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Building a Secure AWS Landing Zone and Compute Platform for Robots for Humanity

Executive Summary

Robots for Humanity is pioneering the next generation of AI-driven humanoid robotics, designed to function fluently in human environments and collaborate seamlessly with people. Their mission: to train humanoid robots that become part of the global workforce — addressing labor shortages, reducing the number of workers in risky jobs, and amplifying human capability through automation.
To support this vision, Robots for Humanity partnered with binbash to design and deploy a modern AWS Landing Zone, implement secure networking and VPN access, and provision GPU-enabled EC2 instances optimized for NVIDIA Omniverse workloads. By leveraging the binbash Leverage™ framework, the solution was delivered fully as code, ensuring repeatability, compliance, and long-term maintainability.

Customer Challenge

Robots for Humanity faced several challenges:

- Foundational AWS Setup: Establish a Landing Zone that could support multiple accounts, enforce security, and provide a foundation for future scaling.
- Secure Remote Access: Enable private, compliant access to environments for development and database workloads.
- GPU Compute Requirements: Originally scoped to host NVIDIA Omniverse on Windows Server, but later shifted to Ubuntu EC2 with Amazon DCV to optimize cost, compatibility, and long-term manageability.
- Operational Agility: Ensure infrastructure was provisioned via Infrastructure as Code to reduce risk, increase repeatability, and enable rapid iteration.

ROBOTS FOR HUMANITY

Robots for Humanity is building the next generation of humanoid robots designed to seamlessly operate in human environments. By combining AI, robotics, and human-centered design, they aim to enhance productivity, safety, and quality of life—developing machines that don't replace people, but work *with* them to extend human potential.

Everything went smoothly
Santiago Braña - **CTO**
Robots for humanity

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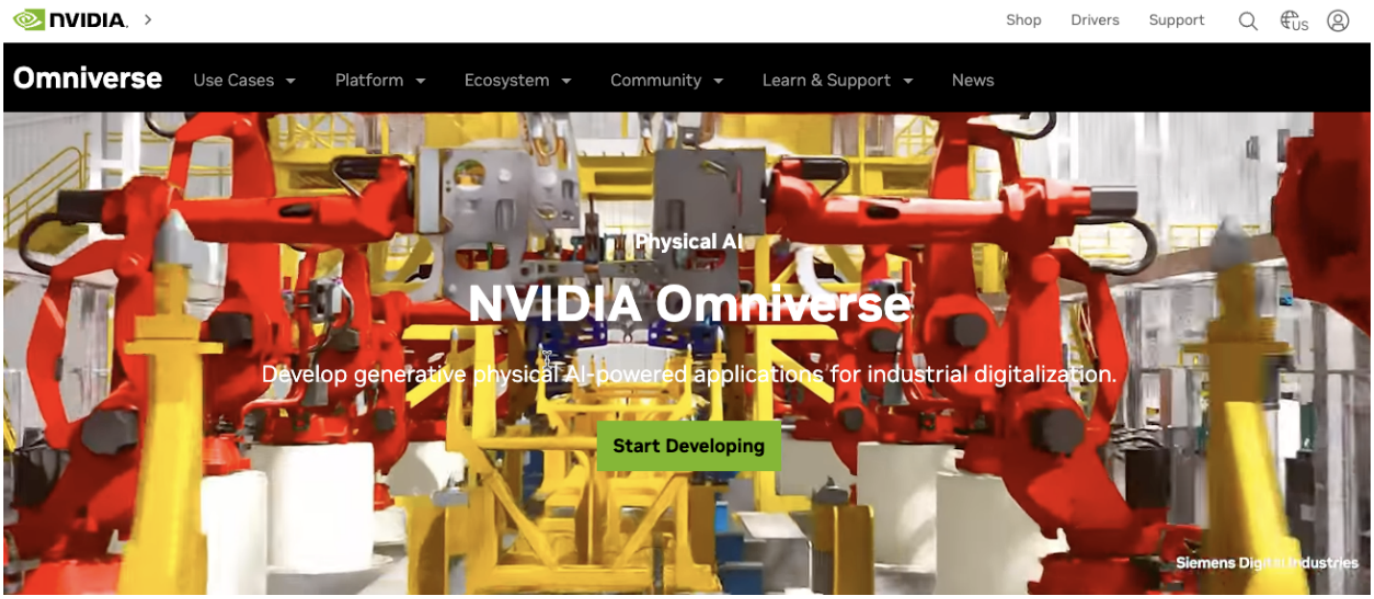


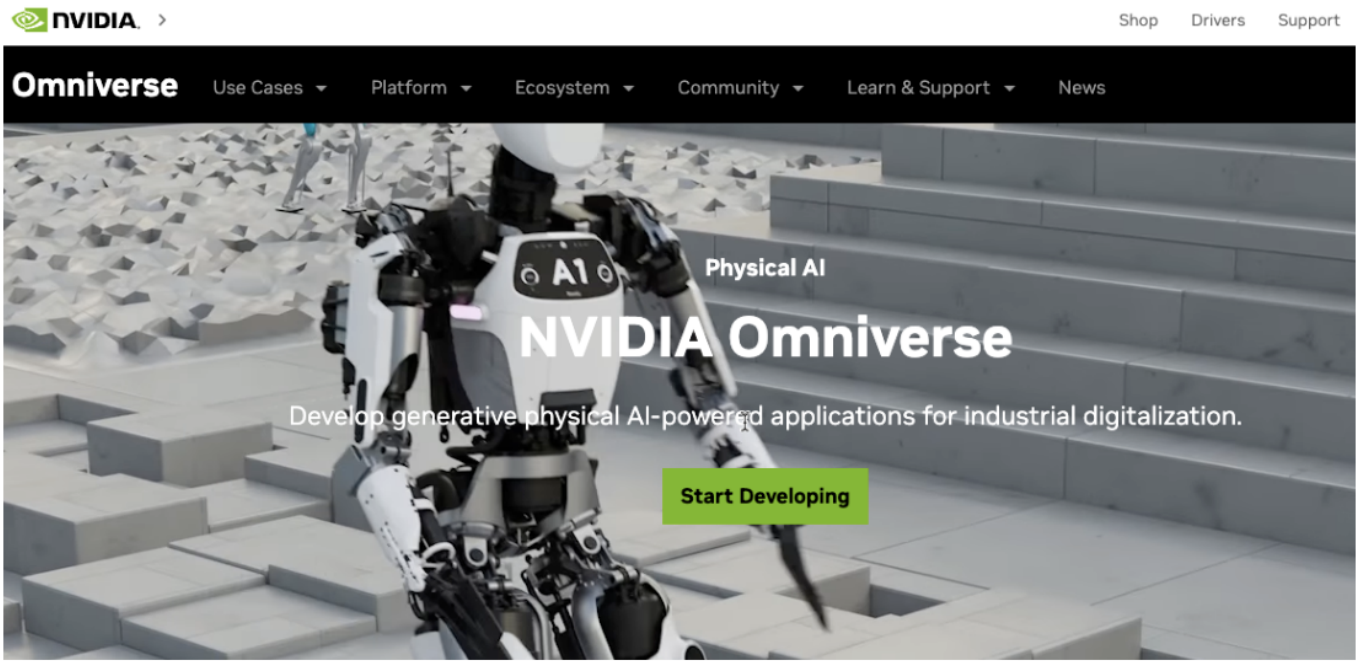
Solution

binbash implemented a secure AWS multi-account Landing Zone leveraging Terraform modules and binbash Leverage™. The design aligned with AWS Well-Architected best practices, enabling Robots for Humanity to run workloads securely and efficiently.
NVIDIA Omniverse, and specifically Isaac Sim and Isaac Lab, were installed on the Ubuntu GPU-enabled EC2 instances, to run real-time 3D robotic simulations and Digital Twin environments.
These tools allowed the engineering team to teleoperate robots within simulated environments, enabling validation of robot behavior, control logic, and perception systems before deployment on physical hardware.

Implementations Highlights

- **AWS Landing Zone:** Organizational Units (Security, Shared, Apps) and dedicated accounts (management, security, shared, apps-dev). Centralized identity management with AWS Identity Center (SSO).
- **Networking & VPN:** Shared networking layer with VPCs, Route 53 DNS, and Pritunl VPN running on EC2 for secure remote access.
- **Security & Compliance:** Organization-wide CloudTrail, IAM Access Analyzer, GuardDuty, KMS encryption, and baseline hardened configurations. Budget controls with AWS Budgets and CloudWatch Alarms.
- **Compute:** Two EC2 Ubuntu instances to run Omniverse:
    - Nucleus Server (Ubuntu 22.04 LTS, GPU-enabled) for database hosting. The Omniverse Nucleus server acted as a centralized collaboration hub, storing and synchronizing 3D

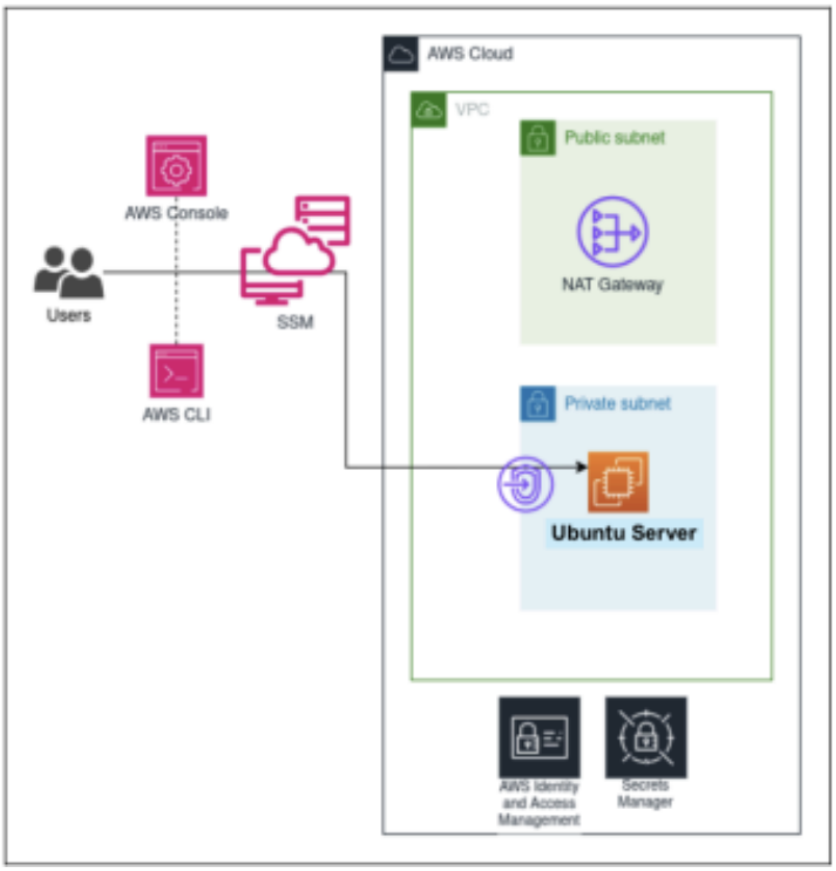
assets across different tools and users. This setup allowed multiple developers and designers to work simultaneously — for example, a 3D artist modifying CAD models in Blender could see changes reflected live inside Isaac Sim.
    - Dev Instance (Ubuntu 20.04 LTS, GPU-enabled) for development tools with scheduled stop/start policies. Amazon DCV installed on Dev instance for secure, high-performance remote visualization. VPN-based secure access and DCV for remote DevOps collaboration.
- **Knowledge Transfer & Collaboration:** Weekly delivery demos and follow-ups. Client team trained on Leverage™ Terraform modules, security baselines, and ongoing infrastructure operations.



Key Components of the Solution

- AWS Landing Zone: Multi-account, multi-OU setup to establish a secure and scalable foundation.
- Secure Remote Access: VPN-based connectivity via Pritunl, ensuring private and controlled access to environments.
- Infrastructure-as-Code: All infrastructure deployed with Terraform using the binbash Leverage™ framework for consistency and automation.
- Compute Platform for Omniverse: GPU-enabled Ubuntu EC2 instances provisioned specifically for NVIDIA Omniverse (Nucleus + Dev) workloads.
- High-Performance Visualization: Amazon DCV implemented for secure remote desktop access to graphics-intensive applications.

- Security & Compliance: Cloud-native safeguards including GuardDuty, IAM Access Analyzer, CloudTrail, and KMS encryption across all accounts.
- Cost Monitoring & Control: AWS Budgets and CloudWatch billing alarms configured to track usage and manage expenses proactively.



Key Milestones

1. Landing Zone Delivery – Deployment of the AWS multi-account foundation, including management, security, shared, and apps environments.
2. Secure Networking Setup – Provisioned shared networking layer, private DNS zones, and VPN (Pritunl) access.
3. Security Baseline – Organization-wide enablement of GuardDuty, CloudTrail, IAM Access Analyzer, and KMS encryption.
4. Compute Deployment – Provisioning of GPU-enabled Ubuntu EC2 instances for Nucleus and Dev workloads, following the change request.

5. Knowledge Transfer & Collaboration – Weekly demos, documentation, and hands-on sessions enabling the client team to manage infrastructure as code going forward.

Metrics to Show

- Deployment Efficiency
  - Landing Zone + VPN delivered within the planned 6-week schedule.
- Cost & Efficiency Gains
  - Infrastructure codified in Terraform (>90% code reuse for future projects).
  - Migration to Ubuntu GPU EC2 reduced projected operating costs by ~35% compared to Windows-based GPU workloads.
- Security & Reliability
  - 100% of accounts deployed with CloudTrail + GuardDuty enabled.
  - Baseline policies enforced (MFA, encrypted EBS, S3 ACL lockdown).
- Omniverse Simulation & Collaboration Performance.
  - NVIDIA Omniverse Nucleus and Isaac Sim deployments achieved >95% GPU utilization efficiency during 3D rendering and simulation workloads.
  - Enabled real-time synchronization across multi-user environments, improving development collaboration speed by ~50%.
  - Validation of Digital Twin simulations reduced physical robot testing needs by ~40%, accelerating R&D iteration cycles.
  - Remote visualization through Amazon DCV improved developer accessibility and reduced local hardware dependency by ~60%.

Conclusion

- By leveraging binbash Leverage™ and AWS-native services, Robots for Humanity now operates on a secure, scalable, and fully automated AWS foundation built for NVIDIA Omniverse workloads supporting high-performance, collaborative simulation workflows, reducing local hardware dependency for developers and enabling secure, remote access through Amazon DCV and VPN for distributed teams.
- This engagement underscores how Infrastructure as Code, multi-account governance, and security-first design enable mission-driven organizations like Robots for Humanity to accelerate innovation—without compromising compliance or cost efficiency.