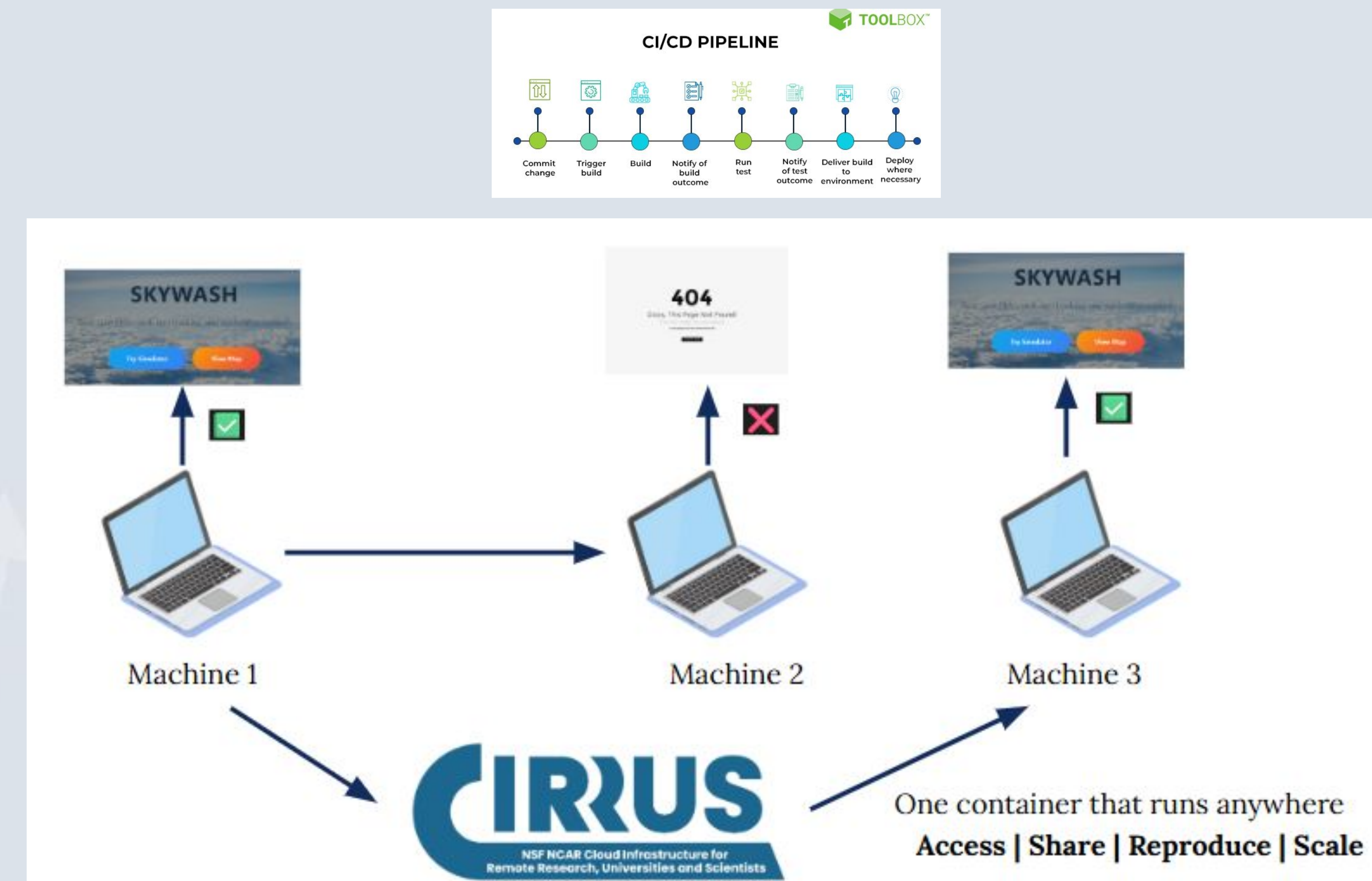
