



Medical Imaging Practice

CitiusTech Medical Imaging Practice offers a wide range of solutions and services, enabling technology organizations to support their engineering and professional services through strong teams with deep understanding of the domain.

- Professional Services
- Product Development
- Sustenance Engineering
- QA & Test Automation

www.citiustech.com

About CitiusTech

With over 4,000 professionals worldwide, CitiusTech enables healthcare organizations to drive clinical value chain excellence, across integration & interoperability, data management (EDW, Big Data), performance management (BI / analytics), data science (predictive analytics, Machine Learning, AI) and digital engagement (mobile, IoT).

CitiusTech helps customers accelerate innovation in healthcare through specialized solutions, healthcare technology platforms, proficiencies and accelerators. With cutting-edge technology expertise, world-class service quality and a global resource base, CitiusTech consistently delivers best-in-class solutions and an unmatched cost advantage to healthcare organizations worldwide.

Worldwide Offices

- **US:** Princeton, New York, Rochester (MN), Dallas, Boston, Philadelphia
- **Asia:** Mumbai, Bangalore, Chennai, Dubai, Singapore
- **Other:** Ontario, London

\$205+ Mn
in revenue



4,000+
healthcare IT professionals

40 Mn+
lives touched

69
NPS - highest in the industry!

110+
healthcare customers

CitiusTech Medical Imaging Practice

CitiusTech has extensive experience of working with market leaders in medical imaging across the chain – RIS, Modalities, PACS and Viewers (incl. Digital Pathology Imaging) enhancing their solutions and supporting interoperability initiatives. Our wide spectrum of services include – professional services, product development, sustained engineering and specialized services

CitiusTech Capabilities

Professional Services	Interoperability & Professional Services across the radiology workflow
Product Development	Product development of imaging solutions using emerging technologies (HTML5, Cloud, Mobile Application Development)
Sustenance Engineering	Sustenance engineering for legacy imaging products across a wide spectrum of technologies (.NET, Java, etc.)
QA & Test Automation	Functional, Non-functional and Conformance testing of imaging product suite

CitiusTech Advantage



Domain Expertise: 400+ HL7 & FHIR certified professionals with in-depth knowledge of healthcare standards



Prototyping : Driving innovation through POCs such as – implementation of DICOM Hanging Protocols, Standards-based Analytics, Pathology Image Standardization, etc.



Thought Leadership: Publications, Poster Presentations and Speakers at prominent imaging conferences such as RSNA and SIIM



CitiusTech: Key Engagements in Medical Imaging

- **Web based multi modality (MR, CT, X-Ray, etc.) viewer** with 2D and 3D rendering capabilities on multiple browsers
- Desktop based **Universal Viewer** with capability to generate 3D MPR and MIP images
- **Modernized** the legacy UI of MR viewer along with **Internationalization support** for 14 languages
- iOS and Android based **imaging viewer** built using HTML5 with **support for DICOM images**
- **Gateway device (Edge Mini)** using RSVP agents to connect MR, CT and PACS with cloud applications, for device management and clinical/non-clinical data exchange
- **Cloud-hosted multi-modality device protocol management** solution (for MR and CT) for standardized and improved protocol compliance

Initiatives and Thought Leadership

- Working on drafting an IHE profile to standardize the operationalization of AI algorithms in imaging workflow
- Working on conceptualizing Cross Enterprise Distribution of pathology images using IHE XDS and APW
- CitiusTech Data Science team has worked on risk quantification of lung cancer using CT scans
- CitiusTech Data Science team has built a POC for worklist prioritization by assessing DICOM images for levels of severity

Case Study: Cloud-based Medical Image Exchange

Client Requirements

Client is a leading provider of medical imaging systems. Client wanted to build a cloud-hosted image exchange platform with image viewing capabilities. CitiusTech was selected owing to its deep expertise in cloud and mobile app development

CitiusTech Solution

CitiusTech deployed a cloud-hosted exchange platform with the ability to interact with multiple systems, including distributed PACS, VNA and physician / patient portals. The key requirements for cloud-based medical image sharing and viewing included:

- Ability to support all major browsers on tablets and mobile devices through an HTML5 interface
- Capability to distribute consolidated data (DICOM and non-DICOM) to clinicians and/or patients that are not employed by the hospital and do not have direct access to content without the need to access multiple systems
- healthcare standard-based recommendations on the product roadmap

