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## GOOGLE CLOUD AI-ENABLED HEALTHCARE

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### CONTEXT

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At the recent HIMSS24 event in Orlando, Google Cloud unveiled a set of new solutions designed to enhance interoperability, establish a robust data foundation, and deploy generative AI tools within the healthcare and life sciences sectors. These solutions promise to improve patient outcomes.

These innovations address significant challenges such as increasing healthcare administrative costs, physician burnout, and global nursing shortages by empowering healthcare workers with gen AI solutions for efficiency and effectiveness.

### VERTEX AI SEARCH

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Google Cloud's new Vertex AI Search for Healthcare is a sophisticated, generative AI-powered search tool designed specifically for the healthcare sector. It's designed to address critical challenges faced by healthcare providers, payers, electronic health record (EHR) companies, and life science organizations by improving efficiency and effectiveness in healthcare work environments.

#### **Key Features of Vertex AI Search for Healthcare include:**

- **Medically-Tuned Search:** This feature allows for precise searches within electronic health records (EHRs), scanned documents, and other types of clinical data. It enables healthcare applications to surface the most relevant information to clinicians and administrative staff, eliminating the need to sift through extensive notes or toggle between multiple screens and applications.
- **Configurable Cloud APIs:** Developers can integrate this medically-tuned search functionality directly into clinical workflow tools using customizable cloud APIs, ensuring that the technology can be seamlessly embedded into existing healthcare systems.

- **Question-Answering Capabilities:** The tool enables clinicians to ask complex medical questions, such as "Does the patient have a history of cancer?" and receive accurate answers. This capability is about recognizing medical terminology and understanding the nuances of language in medical notes and scanned documents.
- **Factuality and Transparency:** One of the most significant features of Vertex AI Search for Healthcare is its ability to provide answers grounded in the healthcare organization's actual data. It can cite and link to specific data points that support the answers, enhancing user confidence in the responses and reducing the risks associated with incorrect or misleading information.
- **Data Platform Integration:** The effectiveness of generative AI and search applications hinges on the data quality they use. The integration with Healthcare Data Engine (HDE) enables high-quality data management, making it easier for organizations to build comprehensive patient data platforms. This integration supports search and summarization use cases without the need for custom development work.
- **Deeper Medical Understanding:** By combining the capabilities of MedLM tools, which are experts in complex medical topics, with medically tuned search functionalities grounded in patient records, healthcare organizations can uncover the most relevant answers to complex medical questions. This dual approach ensures that the insights provided are accurate and highly pertinent to the patient's medical history.

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## HEALTHCARE DATA ENGINE (HDE)

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Google Cloud's new Healthcare Data Engine (HDE) is an advanced, managed service designed to transform how healthcare organizations manage and utilize their data.

Designed to enable a robust, interoperable data foundation, HDE facilitates the adoption of generative AI technologies to improve patient outcomes and operational efficiencies. It addresses the critical need for a unified, high-quality patient data platform that can easily integrate with AI and analytics solutions.

### Key Features and Benefits of the Healthcare Data Engine:

- **Interoperability and High-Quality Data Platform:** HDE is built to help healthcare organizations worldwide create an interoperable and high-quality data platform. This foundational platform leverages gen AI to its fullest potential, enabling advanced data analytics and improving patient care delivery.
- **Simplified Management and Streamlined Pricing:** Google Cloud offers HDE as a consumption-priced, pay-as-you-go managed service. This pricing model makes it accessible to a broader range of healthcare organizations, allowing

them to deploy, build, and manage a near real-time healthcare data platform in the cloud without significant upfront investments.

- **Global Availability:** Previously limited to North America, HDE is expanding its availability to most cloud regions in Europe and Asia Pacific. This global rollout is part of Google Cloud’s commitment to supporting healthcare organizations worldwide, providing them with the tools needed to harness the power of data and AI.
- **Low-code Graphical Data Mapping IDE:** The introduction of HDE Data Mapper, a new low-code graphical integrated development environment (IDE), is a game-changer for healthcare data management. This IDE, built by Google Research specifically for healthcare, allows customers to transform their data quickly and build high-quality longitudinal patient records in FHIR format. This simplifies the process of data preparation for gen AI applications and analytics.
- **Foundation for AI and Analytics Solutions:** By integrating HDE with technologies like Vertex AI Search for Healthcare, healthcare organizations can achieve a comprehensive view across multiple systems and formats through a single search. This integration saves valuable time and allows clinicians to focus more on patient engagement and care than on navigating disparate data systems.
- **Enhanced Patient Records for Advanced Analytics:** HDE harmonizes data from various sources into a comprehensive, longitudinal patient record. This unified view is fundamental for supporting advanced analytics and Responsible AI initiatives, allowing healthcare providers to derive deeper insights and make informed decisions for patient care.

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## MEDLM

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MedLM, developed by Google Research, provides a family of foundation models that have been fine-tuned for healthcare-related use cases. These models aim to improve patient care, enhance clinical decision-making, and streamline healthcare workflows.

MedLM leverages AI's vast capabilities to interpret, understand, and generate text relevant to medical contexts, thus supporting a range of applications from diagnostics to personalized medicine.

### Key Features and Applications of MedLM include:

- **Specialization in Healthcare:** Unlike general-purpose language models, MedLM is specifically tuned for the healthcare domain. This specialization allows it to understand complex medical terminology, patient histories, treatment protocols, and research literature.

- **Support for Diagnostic and Clinical Use Cases:** MedLM can be employed in various diagnostic and clinical scenarios. For example, it can assist in interpreting medical imaging, analyzing patient records to identify trends or conditions, and suggesting potential treatment plans based on the latest medical research.
- **Enhanced Accuracy and Reliability:** Given the critical nature of healthcare, MedLM is designed to prioritize accuracy and reliability in its outputs. It incorporates advanced techniques to minimize errors and biases, ensuring that healthcare providers and patients can trust its information.
- **Integration with Healthcare Data Platforms:** MedLM can be integrated with healthcare data platforms like the Healthcare Data Engine (HDE) from Google Cloud. This integration allows MedLM to access a wide range of patient data, generating more personalized and accurate insights.

#### **Recent Innovations in MedLM include:**

- **MedLM for Chest X-ray:** This new capability of MedLM focuses on classifying chest X-rays for operational, screening, and diagnostic purposes. It transforms chest X-ray images into embeddings that can be used by application developers and data scientists to train classification models, facilitating the identification of various conditions, from pneumonia to lung cancer.
- **Condition Summary API:** Another innovative feature, the Condition Summary API, aims to provide healthcare professionals with a chronological list of patients' conditions accompanied by AI-generated briefs. These briefs include citations from the original text, helping clinicians to quickly understand the patient's medical history and make informed decisions.

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## **ANALYSIS**

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Google wasn't alone in making AI-based announcements at the HIMSS24 event. Its leading competitor in the public cloud market, Amazon Web Services, also [introduced](#) a range of healthcare-focused offerings.

While AWS took a partner-driven approach with its solutions, Google Cloud focused on delivering foundational technologies. Its suite of healthcare solutions, including Vertex AI Search for Healthcare, the Healthcare Data Engine, and MedLM, show a comprehensive and forward-thinking approach to tackling the pervasive challenges within the healthcare sector.

Vertex AI Search for Healthcare addresses a critical pain point in the healthcare industry: the need for efficient and accurate access to a vast array of health data. This tool significantly reduces the administrative burden on healthcare professionals by leveraging generative AI for medically-tuned searches, potentially mitigating physician burnout and improving patient care.

The Healthcare Data Engine is the backbone of this ecosystem, providing a robust platform for data integration and management. The introduction of HDE Data Mapper is particularly newsworthy, as it empowers healthcare organizations to transform disparate data sources into unified, actionable patient records without extensive coding expertise.

MedLM, with its focus on leveraging AI for medical language understanding, complements the data capabilities of HDE and the search functionalities of Vertex AI Search by providing nuanced insights and interpretations of complex medical data.

The announcements by Google Cloud are a significant step forward in using AI and data management technologies in healthcare. The company's offerings streamline workflows, enhance decision-making processes, and ultimately improve patient outcomes by providing healthcare professionals with the tools they need to navigate the complexities of modern healthcare.

As these technologies continue to evolve and integrate into healthcare systems, they can transform healthcare delivery, making it more efficient, personalized, and patient-centered. That's good news for everyone.



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