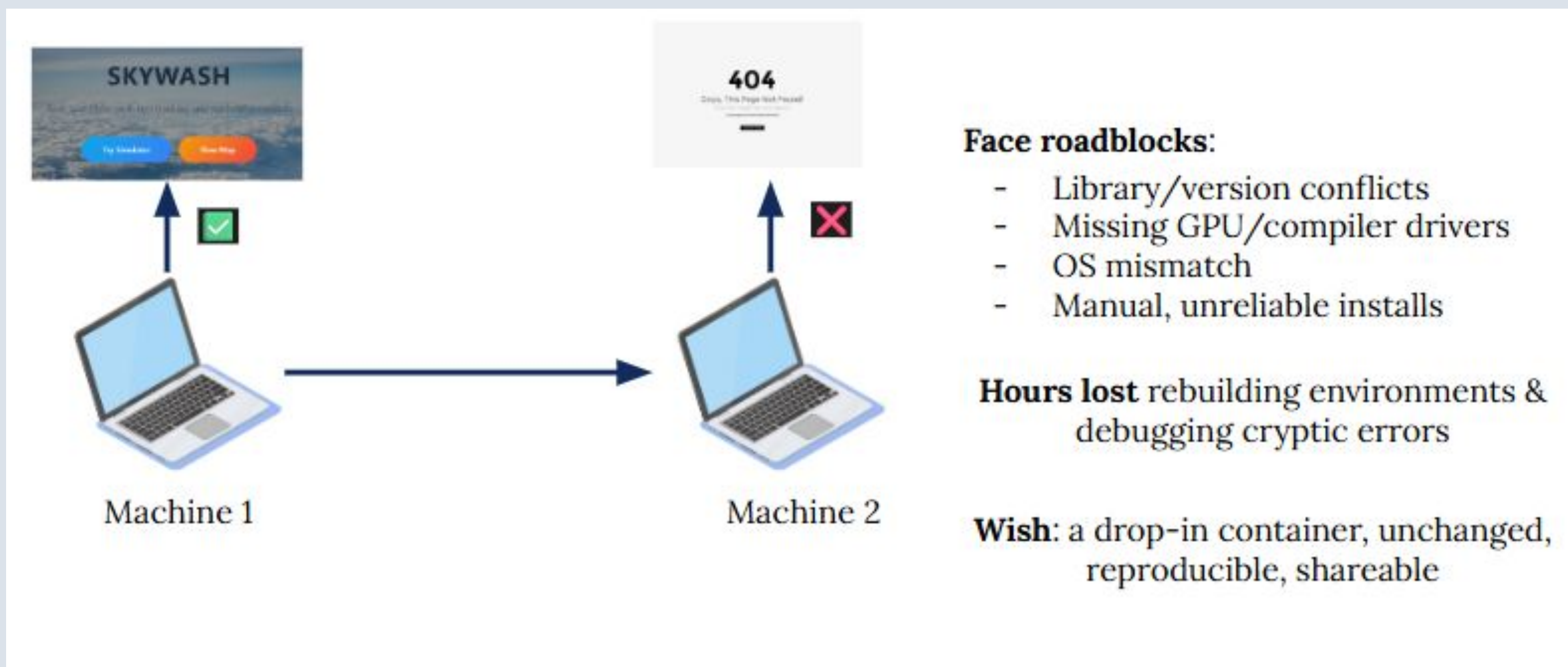