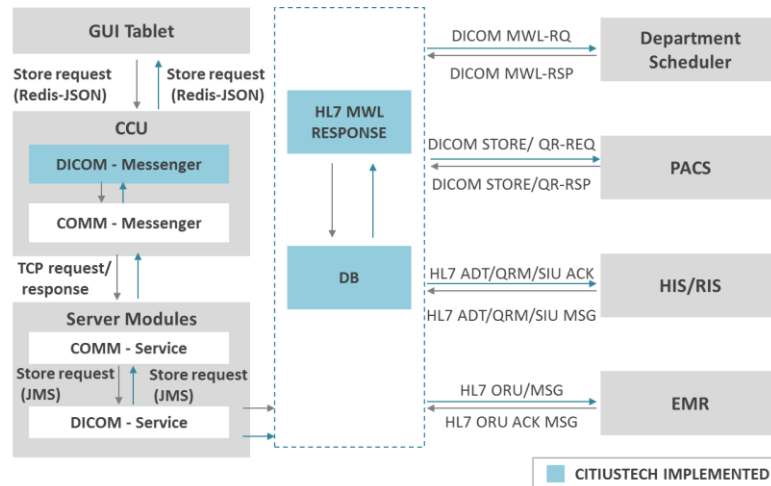
Value Delivered

- Enabled clear definition and efficient implementation of product roadmap owing to domain expertise
- Accelerated development through timely availability of wireframes and test data as well as enabled faster query resolution

Case Study: Interoperability for Imaging Solutions

Client Requirements

Client is a global leader in solutions for orthopedics. It wanted to achieve interoperability between its image management solutions and RIS, PACS and other hospital applications. CitiusTech was selected for its expertise in interoperability and standards-based messaging using DICOM & HL7.



CitiusTech Solution

- Integration of image management solution with RIS, PACS and hospital systems in DICOM and HL7 standards using InterSystems Ensemble
- Provision of a platform for communication in JSON, TCP, JMS and XML formats between applications
- Image conversion using DCMTK open source imaging library

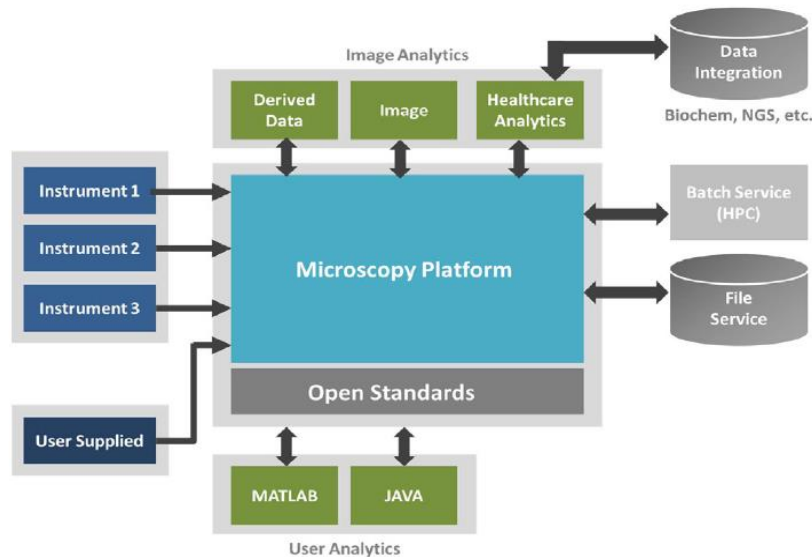
Value Delivered

- Interoperability between client applications and RIS, PACS, and other hospital information systems
- Developed a standards-based, DICOM compliant solution to enable extensibility to other applications

Case Study: Image Processing, Visualization & Analytics for Cellular Research

Client Requirements

Client is a leading provider of medical imaging and diagnostic services to pharmaceutical and life sciences companies. Its platforms produce large volumes of high throughput multimodal imaging data. Client needed to build an enterprise-scale analytics platform to gain visual and clinical insights from the data.



