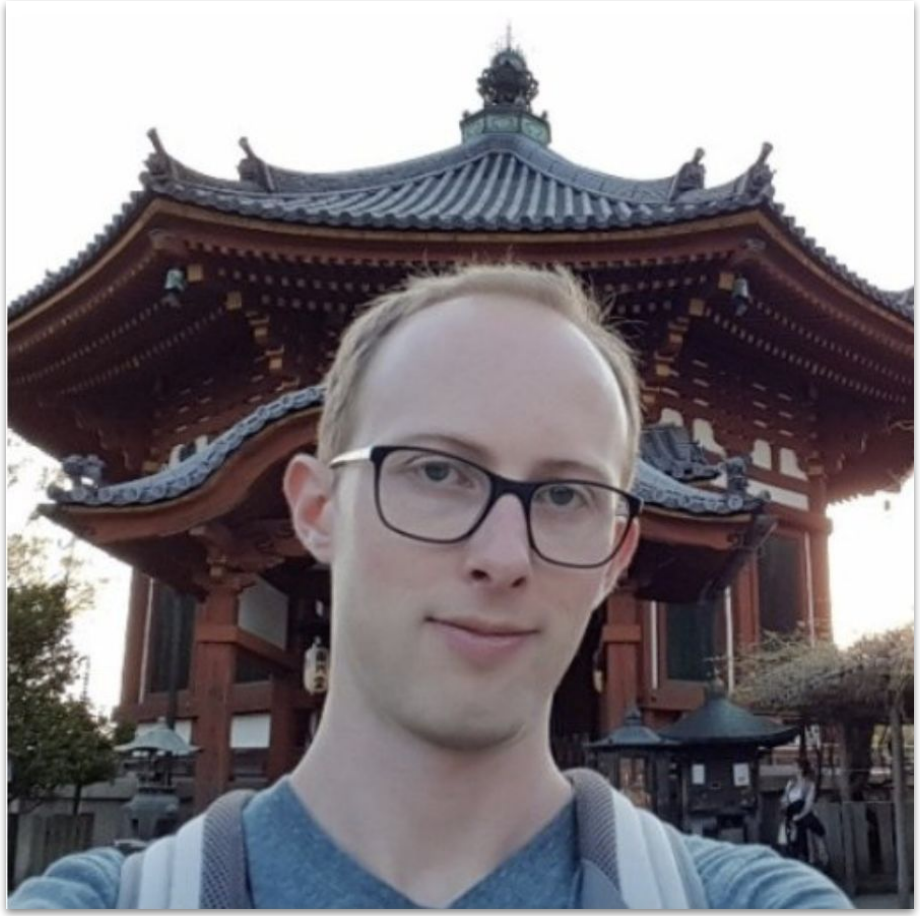
Louis Bailleul

What is a Supercomputer?



“It's a lot of the same, a lot of different things. So it's still like a CPUs, RAM, network, and all the stuff you find in any data center. It's just highly condensed. So in a supercomputer, the main thing is basically power density. So cramming as much as you can in the same floorspace of CPU's, memory, and everything. And also, uh, it's most of the time uses very specialized networking, so either InfiniBand or some proprietary fabric in order to reduce the latency, node to node.”

