MEDICAL IMAGING SUITE

Improving patient care through cloud-native medical imaging

Although this is the digital age, radiologists often find it challenging to interpret, collaborate, and make accurate diagnoses due to the present economics of storing, processing, and accessing medical images. Organizations are searching for a solution that would improve patient care, speed up diagnostics, and provide for secure image access.

The Google Cloud Medical Imaging Suite offers a full-featured, cloud-native medical imaging solution that supports secure image access from any location and faster diagnoses that can improve patient care.

In collaboration with Google Cloud, Deloitte is assisting organizations with the development of AI for imaging to promote quicker, more accurate image diagnosis, more productivity for health care providers, and better patient access.

What's driving the need for cloud-native medical imaging?

Medical images are growing in number. Storing in multiple, siloed on-premise data centers increases capital expenses by expanding storage and maintenance costs.

Hospital data is often exposed to cyberattacks. Aging servers, outdated software, and multiple on-premise locations are often attributed to less secure platforms.

Radiologist shortages and increasing use of medical images. Radiologists should be able to read, diagnose, and collaborate on images anywhere in real time.

Analytics performed on medical images are lacking. Metadata contained within images has the potential to provide valuable insights with analysis.

Image ingestion supports a variety of different sources and approaches to conform to DICOM standard

Analysis of metadata and image data. Algorithms employed by Google Cloud assist in de-identifying information to make it available for research purposes
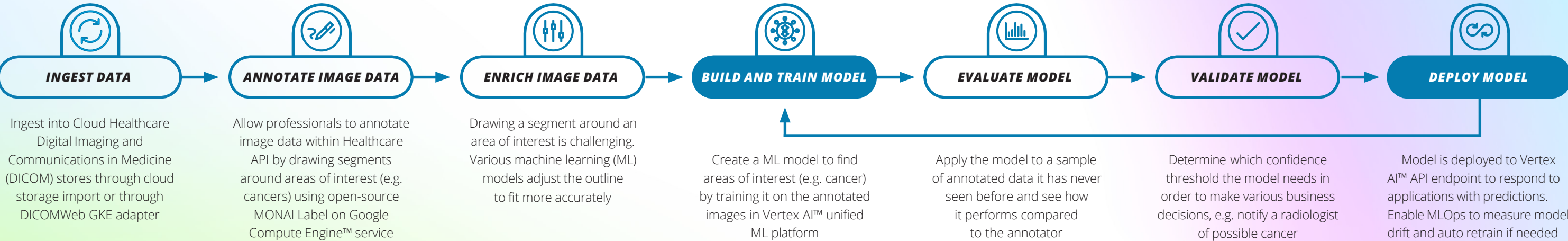
Scalable AI empowers organizations to perform advanced analytics and aids in advanced computer vision model development

Security and compliance achieved as Cloud Healthcare API allows easy and secure data exchange using international DICOMweb standard for imaging

Medical Imaging Suite solution overview

INGEST DATA → **ANNOTATE IMAGE DATA** → **ENRICH IMAGE DATA** → **BUILD AND TRAIN MODEL** → **EVALUATE MODEL** → **VALIDATE MODEL** → **DEPLOY MODEL**

Ingest into Cloud Healthcare Digital Imaging and Communications in Medicine (DICOM) stores through cloud storage import or through DICOMWeb GKE adapter

Allow professionals to annotate image data within Healthcare API by drawing segments around areas of interest (e.g. cancers) using open-source MONAI Label on Google Compute Engine™ service

Drawing a segment around an area of interest is challenging. Various machine learning (ML) models adjust the outline to fit more accurately

Create a ML model to find areas of interest (e.g. cancer) by training it on the annotated images in Vertex AI™ unified ML platform

Apply the model to a sample of annotated data it has never seen before and see how it performs compared to the annotator

Determine which confidence threshold the model needs in order to make various business decisions, e.g. notify a radiologist of possible cancer

Model is deployed to Vertex AI™ API endpoint to respond to applications with predictions. Enable MLOps to measure model drift and auto retrain if needed

OUR APPROACH TO:

MEDICAL IMAGING SUITE
IMPLEMENTATION

Deloitte delivers an industry standards-based methodology combined with technical experience to empower organizations to leverage petabytes of medical image data at enterprise scale.

EVALUATE IMPLEMENT OPERATE

	EVALUATE	IMPLEMENT	OPERATE
OFFERINGS	Discovery → Strategy and roadmap / Proof of Concept (PoC)	Plan and design → Enviromental build → Rollout	Manage and operate
ACCELERATORS	Assessment framework · Strategy template · Deloitte PoC labs	Assessment framework · Strategy template · Deloitte PoC labs · Deloitte PoC labs	Operational Runbook

OUTCOMES

EVALUATE:
- Current state analysis competed
- Initiatives prioritized
- Use case roadmap developed
- In-scope images, modalities, and studies defined
- PoC ML use case defined
- PoC scope defined
- PoC conducted and reviewed with stakeholders

IMPLEMENT:
- Image storage: Define image ingestion and De-Identification strategy
- Image lab: Image viewing and annotation workflow and change management plan adopted
- Imaging AI pipelines: ML models developed, and ML Ops process defined for continuous improvement
- Imaging deployment: Predictive workflows established for diagnostics in the cloud or on edge devices
- Imaging datasets and dashboards: Analytics, cohort-building and reporting workflows developed
- Prioritized modalities and image types onboarded

OPERATE:
- Support Service Level Agreements defined
- Ongoing operations and maintenance support
- Enhancement plan defined and operationalized

Medical Imaging Suite Solution Potential Benefits

- **Drive quicker, more accurate diagnosis** by automatically uploading images, making available to view sooner, and reporting findings faster
- **Improve services to stakeholders** by leveraging image data and enabling analytics to drive insights
- **Secure access to images anywhere at any time** by leveraging Zero Trust framework that authenticates and validates the users accessing the data
- **Lower infrastructure and maintenance costs** by migrating to the cloud and leveraging cloud services/tools
- **Enhance provider experience** with ease of access to images via a web application or easy-to-use viewer

START THE CONVERSATION

Chris Goodman
Managing Director
Google Cloud Alliance Health Care - GTM Lead
Deloitte Consulting LLP
chrgoodman@deloitte.com

Matt Iames
Specialist Leader
Life Sciences & Health Care
Deloitte Consulting LLP
miames@deloitte.com

Courtney Claussen
Senior Manager
Life Sciences & Health Care
Deloitte Consulting LLP
cclaussen@deloitte.com

Phil Businger
Specialist Leader
Life Sciences & Health Care
Deloitte Consulting LLP
pbusinger@deloitte.com

Rahul Khatkhedkar
Managing Director
Life Sciences & Health Care
Deloitte Consulting LLP
rkhatkhedkar@deloitte.com