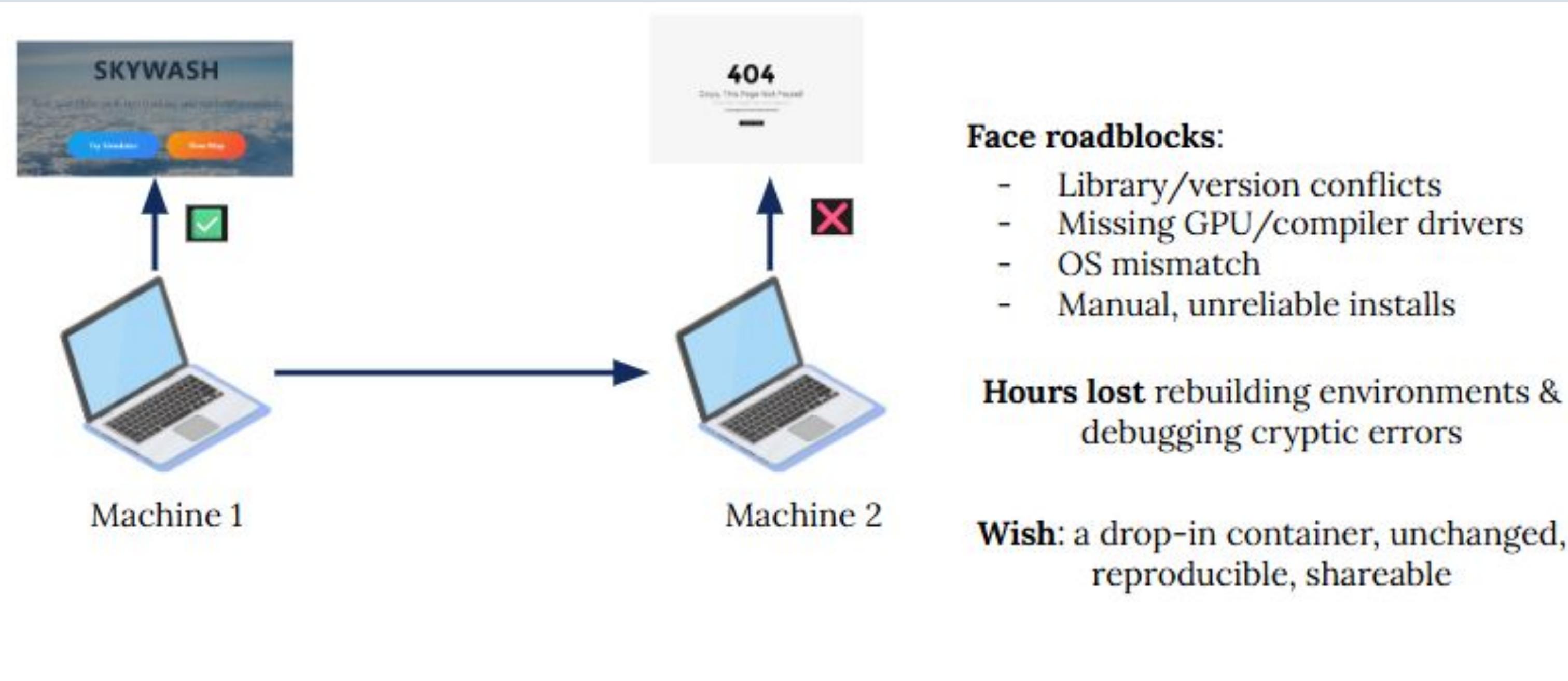


Deploying “SkyWash”: Interactive Air-Quality & Cloud-Seeding Insights on the NCAR CIRRUS Cloud Platform



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



Lengthy narrative documentation

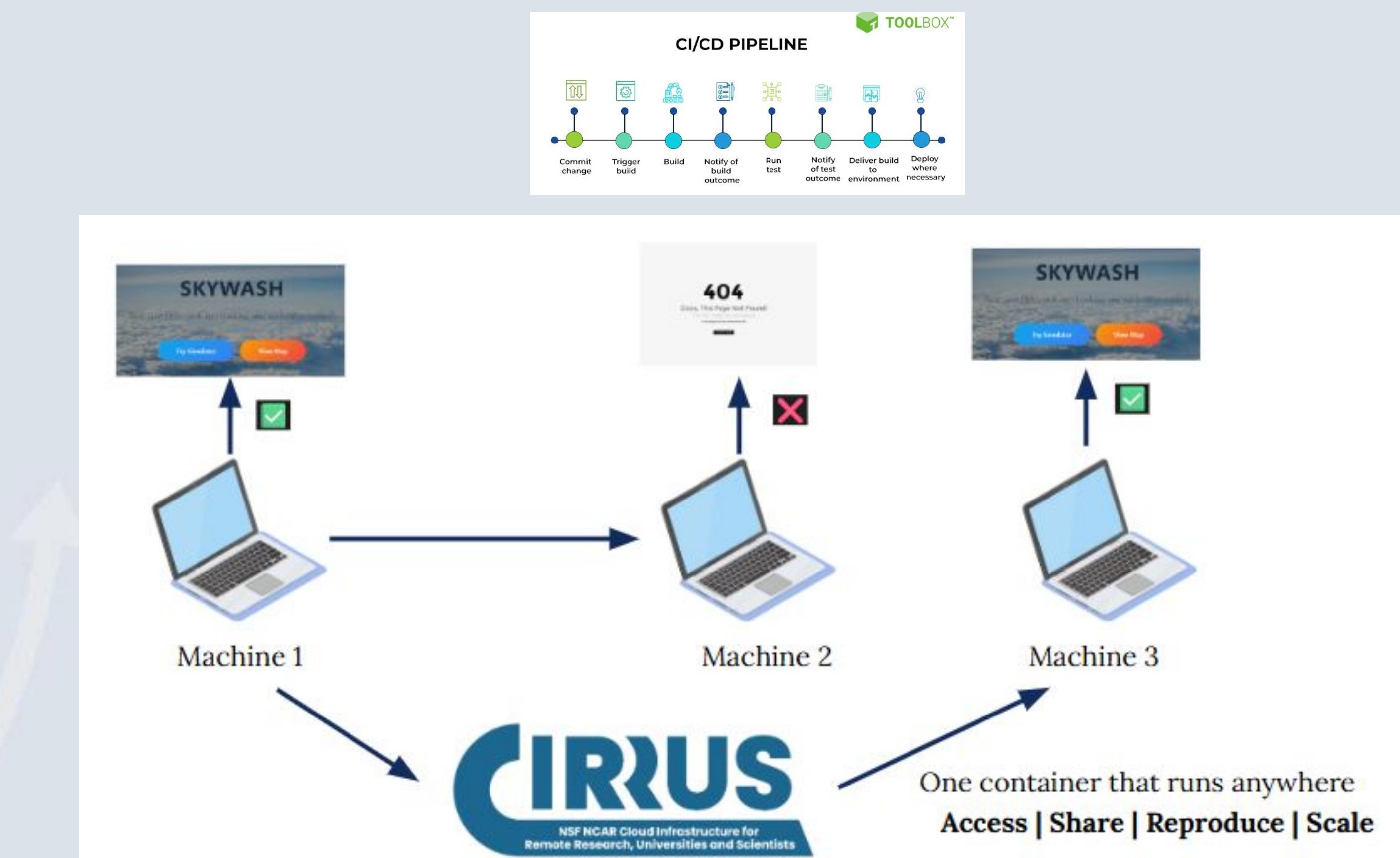
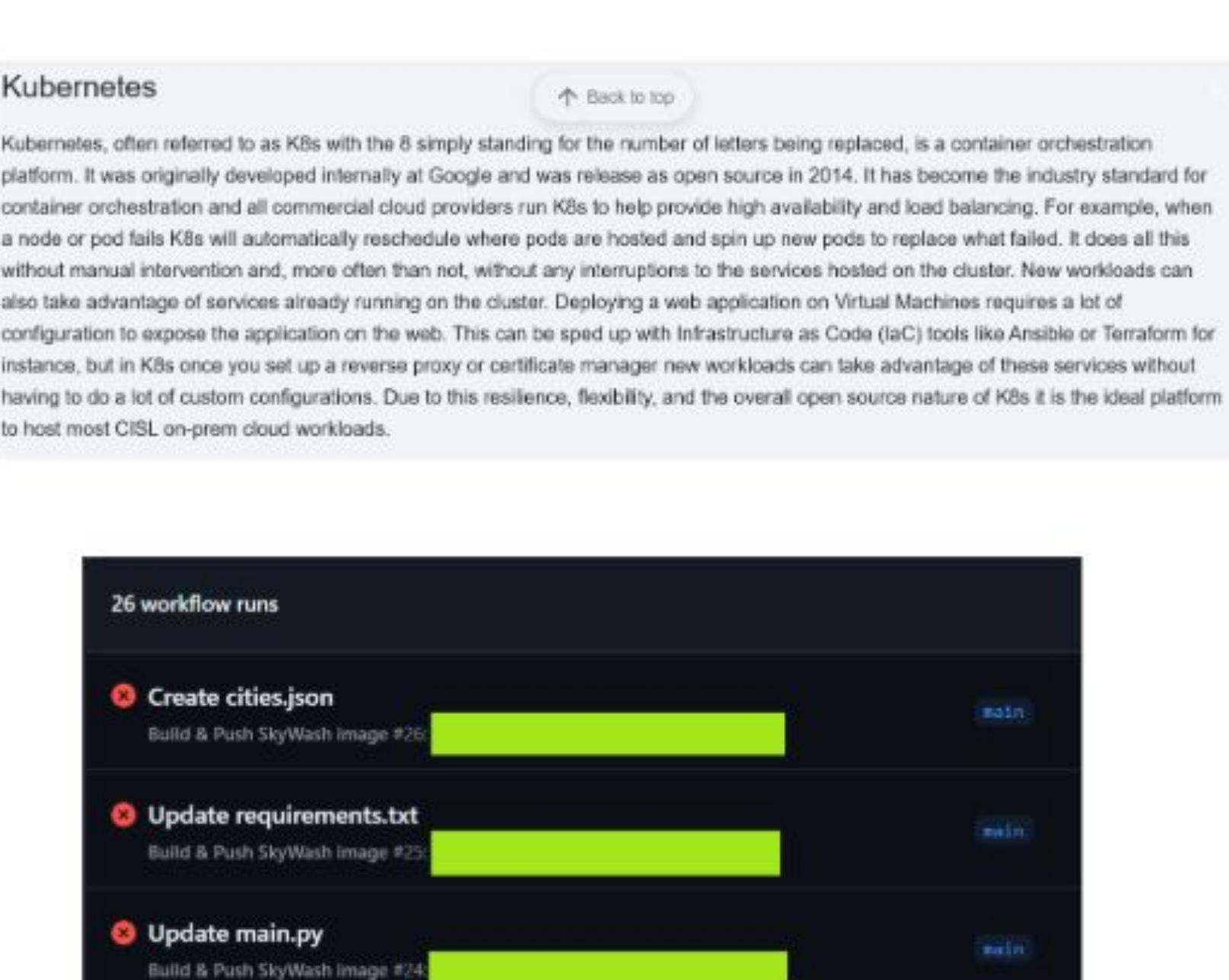
Disconnect between the working example and reference docs