Deploying “SkyWash”: Interactive Air-Quality & Cloud-Seeding Insights on the NCAR CIRRUS Cloud Platform



Shilin Chhabra | SIParCS Intern, NCAR CISL | University of Wisconsin-Madison | Nick Cote



Researcher does...

- 1) Push code to GitHub
- (one time)
2) Save Harbor robot token as repo secrets
- 3) Merge deploy YAML / click “Upgrade”
- 4) Open dashboard



CIRRUS

- Builds the Docker image
- Pushes image Harbor registry
- Harbor runs a vulnerability scan; blocks critical CVEs
- Kubernetes + rancher rolls out the new image and auto-scales pods
- OpenBao Secret Manager injects runtime secrets

Left Column = 2 min of human effort | Right column = full DevOps pipeline on autopilot

Lengthy narrative documentation

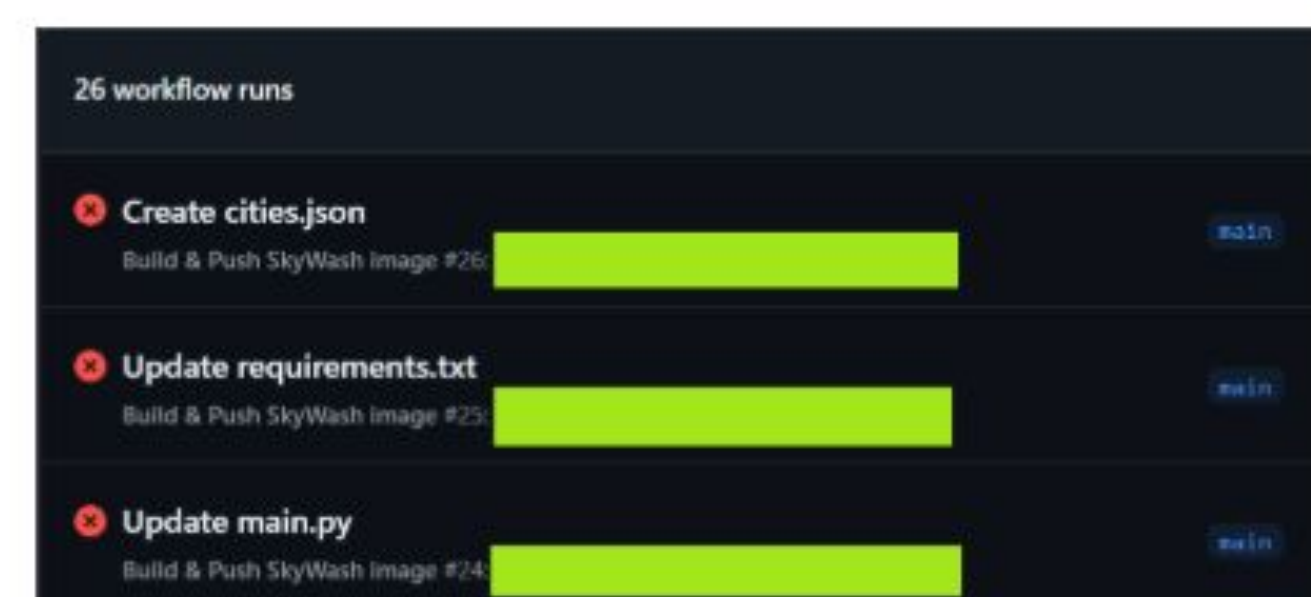
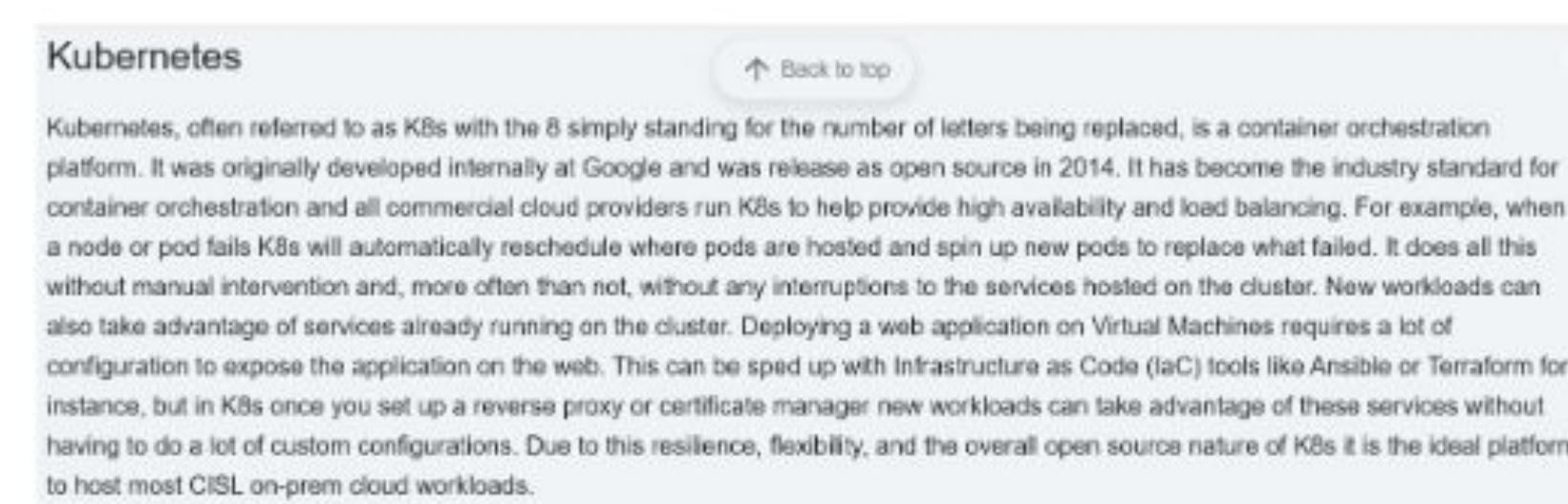
Disconnect between the working example and reference docs

Extensive security workflow yet unclear, leaving newcomers uncertain

≈ 4 hours for a newcomer to reach a first successful deploy (not a smooth onboarding process)

Why onboarding matters:

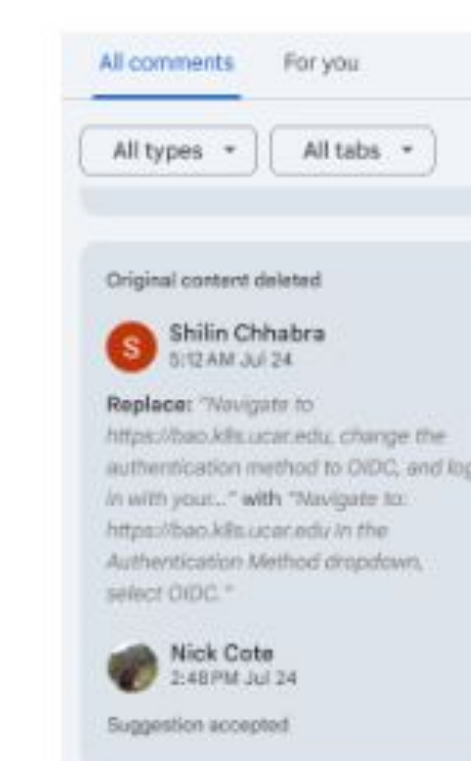
Quick, clear onboarding turns interest into adoption, cuts support time, and lets scientists start producing results sooner.



Aim: Craft the docs to be easy for a first-time user as well as detailed and coherent enough for an advanced user to make the most of the platform.

Re-audited CIRRUS docs from a first-time user's view

Filed 600+ improvement issues and merged suggestions weekly with mentor reviews



Built & deployed SkyWash, exercising containers, CI/CD, Kubernetes, Harbor scans, and OpenBao secrets



Outcome: Estimated onboarding time slashed from ~4 h to ~1 h

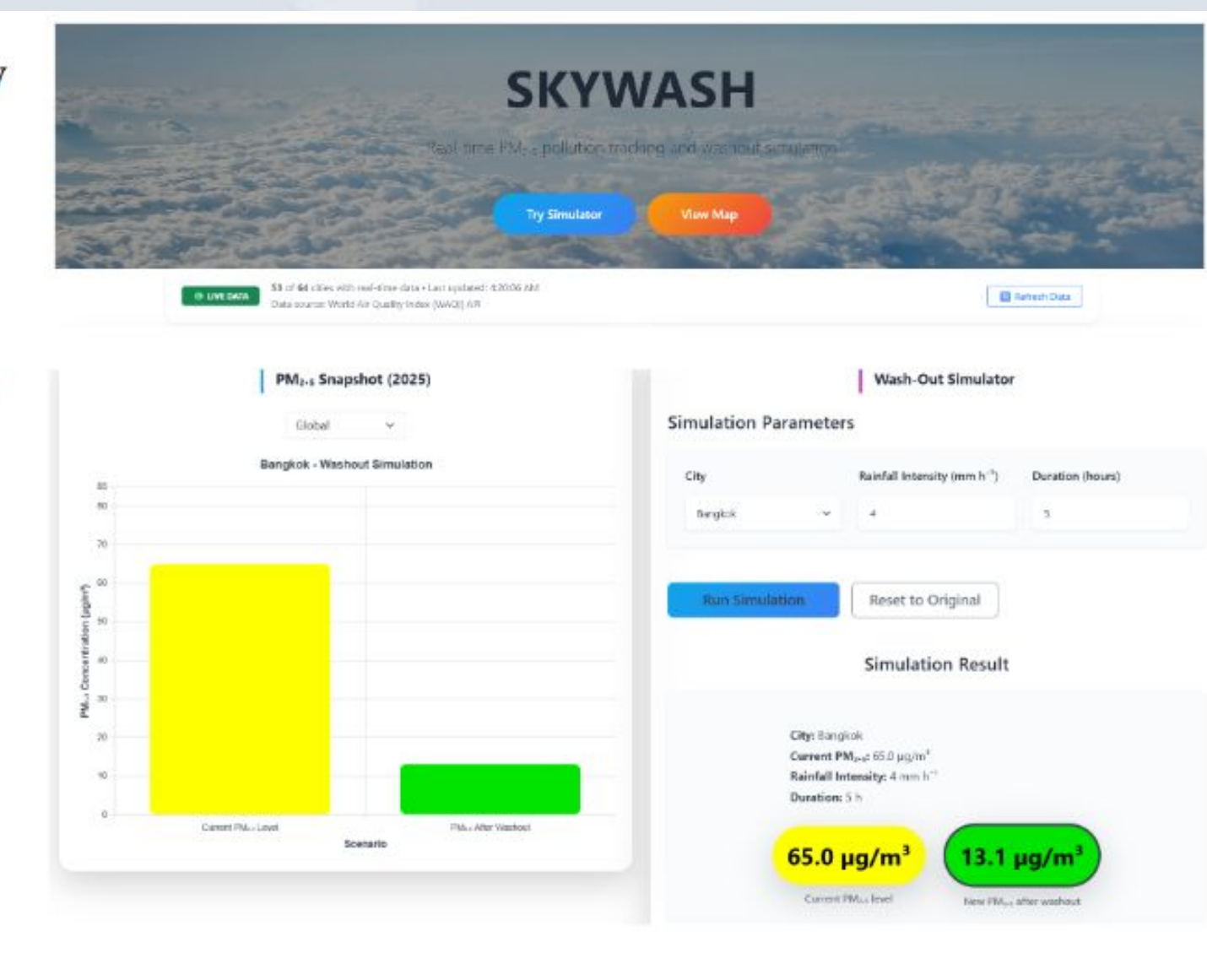
Purpose: interactive tool spotlighting air-quality challenges in South & East Asia