CitiusTech Solution

- Capturing images configured based on assays
- Analyzing and interpreting data from live and fixed cell assays
- Performing complex subcellular assays
- Quantifying multiple-biomarker expression patterns and correlating to non-imaging data
- Visualizing and interpreting statistical and machine learning analytics results

Value Delivered

- Unified analytics platform synchronously working with multiple imaging tools, serving varying needs and configurations
- Faster go-to-market by reusing existing technology platforms and components,

Case Study: Prefetching Imaging studies from Cloud using VNA

Client Requirements

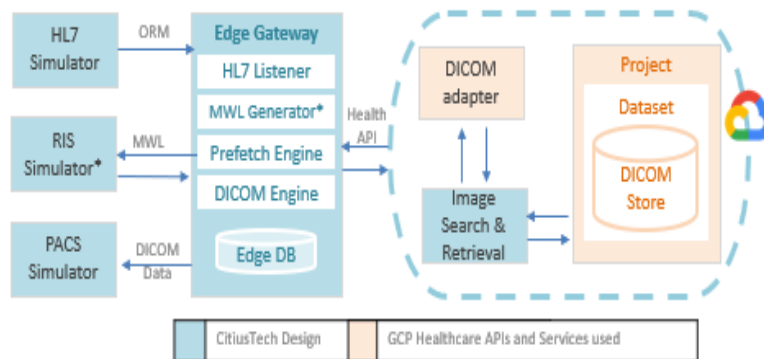
Client is a leading provider of cloud compute & storage services. Client wanted to demonstrate their cloud capabilities for Radiology by developing a smart prefetch system which would fetch archived images of the visiting patient from VNA using HL7 orders. The system would also import imaging data from the VNA, reconcile and transfer to local PACS.

CitiusTech was selected to develop the information management solution, given its expertise around medical imaging standards and health cloud.

CitiusTech Solution

Developed an information management solution on Google Cloud Platform to aggregate and auto-download PACS data and accelerate the fetch process for a patient visit. Google Healthcare API enabled Vendor Neutral Archive (VNA) gateway identified and pre-fetched imaging data for each patient.

Physicians could access a patient's imaging information on a visualization workstation and analyze imaging data from multiple PACS.



Value Delivered

- Centralized, scalable and interoperable repository for medical images
- Single source of truth on Cloud for all PACS and hospital data
- Remotely access to patient images, any time, through multiple devices

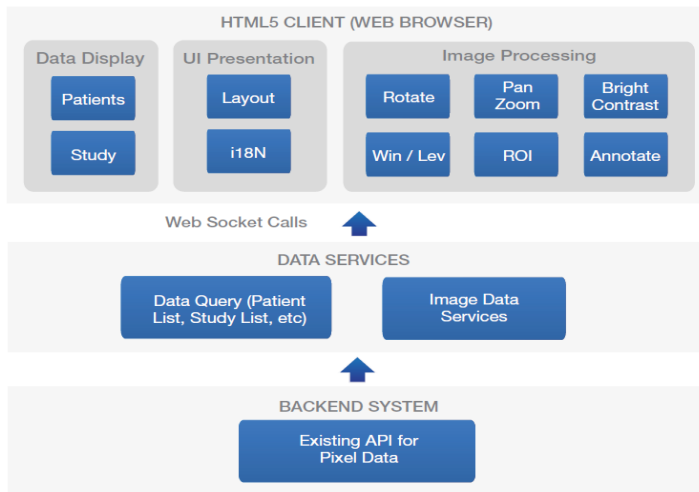
Case Study: HTML5 Based Medical Imaging Viewer for Mobile Devices

Client Requirements

Client is a leading provider of medical imaging and medical diagnostic systems. The client wanted to develop a next generation browser-based medical imaging viewer which was mobile enabled and cross browser compatible. The viewer needed to function as a stand-alone application, allowing a standardized view of medical images, irrespective of the operating system, browser or mobile device.

CitiusTech Solution

CitiusTech developed the medical imaging viewer on HTML5, with the capability to support rich media without any custom component. The viewer consisted of a rich interface for multi-modality image display, enabling end-users to perform extensive imaging operations. The application was designed to use full set of HTML5 features, such as stacking vector layers, client rendering, on-demand data loading and bi-directional communication (WebSocket)



Value Delivered

- Address real-world mobile enablement challenges such as latency, client throughput and compatibility
- significantly reduce time-to-market through quick development and deployment
- Lower dev. and implementation costs by 35%

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