Flywheel NVIDIA

Hybrid Infrastructure to Accelerate AI Model Training & Development

In today's competitive landscape, medical device companies are evolving toward software-defined systems where success in next-generation healthcare depends on parallel, integrated AI and data strategies that enable devices to learn, adapt, and improve.

This white paper explores why a hybrid architecture leveraging Flywheel's imaging data platform and NVIDIA's accelerated computing capabilities is crucial to unlocking AI innovation at scale. We outline how a coordinated approach to AI development and enterprise-wide data activation positions device manufacturers to lead in diagnostics, therapeutic monitoring, and surgical innovation.

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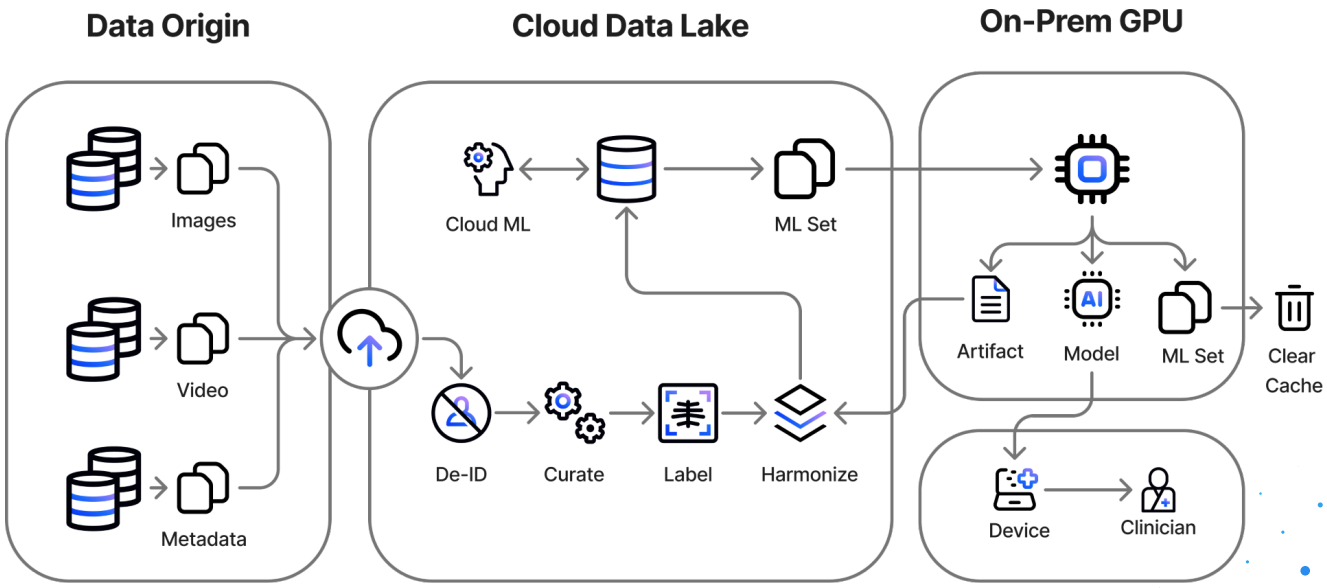


The Opportunity and the Gap

Medical device companies are increasingly recognizing that AI capabilities are not optional features, but core differentiators. While many organizations have begun piloting AI development initiatives, few have built the necessary *parallel data foundation* to scale. What challenges materialize as a result?

- **AI Strategy Alone is Insufficient:** Without accessible, high-quality data, AI initiatives remain stuck at pilot stage.
- **Data Strategy Without Commercial Alignment Lacks Purpose:** Without clear AI application targets, data modernization efforts risk becoming expensive storage projects without clear business impact.
- **Inefficient Foundation Minimizes ROI:** Without a well thought out foundational plan focused on maximizing hybrid infrastructure, organizations are destined to incur costly redesign challenges.

Hybrid solutions that intelligently connect on-premises data stores (*where imaging, video, and device data is generated*), cloud platforms (*where scalable AI development occurs*), and edge devices (*where AI is deployed*) in a secure and efficient way are essential.

Enterprise Data Strategy

Medical device companies are under increasing pressure to unify vast amounts of imaging, procedural video, telemetry, and device-generated data distributed across research, clinical, and commercial teams. Fragmented, siloed datasets limit visibility, create compliance risks, and severely hamper AI innovation efforts. Without an enterprise data strategy that prioritizes cross-business unit standardization, governance, and accessibility, organizations will struggle to operationalize their most valuable asset—their data—to drive differentiation and innovation at scale.

- **Activate Siloed Data:** Build pipelines to extract and standardize imaging, procedural video, and telemetry data trapped inside R&D, clinical, and commercial silos.
- **Enriched Cloud-Based Data Lake:** Deploy Flywheel.io on your cloud deployment to create a compliant, searchable, multi-modal repository capable of supporting cross-BU AI initiatives.
- **Democratization and Governance:** Ensure datasets are discoverable across business units, but access is controlled and auditable to maintain HIPAA, GDPR, and 21 CFR Part 11 compliance. infrastructure, organizations are destined to incur costly redesign challenges.

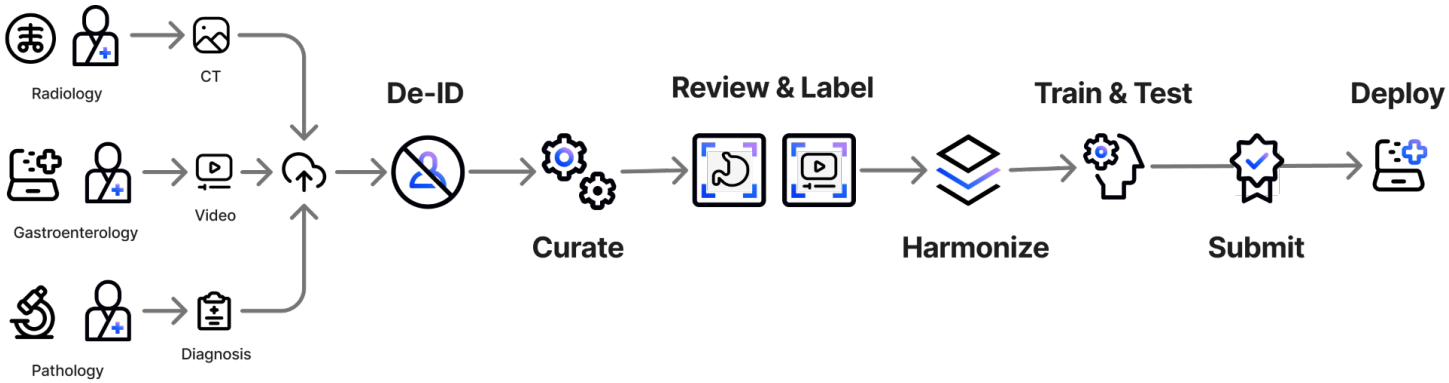
Enterprise AI Strategy

Leading device manufacturers must also craft an enterprise AI strategy that aligns closely to business objectives. Identifying where AI can enhance device functionality, improve clinical outcomes, or streamline operations is crucial to realizing a measurable ROI. Investing early in edge-capable hardware, model deployment workflows, and regulatory pathways ensures that AI becomes an embedded, value-generating capability across the entire device portfolio, rather than isolated research experiments.

- **Identify Opportunities:** Analyze your device suite to pinpoint where AI can add clinical or operational value (e.g., real-time defect detection, surgical navigation enhancement, predictive maintenance).
- **Edge Hardware Investment:** Choose the right NVIDIA-powered edge platforms (e.g., Clara Holoscan, Jetson AGX Orin) to enable on-device AI inferencing and real-time feedback.
- **Differentiator Mindset:** View AI capabilities not as “add-ons” but as fundamental competitive levers that can have regulatory advantages, improve patient outcomes, and accelerate adoption.

Illustrative Use Case:

How Med-Device Companies Build Multimodal AI Models for Smart Devices



1 **Capture** Device-generated imaging and video data is stored locally

2 **Ingest** Pre-Operative CT, colonoscopy video, and histopathology results are uploaded to the cloud using Flywheel's drag-and-drop case uploader

3 **Curate** Flywheel's automated **de-identification service** & flexible compute accelerated **gear pipelines** standardize and enrich the data as it lands in the system

4 **Review** Pre-Operative imaging is reviewed by a Radiologist and a qualitative assessment is captured using Flywheel's **reader study module**

5 **Label** AI assisted segmentation of colonoscopy video using NVIDIA's **MONAI Label** & Flywheel's **CVAT.ai integration**

6 **Cohort** Find similar subjects across the enterprise data lake using Flywheel **search** & request access for model development

7 **Test** Deploy the trained model on the device with **NVIDIA Clara** for testing & fine tuning

8 **Submit** Leveraging Flywheel's **audit trail & provenance reporting**, the model powered device can be submitted to the FDA for approval

9 **Deploy** Approved model is deployed clinically using **NVIDIA Triton Inference Server** as part of the colonoscopy platform

10 **Enrich** Containerize the model as a **Flywheel gear** or **NVIDIA NIM** to automatically characterize polyps enriching the utility of relevant files in the enterprise data lake

11 **Iterate** As real-world data & clinician feedback comes in, continuous evolution of the model using the Flywheel & NVIDIA AI Factory

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Conclusion: Parallel Investment for Parallel Success

Medical device companies that succeed in the next decade will not view AI and data modernization as isolated projects. Instead, they will leverage the power of an AI Factory, like the one Flywheel & NVIDIA offer, to:

- **Streamline data aggregation, curation, and harmonization**
- **Democratize access to data across their enterprise to unlock collaboration**
- **Accelerate time-to-market with differentiated AI powered devices**

The next generation of medical devices won't be defined by hardware, but by intelligence. The transformation begins now — with a hybrid AI and data strategy at the core.

*Visit **flywheel.io***
Schedule a demo or get in touch with a Flywheel representative.

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