Wash-Out Simulator: cloud-seeding model (FastAPI) forecasts post-rain PM_{2.5} / AQI

Visuals: React + Leaflet map & Chart.js bar chart

Deployed end-to-end on CIRRUS (GitHub → Harbor → K8s → Ingress)

Try it yourself: QR code to live site



Docs are the gateway: refined guides move CIRRUS from pilot curiosity to production-ready platform.

Proven path: Skywash + updates cut estimated first deploy time 4 h → 1 h,

Impact: faster onboarding drives adoption and guarantees reproducible science on CIRRUS.



Build multi-stage Docker image

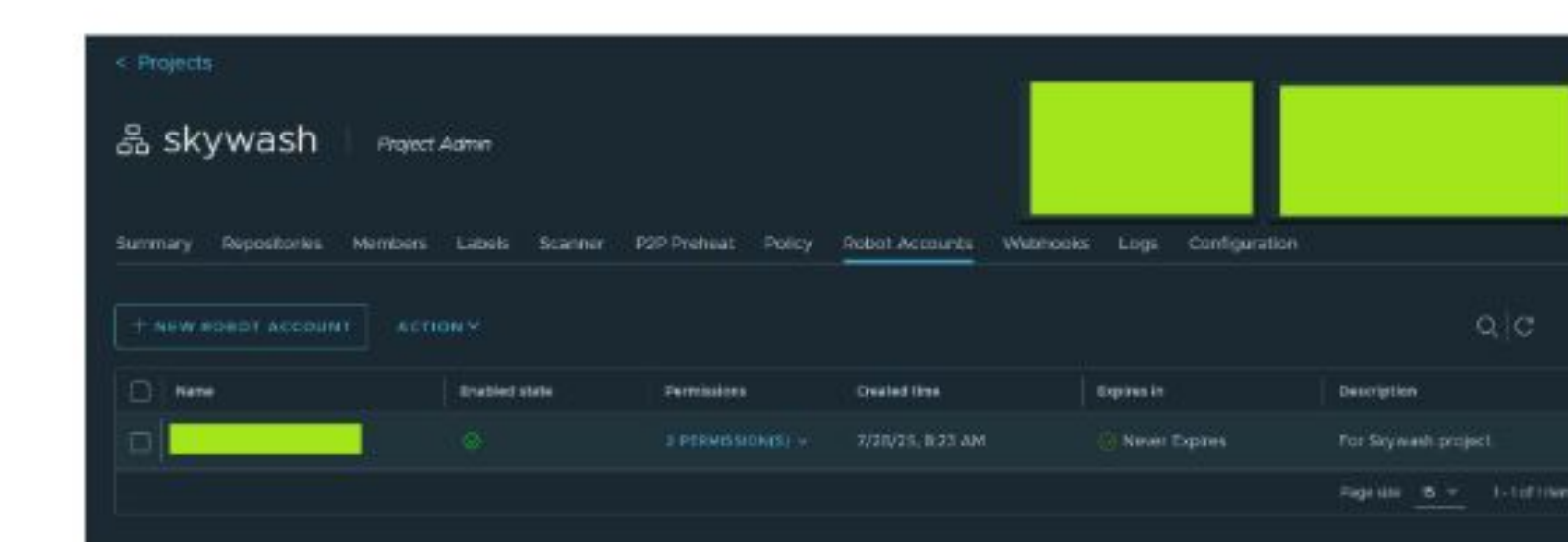
Push image the Harbor registry

Trigger Github Actions workflow

Deploy via Kubernetes Deployment + Service + Ingress

Inject runtime secret with OpenBao

Read/Write data in object storage



Thank you to my mentors:

Nick Cote, Kevin Hrpcek, Varsha Banda

Thank you to the internship organizers:

Virginia Do, Jessica Wang, Prashansa Agrawal

Thank you to the organizations that support us:

