Reimagining Healthcare Access with Data Integration and Microservices at Scale

Transforming healthcare through Kubernetes-native microservices and modern data integration

About the Speaker

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University of the Cumberlands

Healthcare technologist specializing in cloud-native architectures and interoperability solutions. Passionate about bridging the gap between cutting-edge technology and equitable healthcare access.

Focus areas include Kubernetes orchestration, FHIR standards implementation, and microservices design for healthcare systems.

The Healthcare Data Crisis

80%

Critical Patient Data

Remains siloed across disparate healthcare systems globally

This fragmentation impedes timely care delivery and inflates operational costs across the healthcare ecosystem.

The Modernization Imperative

Scalable Infrastructure

Healthcare systems require robust, cloud-native architectures that can handle growing data volumes and user demands

Interoperable Systems

Seamless data exchange between providers, payers, and patients is essential for coordinated care

Rural Access

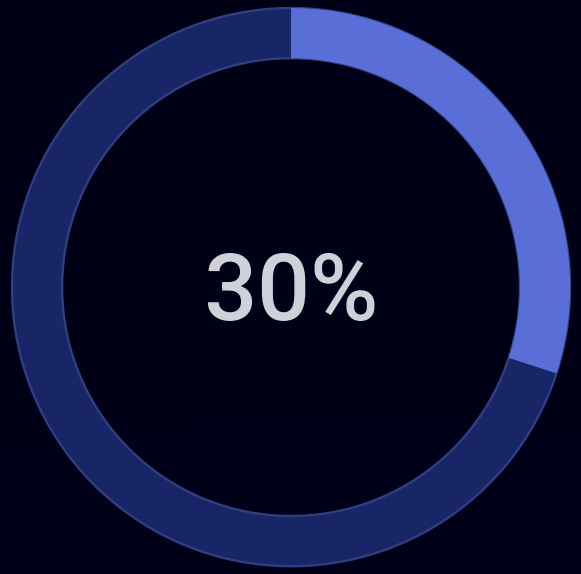
Underserved populations need technology solutions that bridge geographic and resource gaps

Cloud-Native Architecture Revolution

Kubernetes-native microservices and standardized APIs like FHIR are fundamentally reversing healthcare system inefficiencies.

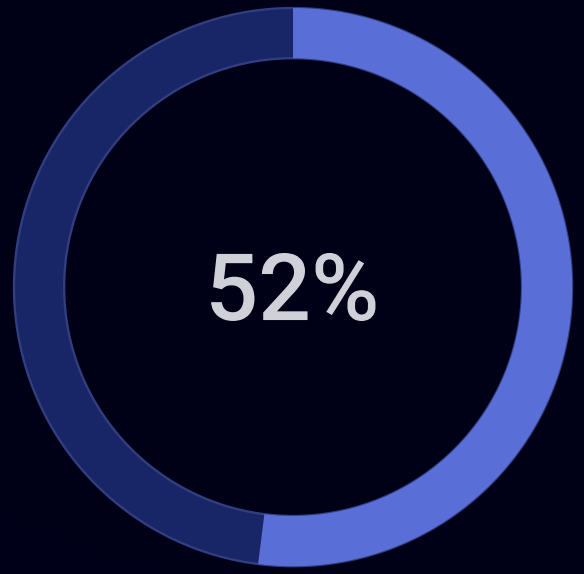
This architectural shift enables unprecedented scalability, resilience, and interoperability in healthcare technology infrastructure.

Health Information Exchanges: Proven Impact



Readmission Reduction

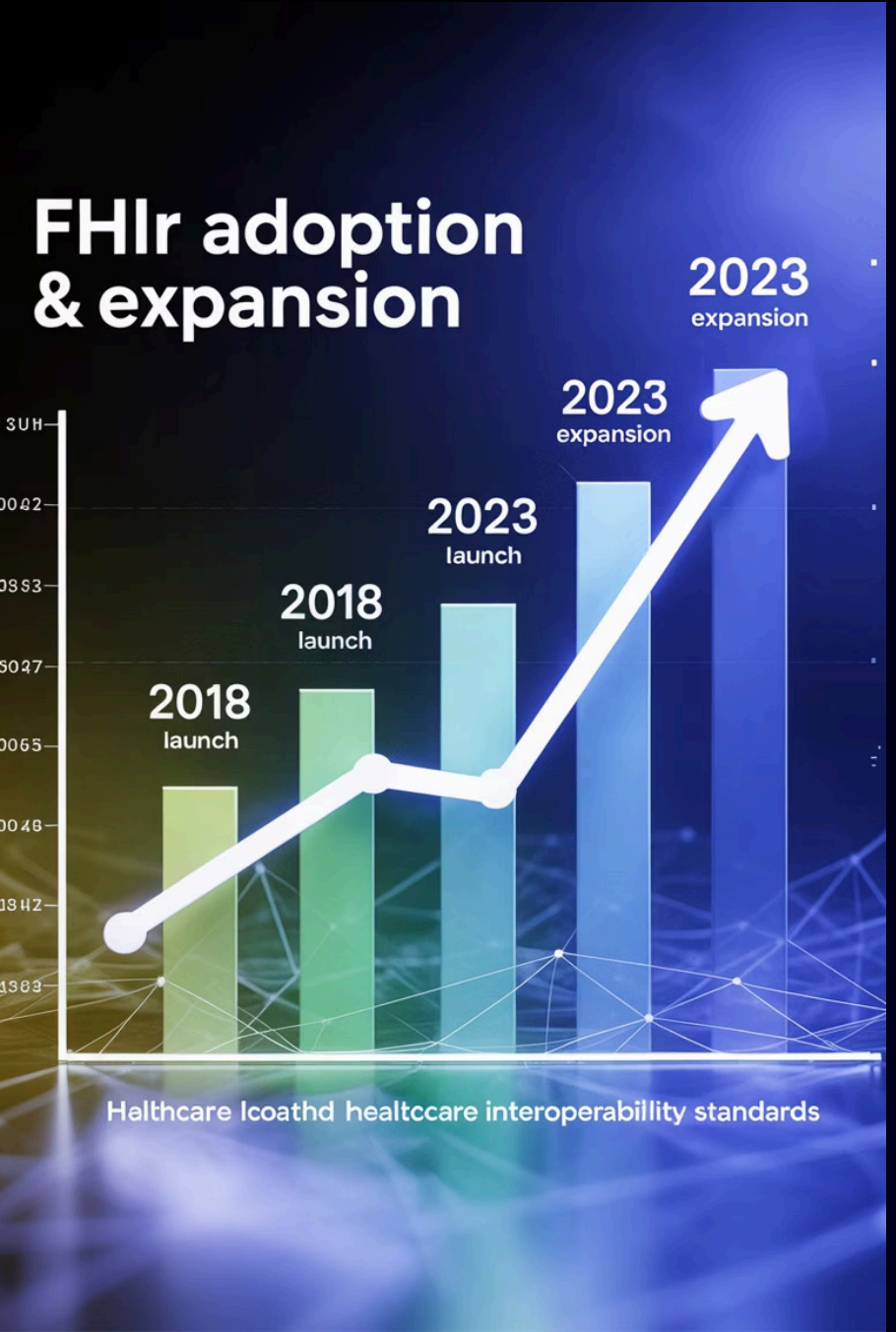
Integrated HIEs have reduced preventable hospital readmissions



Duplicate Testing

Decrease in redundant laboratory testing through data sharing

These improvements demonstrate the tangible benefits of integrated healthcare data systems on patient outcomes and cost efficiency.



FHIR Standards Adoption Growth

1 **2017**

14.8% FHIR adoption rate

2 **2022**

58.3% FHIR adoption rate

This dramatic increase in FHIR standards adoption has drastically improved healthcare system interoperability across the industry.

Kubernetes Performance Benefits

62% Transaction Boost

Increased throughput capacity under normal operations

47% Faster Response

Improved response times during peak load conditions

Containerized microservices on Kubernetes deliver measurable performance improvements for healthcare applications.

Infrastructure Cost Optimization

Infrastructure Costs

Dropped by up to 57% through cloud-native optimization

Deployment Speed

Reduced deployment times by 74%, enabling rapid scalability

COVID-19 Telehealth Transformation

Unprecedented Scale

Cloud-native systems enabled telehealth to scale from just 1% to 35.3% of all healthcare visits during the pandemic.

This rapid transformation demonstrated the critical importance of scalable, resilient healthcare technology infrastructure.

Mobile Health Applications Impact

Microservices-powered mobile health applications have significantly improved patient engagement and health outcomes.

- Enhanced medication adherence rates
- Better chronic disease self-management
- Increased patient empowerment through data access

Rural Healthcare Success Story

Rural India Implementation

Specialist Access

58% improvement through Kubernetes-based telehealth platforms

Urgent Care Delays

43% reduction in time-to-treatment for urgent conditions

Design Principles for Resilient Systems

01

Cloud-Native Architecture

Build on containerized microservices with Kubernetes orchestration

02

Standards Compliance

Implement FHIR and other healthcare interoperability standards

03

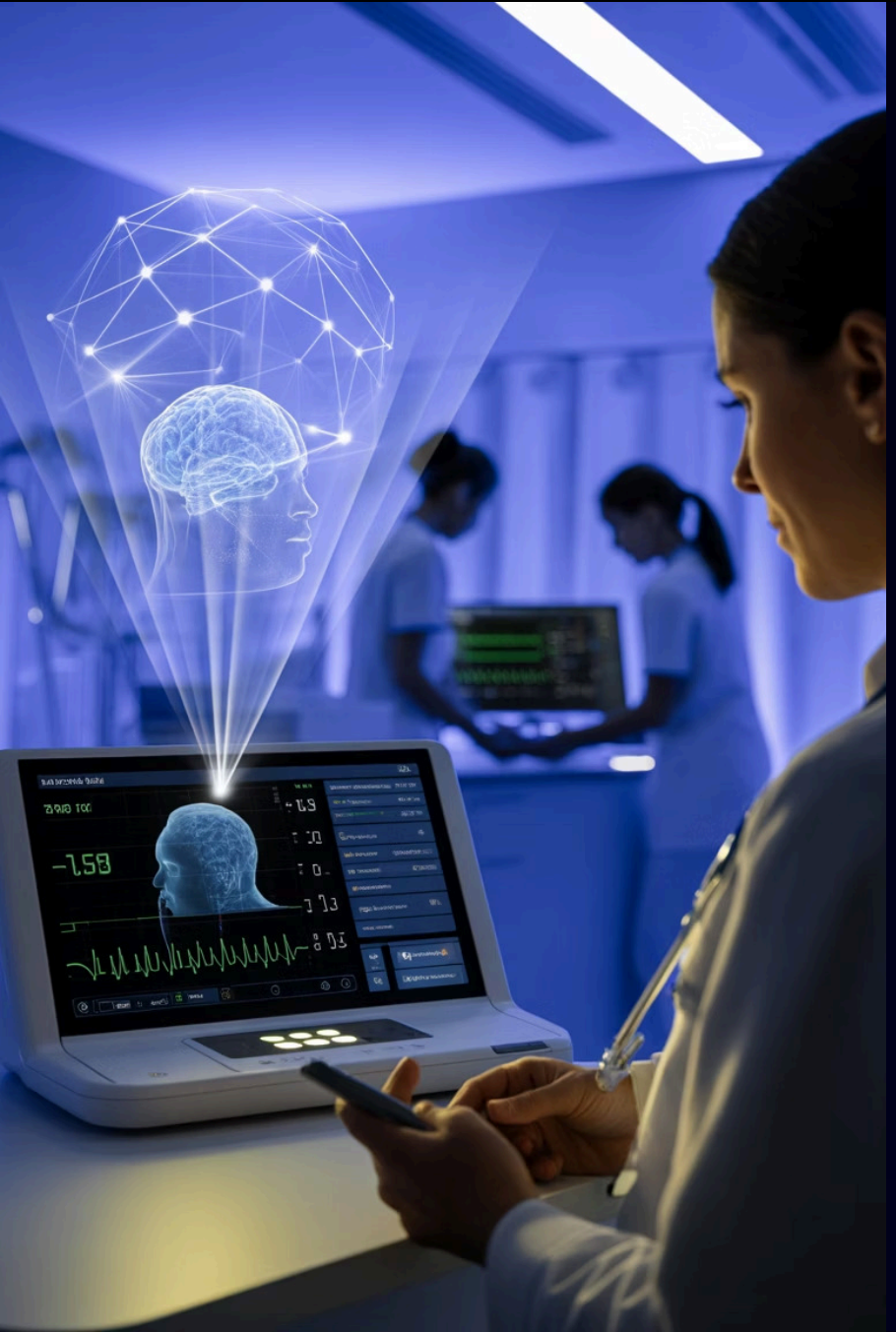
Scalability Focus

Design for elastic scaling to handle variable healthcare workloads

04

Security First

Embed security and compliance throughout the development lifecycle



Key Takeaways

Data Integration is Critical

Breaking down silos through standardized APIs and HIEs delivers measurable patient outcomes

Microservices Enable Scale

Kubernetes-native architectures provide the performance and cost benefits needed for modern healthcare

Equity Through Technology

Cloud-native solutions can bridge healthcare access gaps for underserved populations

Thank You

Questions and Discussion

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Building equitable healthcare systems through cloud-native innovation