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

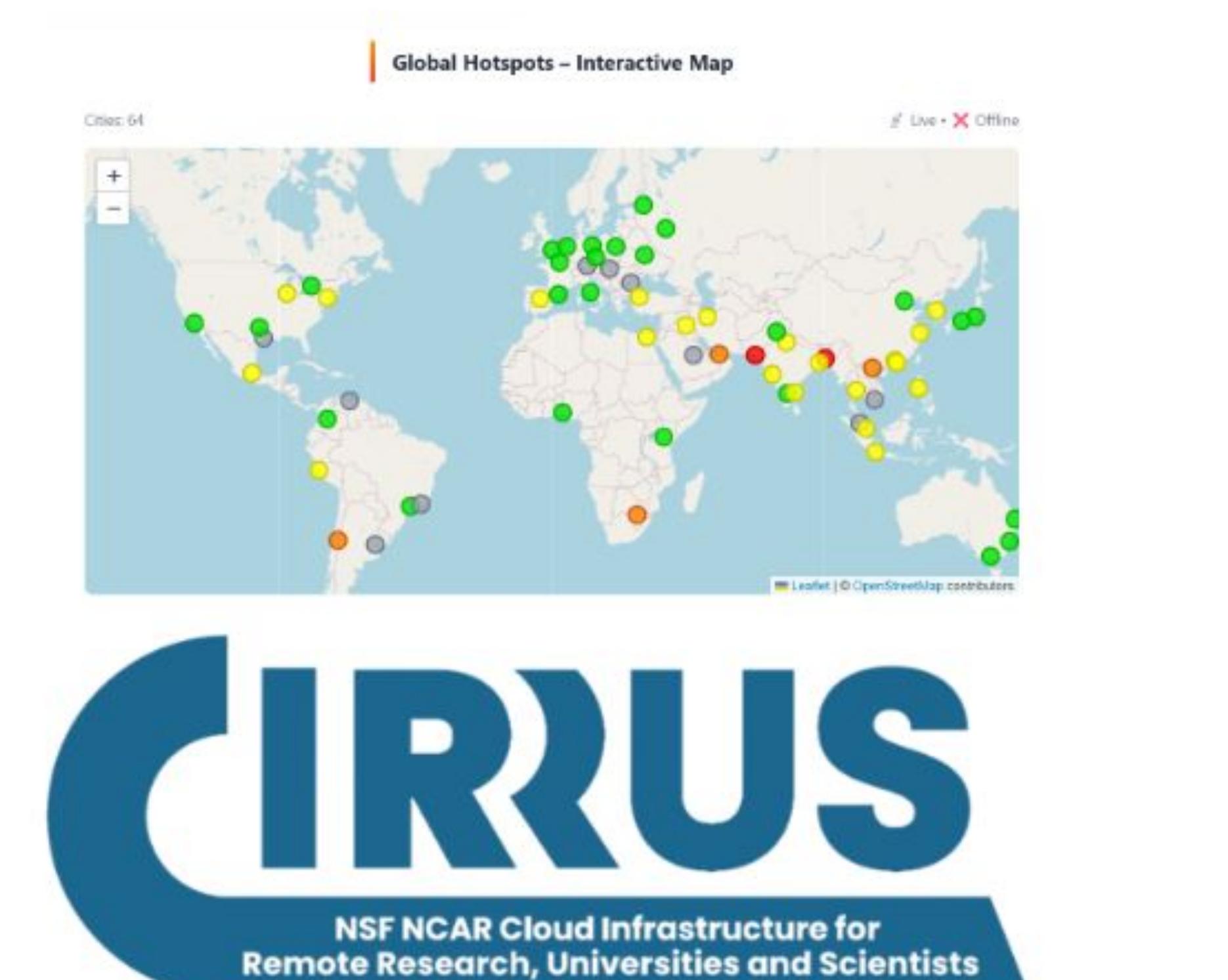


Outcome: Estimated onboarding time **slashed from ~4 h to ~1 h**

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

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