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Louis Bailleul

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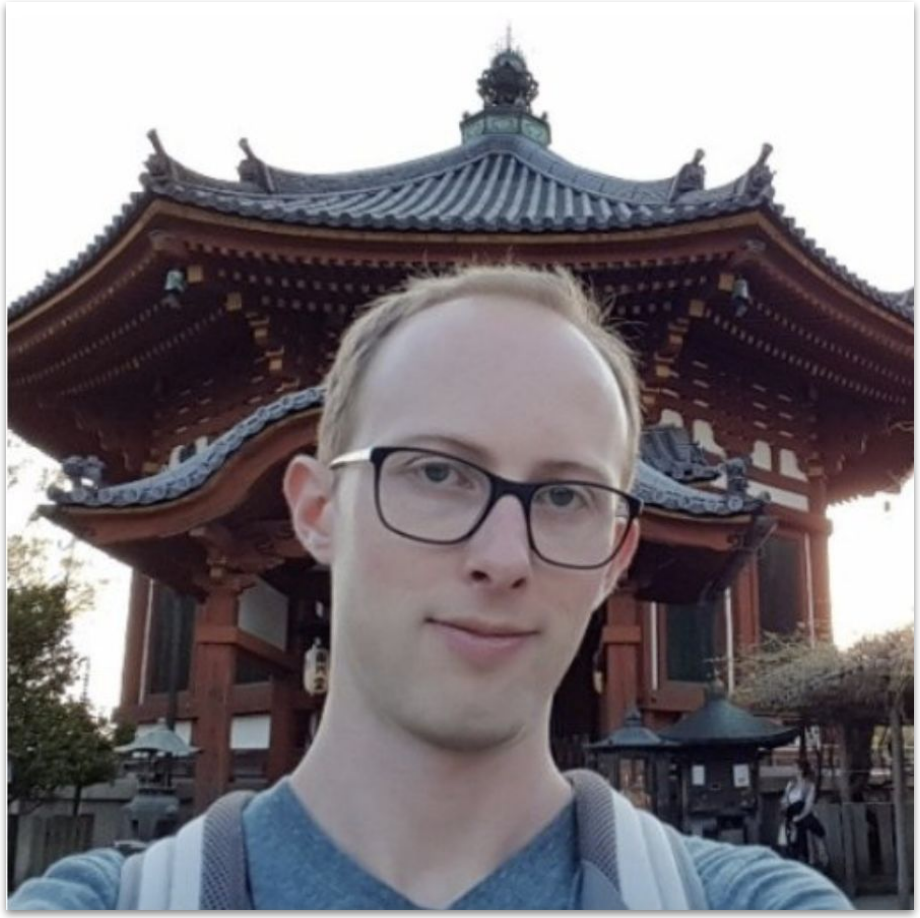
Supercomputing in the Cloud with Kubernetes



“It was a long pass toward Kubernetes and it definitely wasn't something we had decided from the get-go. We ended up there more than we actually choose to go there. The main thing is basically like in 2020, yeah, we've been impacted like everybody and we ended up in a financial situation that meant that renewing on-premise platform was just out of equation. There was no way we could actually do it with our, yeah, our finance at the time.”

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Louis Bailleul

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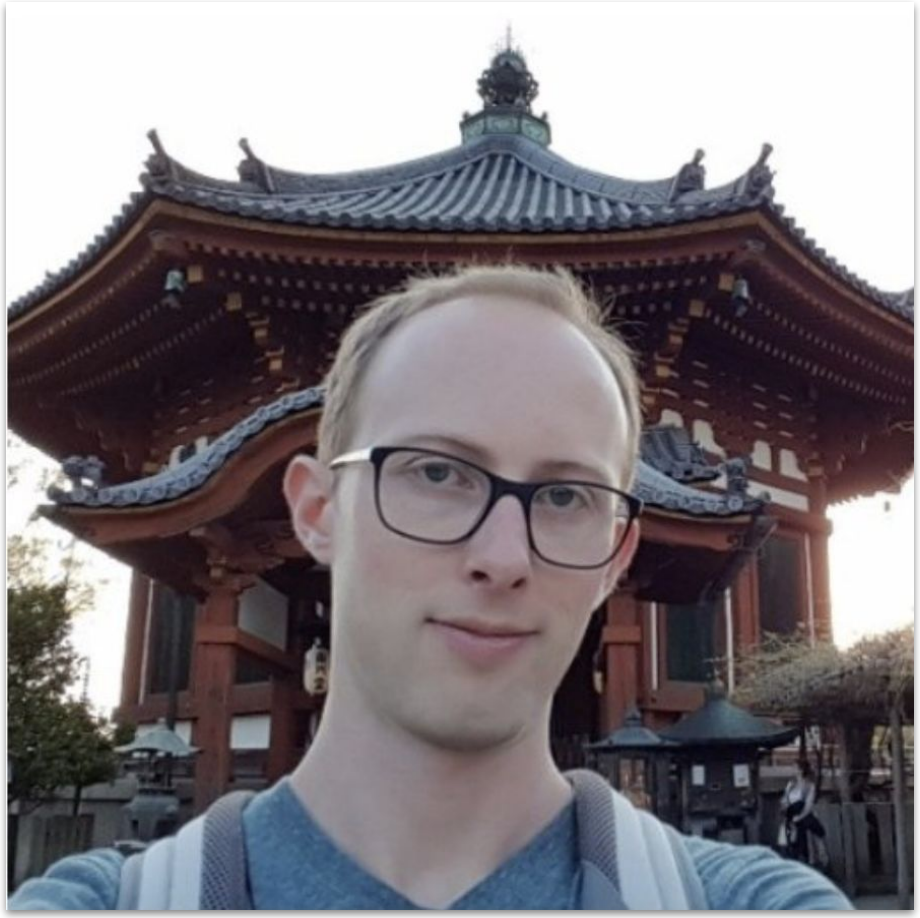
Supercomputing in the Cloud with Kubernetes



“So we had to find a solution. And because we'd been getting our foot wet in the cloud and were starting to see what was working and what was not, we were starting to see that, actually, if we go a bit further in there is probably a way for us to completely shift our idea in on its head and instead of going, yeah, 20% burst in the cloud, actually going 80% in the cloud and replacing the Crays.”

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Louis Bailleul

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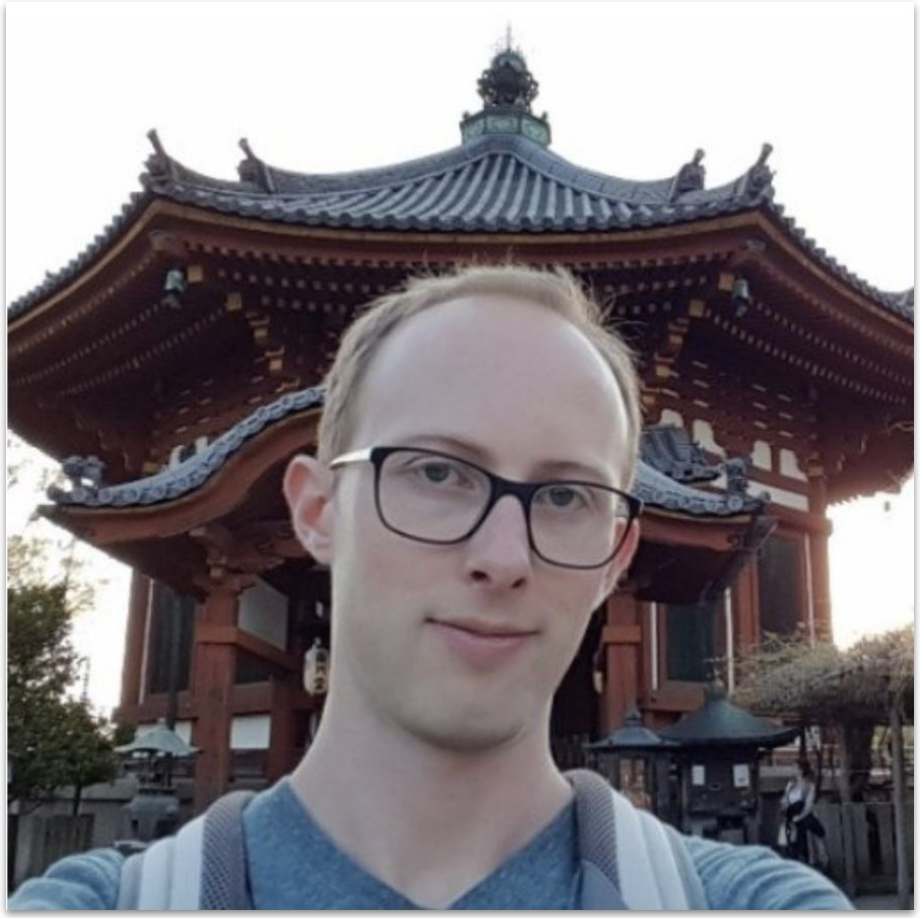
Supercomputing in the Cloud with Kubernetes



“So we started to explore that idea and because we didn't really know what we didn't know and uh, what we actually could do in the cloud, we started with the approach of taking what we knew from on-premise and looking at the different component that had like cloud interfaces or had cloud component that could be used. So we effectively like did a lift and improve, would say in that case. So we took a lot of the system we already had and started to build like cloud interfaces on it.”

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In Closing

Key Lessons

- **Open Source**
  - Open Source helps you build a career that's robust and will last
- **Kubernetes**
  - Kubernetes developed slowly over time, it didn't become the prominent tool it is today overnight
  - Learning Kubernetes the first time can be tough, but it will help you do it the easy way later
- **Contribution**
  - You don't have to be a Kubernetes expert to get started
  - Help maintainers help you, by sticking around and sharing your interests
- **Security**
  - Security is still a growing, maturing field
  - Kubernetes security is changing and improving a lot
- **AI/ML HPC**
  - The Cloud changes the landscape of supercomputing

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