

InfraHub

A Unified Infrastructure Knowledge Platform for IT & DevOps Teams

Team Members:

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MEET THE TEAM



Bryan Garcia

Poster / Documentations /
Research

IT major with DevOps,
contributed to InfraHub
development and review
documentation.



Tom Mizrachi

Frontend Developer

IT major with a focus on
web development and
UI/UX design. Contributed
to InfraHub by designing
and implementing the
frontend interface,
ensuring clean navigation,
mobile responsiveness,
and a consistent user
experience across all
pages.



Andres Jaimes

Backend Developer /
Research

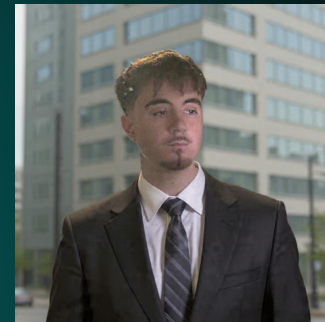
I contributed to InfraHub
as the backend engineer,
designing and deploying the
AWS architecture, and
creating the backend
RESTful API in Flask,
packaged as a Docker
image for seamless
deployment to the AWS
instance running the
website.



Cesar Pereyra

Automation & Scripts
Engineer

I contributed by creating
the ansible playbooks(it,
accounting and talent) and
the Ubuntu docker
sandbox. I also helped
record some footage for
the demonstration of
InfraHub's components.



Bryan Hernandez

Poster / Team Lead /
Presentation

I contributed by managing
documentations, as well as
doing the project lead
requirements d focusing
on organization.

AGENDA

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The Problem

Organizations struggle to:

- 1 Provision department-specific machines quickly
- 2 Manage consistent configurations across Talent, Accounting, and IT
- 3 Train new admin staff without causing downtime
- 4 Document internal workflows across multiple teams
- 5 Provide safe sandboxes for testing tools and environments

Key Impact:

Inconsistent setups → delays, misconfigurations, security gaps.

Requirements We Identified

Functional Requirements

- Website to host everything
- Tutorials/Guides
- Sandbox for developers to work with
- Automated workstation provisioning
- Department-specific bundles: Talent, Accounting, IT used as examples
- Create users, install tools, configure environments
- Reproducible & idempotent builds

Non-Functional Requirements

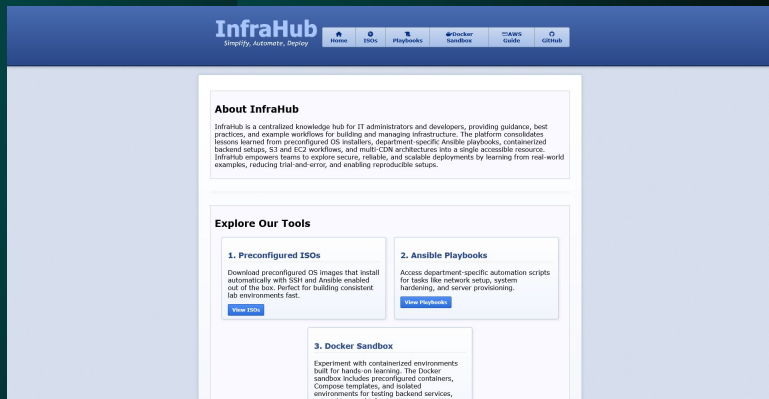
- Secure: no private keys or secrets in repo
- Maintainable: modular roles & group_vars
- Fast: reduce onboarding time
- Auditable: clear logs & PR-based updates

What is InfraHub?

A centralized platform containing:

- Preconfigured installer ISOs for dev-ready systems
- Ansible playbooks with department-specific automation
- Docker sandbox environments for safe testing
- AWS operational guidance (S3, EC2, IAM workflows)
- Knowledge hub for best practices & examples
- GitHub Repository for version control and CI

InfraHub consolidates all IT workflows into one location.



AWS Knowledge Hub

This section consolidates InfraHub's AWS architecture, best practices, and lessons learned while building highly available, fault-tolerant infrastructure. Ideal for IT administrators who want to understand scalable AWS deployments, automation, and security configurations.

Note: this entire website "InfraHub" was built from these AWS concepts, including S3 backend hosting, multi-CDN architecture with Route 53 failover, and secure EC2 deployments.

Core Topics

1. Multi-CDN Architecture

Learn how CloudFront and Fastly work together with Route 53 for automatic failover.

[Learn More](#)

2. S3 & Backend Integration

Explore dynamic content delivery from S3 using boto3, streamed responses, and stateless containers.

[Learn More](#)

3. Security & Privacy

Study header validation, NGINX protections, CloudFront/Fastly TLS termination, and secure AWS access.

[Learn More](#)

Why InfraHub Matters

Before InfraHub:

- Configurations differed between machines
- Manual installs took 30–60 minutes per workstation
- New IT staff struggled to learn internal tooling
- High risk of configuration drift
- Improper configured cloud environments led to failing implementations and frequent website downtime.

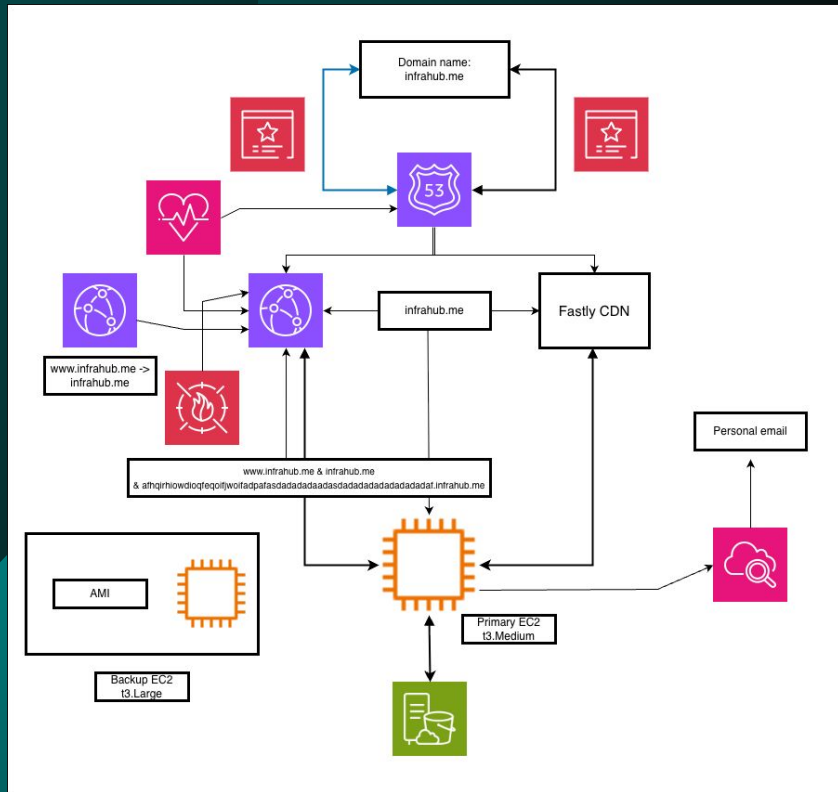
After InfraHub:

- Repeatable workstation builds
- 1-command provisioning
- Unified knowledge base
- Faster onboarding & reduced errors
- Provided knowledge in how to manage and secure cloud infrastructure to ensure reliable, highly available web services while minimizing the risk of system failures.



Core Architecture

- Multi-CDN setup: CloudFront (primary) + Fastly (secondary) with automatic failover via Route 53
- Two EC2 instances:
 - Primary: t3.medium, running Flask backend + NGINX reverse proxy in Docker
 - Backup: t3.Large, manually activated for high traffic/failover
- Backend communicates with S3 using Boto3 for dynamic context
- All templates, CSS, and images served from S3 bucket
- CloudWatch & Health Check automatically checking up on status of system to make sure everything runs well
- A healthcheck html if the EC2s are malfunctioning this helps the administrators recognize what the issue is



Core Architecture - Security implementations

- NGINX enforces CDN-only access via header validation. Blocks unauthorized traffic by returning back a <404> error message.
- TLS/SSL handled at CDN layer, DoS protection at the edge
- EC2 instances automatically refresh containers on reboot using systemd
- AWS System Manager used for admin access (no SSH)
- CloudWatch monitors CPU & health

Ansible Automation

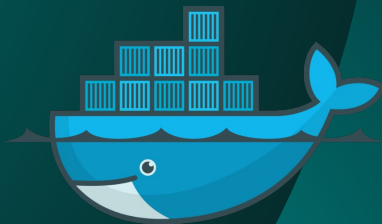
- Automates IT workstation setup for fast, consistent deployment
- Handles user accounts, software, security policies, and network access
- Playbooks are simple YAML files; adjust variables and run remotely
- Department-specific templates: IT, Accounting, Talent Management
- Reduces manual work, errors, and ensures standardized environments



ANSIBLE

Docker Sandbox Template

- Provides standardized, repeatable lab and development environments
- Uses Docker and Docker Compose for fast, isolated setup
- Templates include Dockerfile, Compose file, and sandbox scripts
- Easy download via Git or ZIP; ready-to-run with minimal configuration
- Pre-installed tools and environments ready for experimentation and testing.



docker

Pre-Configured ISO image

- Provides a fully automated Ubuntu installation, eliminating manual setup steps like language selection, account creation, and network settings.
- Ideal for IT teams deploying multiple new workstations quickly using USB installation or network (PXE/NXE) boot servers
- Includes a read-to-use `autoinstall.yaml` that preconfigures SSH, installs base tools, and auto-registers the machine for Ansible management
- Ensures every workstation is deployed consistently, securely, and with identical baseline settings.

DEMO Example



Testing and Evaluation

Testing Methods

- Dry-run (--check) for ansible
- Docker Ubuntu image safety script
- Regression runs (idempotence)

KPIs

- Provision Success Rate
- Provision Time
- Website uptime



Security & Compliance

Implemented:

- No private keys in repository
- Ansible Vault ready for secrets
- PR-based change control
- No personal data stored or logged



Future Implementations

InfraHub

- More Tutorials/Guides
- Documentation listed and ready on the site
- Solve any issues with AWS

Playbooks

- More playbooks
- Customizable playbooks that are still plug and play

Ubuntu Docker Sandbox

- Other options besides Ubuntu
- Choice of what software or dependencies you need

AWS Guide

- Video content to help explain
- More sections
- Link to documentation/wiki

Conclusion

InfraHub delivers:

- Automated workstation onboarding
- Centralized documentation & workflows
- Preconfigured environments for training & testing
- Reproducible, secure setups
- A foundation for scalable DevOps operations

InfraHub.me



Q&A

Let's Discuss! Questions?