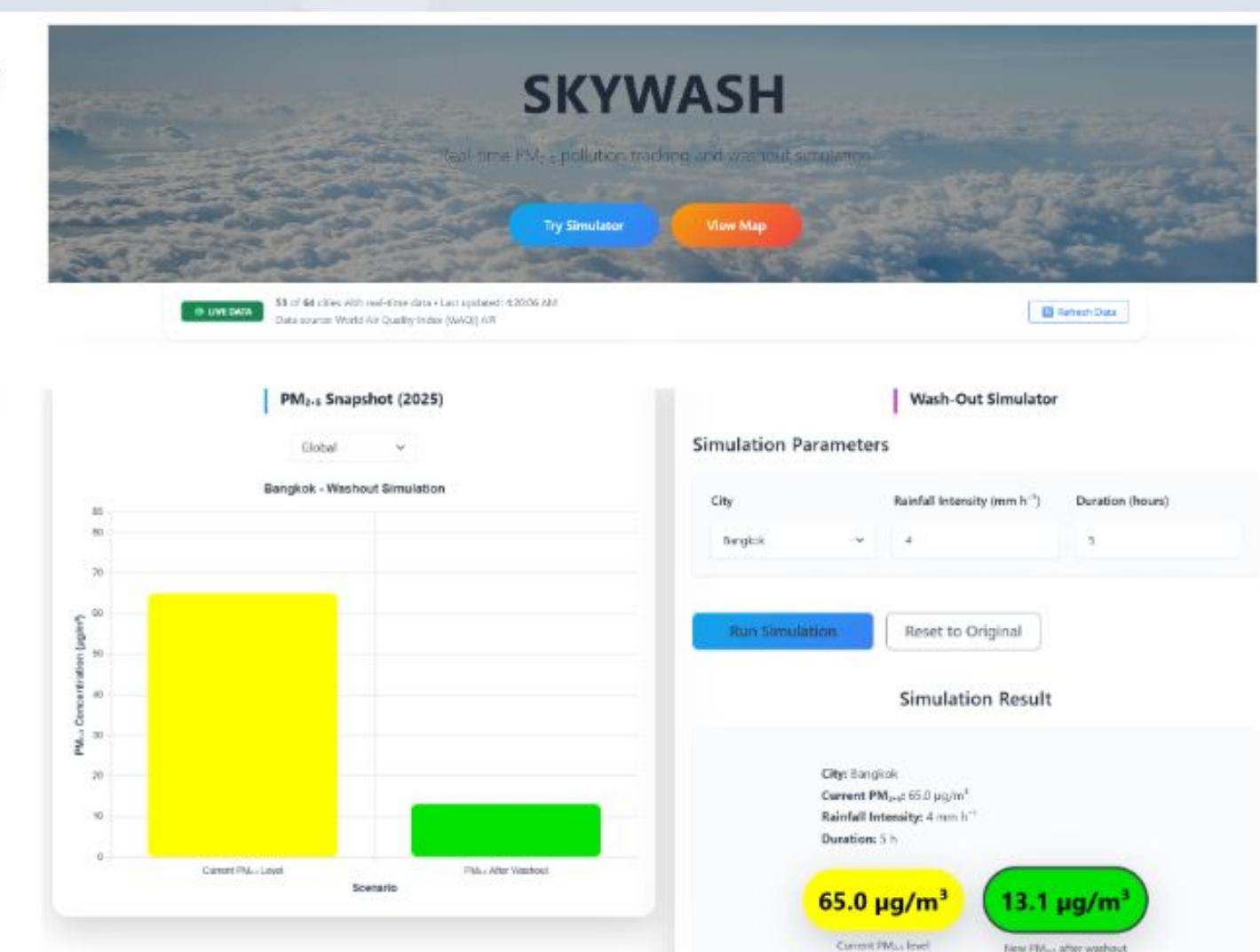
Purpose: interactive tool spotlighting air-quality challenges in South & East Asia

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



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:

