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Company



# QBurst Vision Platform: Multi-Camera AI Visual Intelligence

Transforming passive video feeds into an intelligent edge-to-cloud visual monitoring system for real-time anomaly detection and compliance enforcement.

## Overview

We engineered the QBurst Vision Platform, a hybrid AI computer vision framework combining edge inference and cloud-scale analytics to transform camera feeds into real-time operational intelligence.

- **Sub-Second Edge Inference & Cloud Optimization:** Enabled low-latency, sub-second on-device local processing on edge nodes, significantly reducing cloud processing overhead and bandwidth expenses.
- **Measurable Compliance Impact:** Achieved 95%+ detection accuracy in single-camera environments, 90%+ multi-camera accuracy, and 24/7 automated compliance monitoring across hospital premises.
- **Real-Time Campus Security:** Tracked people and objects across overlapping camera views and raised instant alerts for unauthorized entry, blocked exits, and SLA breaches.



## Client Profile

The client is a prominent academic medical center headquartered in the United States. The healthcare system manages high-density hospital facilities requiring strict adherence to medical safety protocols, environment hygiene, operational SLAs, and patient privacy standards.

## Challenges: Passive Video Feeds and Manual Monitoring

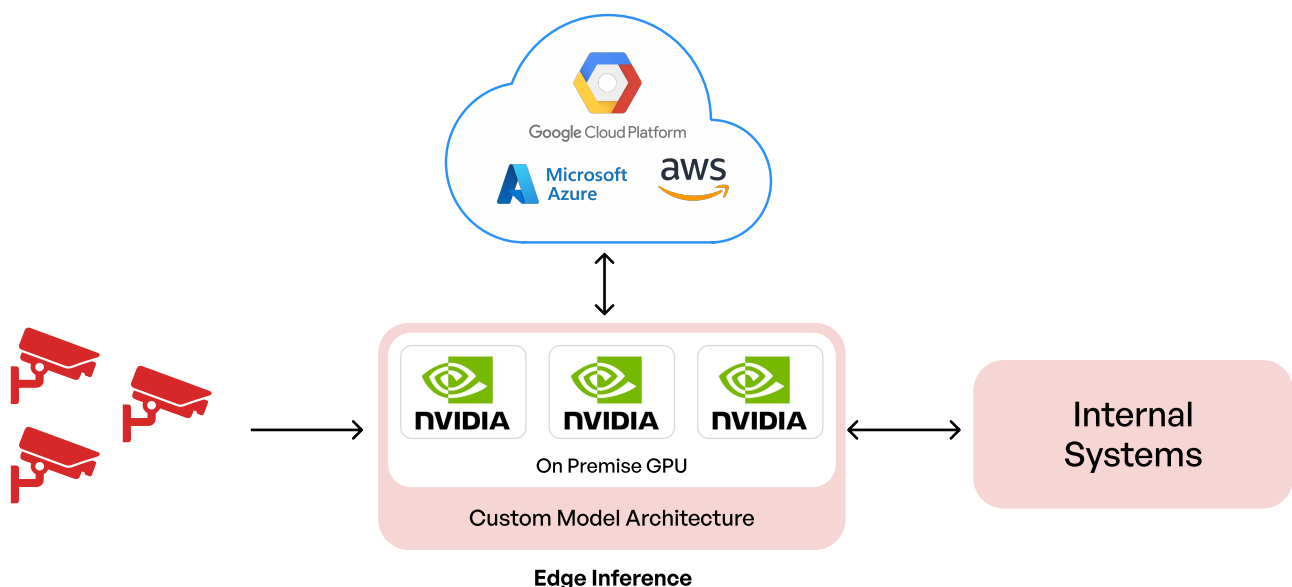
- **Manual Compliance Auditing and Security Monitoring:** Safety teams could not manually monitor multi-camera networks to spot blocked pathways, unauthorized entry, SLA violations, or PPE non-compliance in real time.
- **Cross-Camera Context Tracking:** Standard video analytics failed to maintain object identity across overlapping feeds, leading to disjointed tracking across premises.

- **Privacy and Cost Pressures:** Streaming continuous raw video feeds to the cloud created massive bandwidth costs and violated healthcare PII/data residency guidelines.
- **Rigid Rule Configurations:** Adding domain-specific detection rules required extensive custom code updates across existing surveillance software.

## Solution: Edge-to-Cloud Visual Intelligence

We deployed a hybrid AI visual platform using NVIDIA edge hardware for local inference and AWS for centralized intelligence and enterprise application integration.

- **Edge Inference:** Installed NVIDIA Jetson and Orin edge devices to process video feeds locally with YOLO and Mask R-CNN, enabling sub-second inference even in bandwidth-constrained settings.
- **Real-Time Multi-Object Tracking:** Integrated DeepSORT and custom probability layers to fuse data across overlapping feeds, keeping spatial continuity and object identity across camera views and facilities.
- **Campus Security and Compliance Monitoring:** Built dynamic rule engines and LLM decisioning layers to trigger alerts for unauthorized entry, blocked exits, PPE violations, or SLA breaches without code overhead.
- Automated PII Masking & Hybrid Routing.
- Unified Intelligence Dashboard.



High-Level Logical Architecture

## Technical Highlights

- **NVIDIA Edge Inference Deployment:** Powered local camera nodes with NVIDIA Jetson/Orin devices running fine-tuned YOLO and Mask R-CNN models for low-latency visual analytics, with sub-second inference in bandwidth-constrained settings.
- **Real-Time Multi-Object Tracking Pipeline:** Combined YOLO detection with DeepSORT tracking and custom probability adjustment layers to correct tracking errors from missed frames and keep multi-camera object continuity.
- **Campus Security Rule Engine:** Configurable triggers for unauthorized entry, blocked exits, PPE violations, and SLA breaches, added as rules instead of custom code changes to the surveillance software.
- **Privacy-First Edge/Cloud Split:** Engineered on-premise PII masking and local edge rule validation to satisfy strict healthcare compliance guidelines before pushing data to AWS.
- **LLM-Driven Dynamic Alerting:** Embedded Large Language Models in the decisioning layer to evaluate complex scene context and dynamically generate incident alerts.
- **Hybrid Deployment Stack:** NVIDIA Triton as the inference server, Jetson Nano/Orin(depending on the hospital area size) as the GPU edge hardware, and AWS Greengrass for remote device management where needed.
- **Open-Source Client-Owned Stack:** Built the platform on open-source vision frameworks, delivering an enterprise-ready architecture with full client IP ownership.

## Impact

- **95%+ Single-Camera Accuracy:** Delivered high-precision detection for localized environment violations and instrument tracking.
- **90%+ Multi-Camera Accuracy:** Maintained object identification and continuous tracking across complex multi-camera hospital facilities.

- **24/7 Autonomous Surveillance:** Replaced manual auditing with continuous compliance and security monitoring, accelerating issue resolution times.
- **Optimized Cloud & Bandwidth Expenses:** Reduced cloud processing overhead through edge-level inference and filtering.