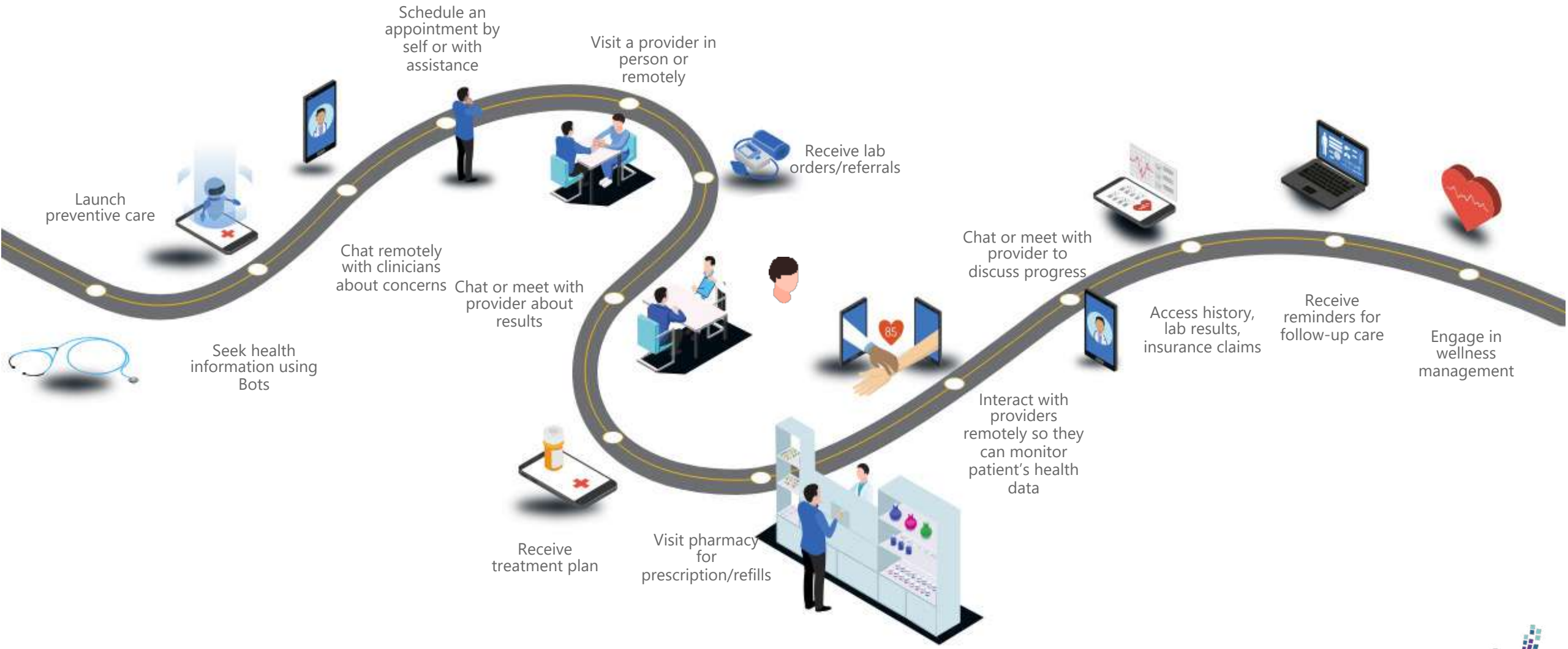
Continuous Patient Monitoring and Operational Analytics

Presenters:

- Syed Safdar Hussain - Principal Cloud Solution Architect at Veraqor
- Fahad Ali Hashmi - Technology Solutions Professional – Data and Analytics at Veraqor
- Muhammad Abdullah – Solution Specialist at Veraqor
- Moussa Khaled – Business Development Manager at QDS

The future of healthcare is a more seamless, end-to-end patient experience



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The pandemic validated cloud's value proposition. The ability to use on-demand, scalable cloud models to achieve cost efficiency and business continuity is providing the impetus for organization to rapidly accelerate their digital business transformation plans. The increased use of public cloud services has reinforced cloud adoption to be the 'new normal' now more than ever.

- Sid Nag
Research Vice President, Gartner

80%

Of healthcare providers plan on increasing their investment in technology and digital solutions over the next five years. (HIMSS, 2021)

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Microsoft Cloud for Healthcare

Capabilities enabling better experiences, better insights, better care

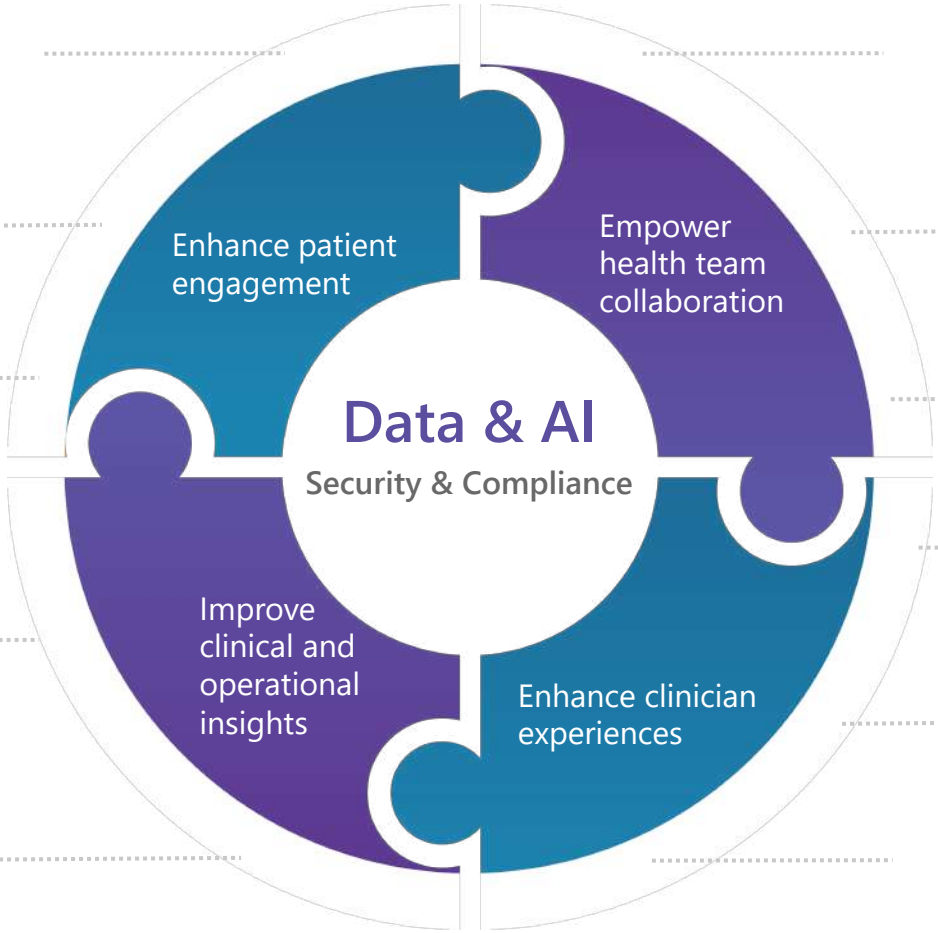
Personalized Care
Build relationships through enhanced experiences

Patient Insights
Transform data into prescriptive insights

Virtual Health
Provide new avenues for care

Clinical Analytics
Access and securely share actionable data insights

Operational Analytics
Gain insights to help optimize operational effectiveness



Care Coordination
Develop systems of care management with clinical intelligence and workflows

Care Collaboration
Optimize resources and solve problems effectively

Remote Patient Monitoring
Combine IoT and analytics to optimize treatments

Ambient Clinical Intelligence
Automatically document patient encounters

Clinical Documentation
Reduce administrative tasks and burnouts

Diagnostic Intelligence
Empower radiologists to drive action, quality, and efficiency

Healthcare Industry Specific

Data models — Connectors & APIs — Partner ecosystem

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Data and AI in Healthcare: Priority Use Cases

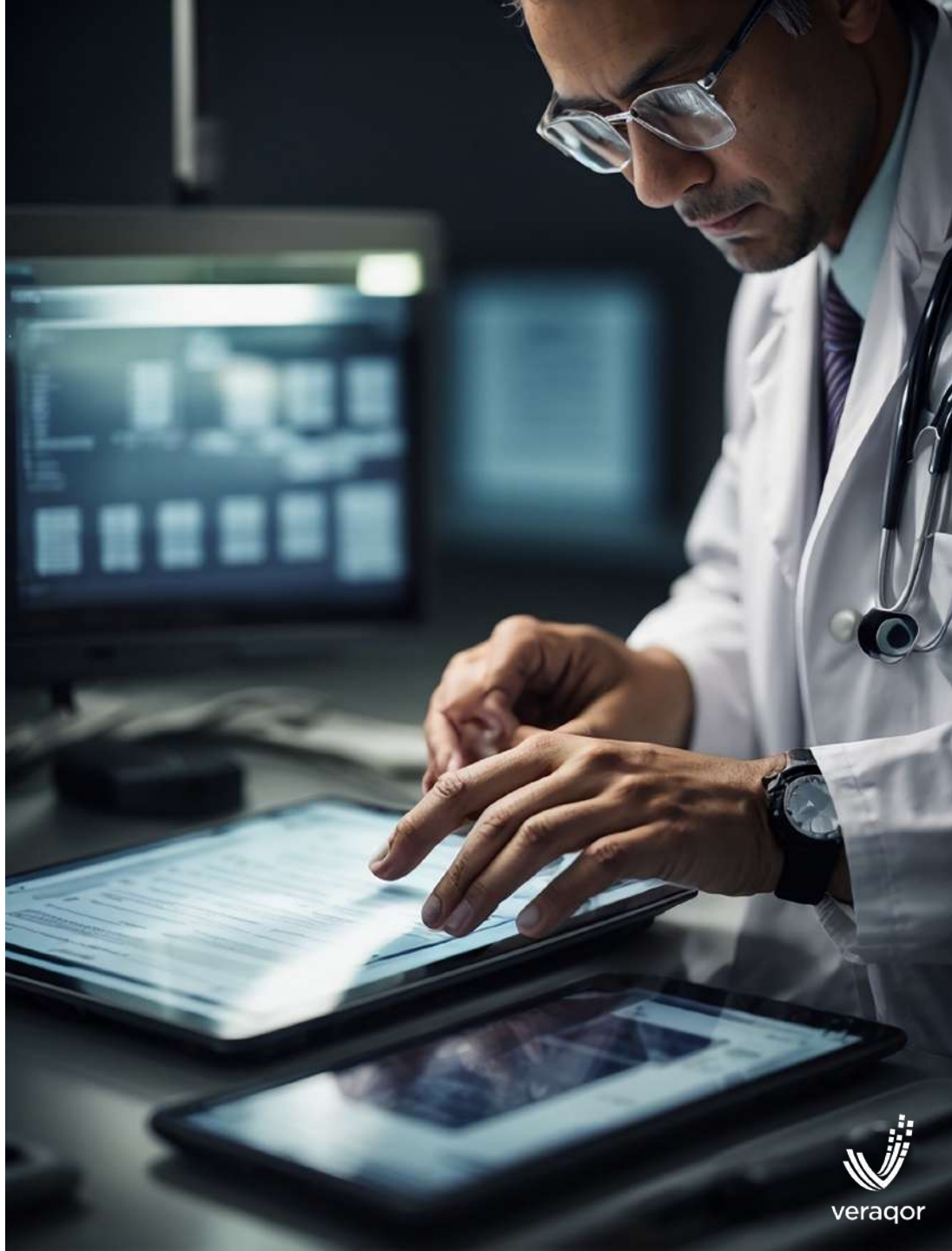
Improve Clinical & Operational Insights

- Operational Analytics

Empower Health Team Collaboration

- Continuous Patient Monitoring

Hero Use Case



Improve clinical and operational insights

Connect data from across systems, creating insights to enable healthcare providers to predict risk and improve patient care, quality assurance, and operational efficiencies

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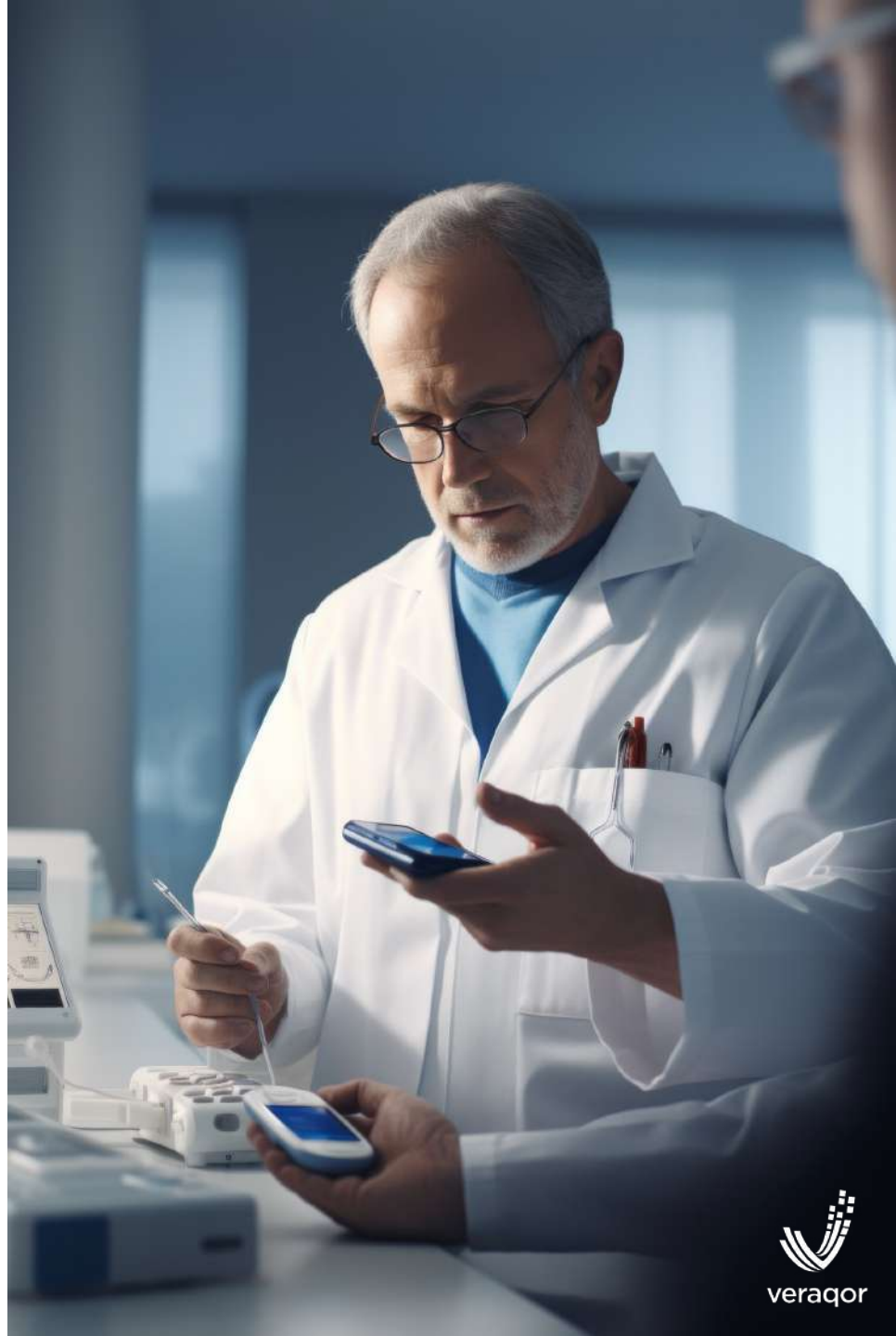
Priority Use Case: Operational Analytics

Overview

- **Operational analytics**: Enhances care process efficiency.
- **Data growth:** Health data doubles every 24 months due to Electronic Medical Records.
- **Pandemic response:** Predictive models were trained using operational data during COVID-19.
- **Excessive benefits:** Improves resource use, patient access, wait times, and profitability.

Why It Matters

- **Resource deployment:** Use COVID surge predictions and patient acuity to allocate resources effectively.
- **Clinician empowerment**: Enable sharing and analysis of data for better decision-making.
- **Operational improvement**: Enhance effectiveness and reduce costs.



Clinical analytics
Access and securely share actionable data insights

Operational analytics
Gain insights to help optimize operational effectiveness

Partner and customer use cases

Population health management	Clinical research
Predictive care guidance	Behavioral analytics and alerts
Imaging intelligence	
Billing	Throughput and readmission management
Facility and supply chain insights	Resource management
Predictive maintenance	Facilities and equipment management
Forecasting resources and automated alerts	

Data Governance

Interoperability

Azure Health Data Service
Azure FHIR Sync Agent
Dataverse Health Data Exchange API
Third-party connectors

Operational data

Azure Synapse Analytics
Microsoft Dataverse

Clinical data

Azure Synapse Analytics
Azure Internet of Things (IoT)
Azure Health Data Services
Text Analytics for Health

Analytics

Azure Synapse Analytics
Power BI
Azure Cognitive Services for Language

Security / Compliance / Privacy

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We're unifying disparate data sources to establish a singular, in-depth profile of each patient

Healthcare specific

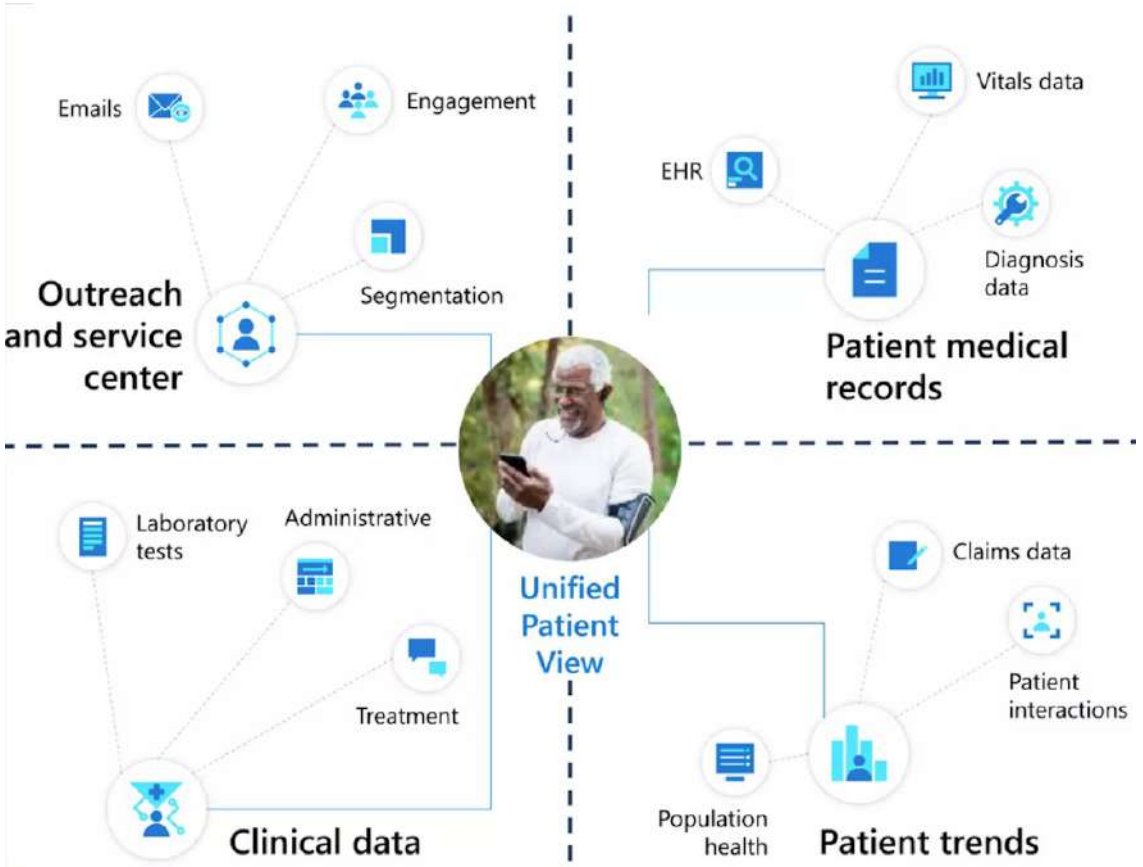
Leverage health data models that align with FHIR, DICOM, and other global data standards.

Interoperability

Ingest, enrich, and unify data, enabling faster time to value.

Faster innovation

Extend value with additional solutions, analytics, and predictions.



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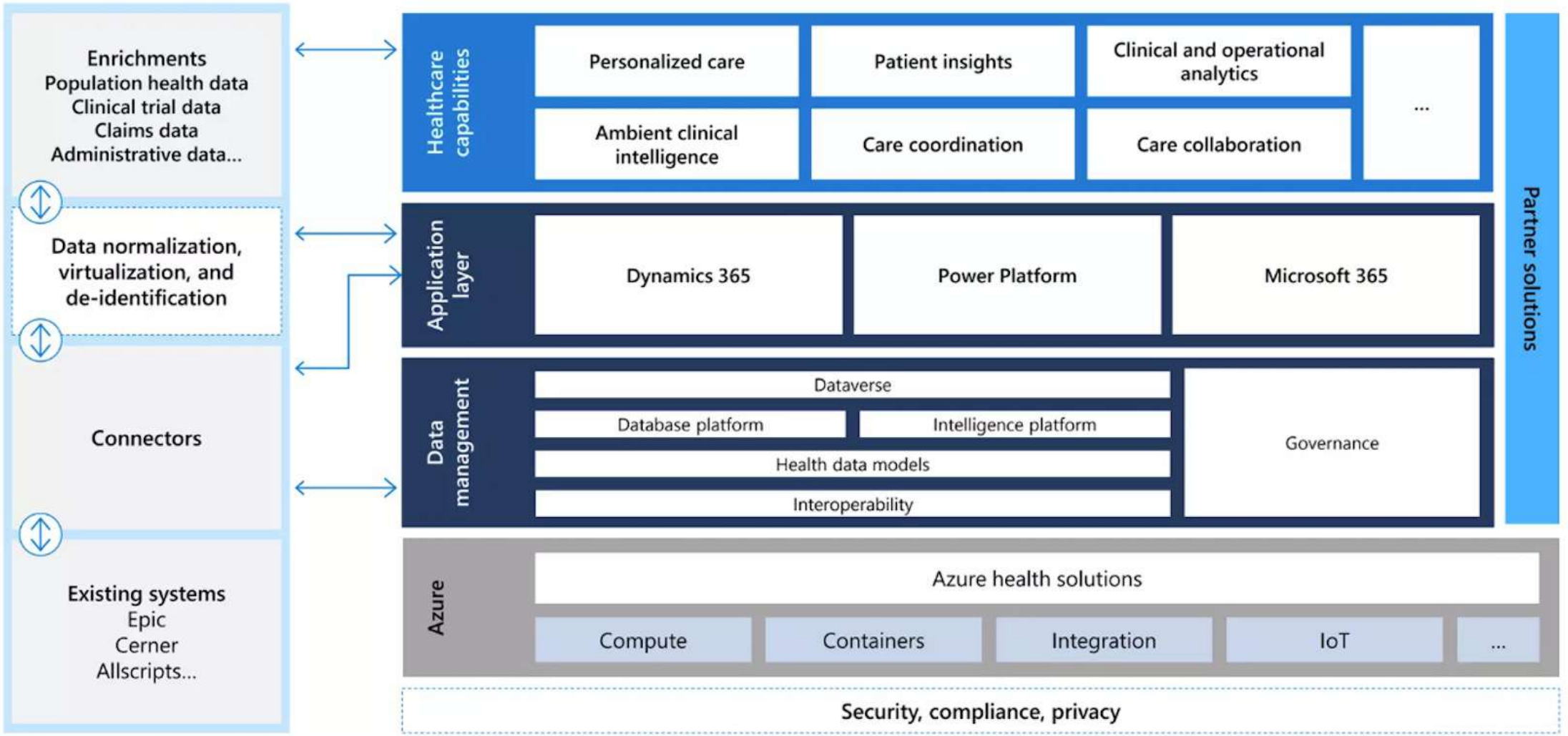
Enabling Organizations with Proven Technology



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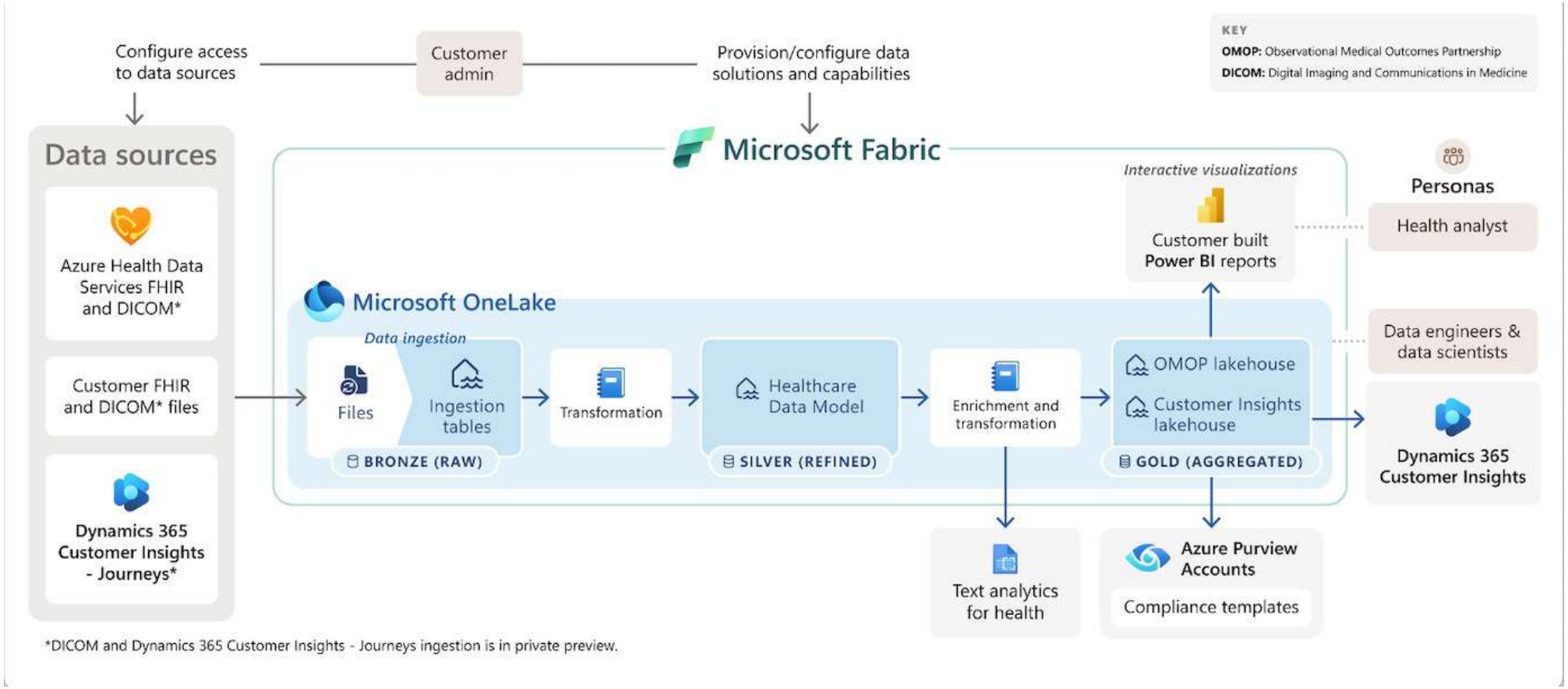
Healthcare Data Solutions in Fabric - Solution Overview



Business Outcomes

Reduce Average Length of Stay

Integration and visual automation of patient medical records results in a reduction of average length of stay by 3%

Decrease Costs by Reducing Duplication

Records duplication result in more than $20 billion US dollars in health costs annually. Through AI and smart data management solutions, decreased duplicate work by 5%

Increase Revenue Opportunities

By replacing data silos with centralized analytics-driven platform, customer increased revenue by 10%

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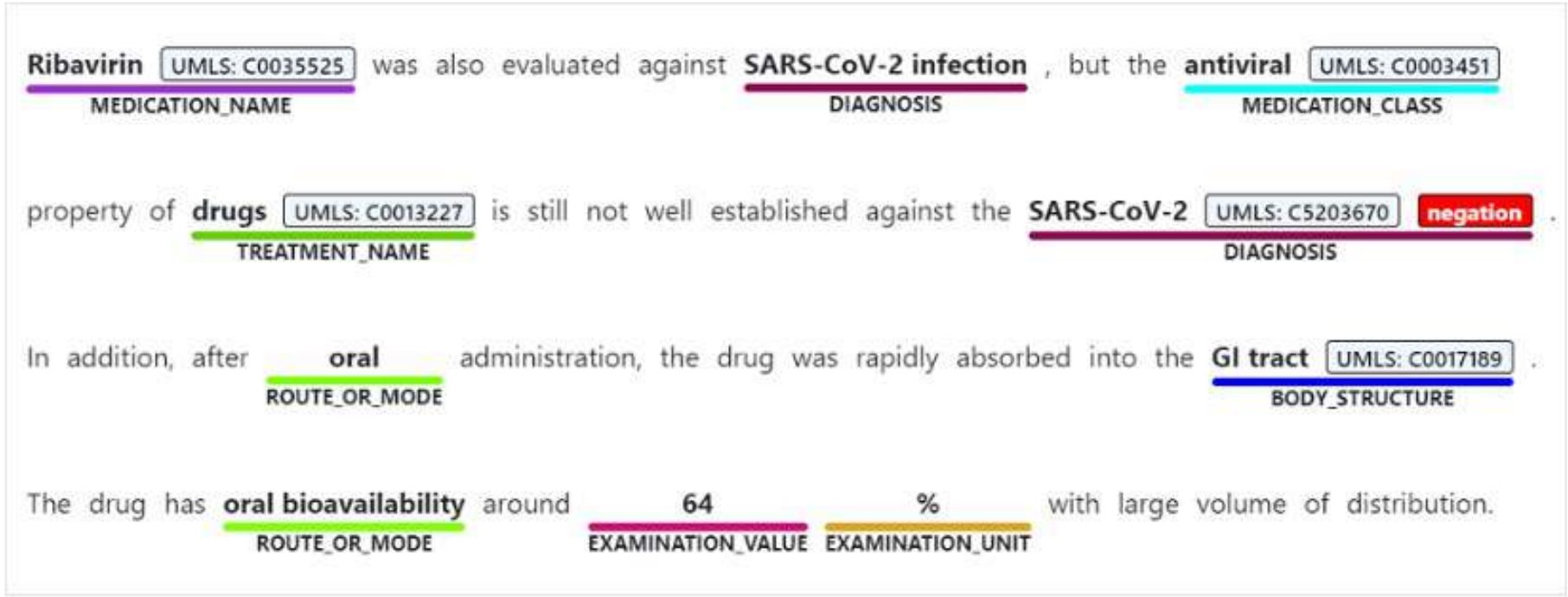
Text Analytics

Use case
Extract insights and statistics
Develop predictive models using historic data
Annotate and curate medical information
Review and report medical information
Assist with decision support



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Solution Demonstration

Microsoft Cloud for Healthcare

Providing trusting and integrated cloud capabilities to deliver better experiences, better insights, and better care

Enhance patient engagement

Deliver personalized experiences to engage patients in secure, individualized encounters through every point of care.

Empower health team collaboration

Connect, engage, and efficiently manage your healthcare workforce with tools that help them provide the best possible care.

Enhance clinician experiences

Reduce time spent documenting patient encounters and alleviate provider burnout through AI-powered solutions that drive more personal and accessible healthcare.

Improve clinical & operational insights

Leverage insights to improve patient care by connecting data from multiple sources and using predictive analytics for data modeling and identifying clinical trends.

Built on a foundation of

Security/Privacy/Compliance

Make it faster and easier to provide more efficient care and help customers support their security, compliance, and interoperability of health data.

Interoperability

Make it faster and easier to provide more efficient care and help customers support their security, compliance, and interoperability of health data.

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Care Team Collaboration

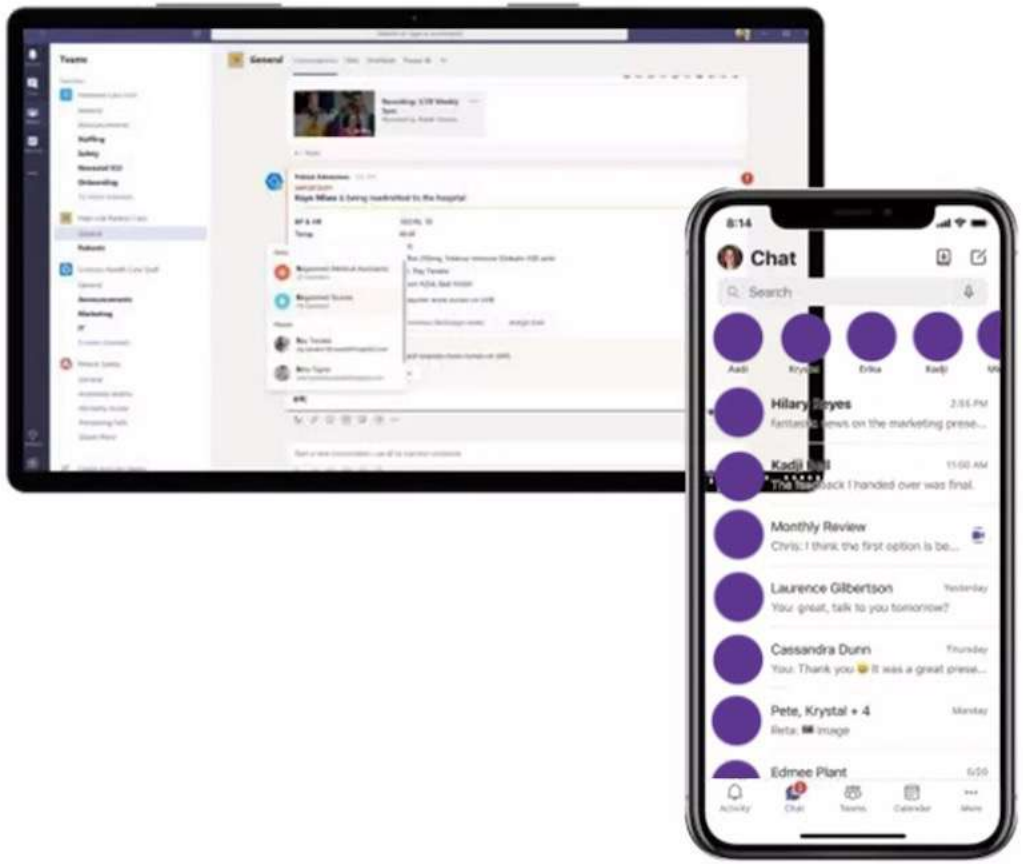
Optimize resources and solve problems collectively

Connect and engage the healthcare workforce

- Get information to the right care team member with secure messaging features such as priority notifications and message delegation in Microsoft Teams
- Capture, annotate, and share images using Smart Camera
- Keep critical, time-sensitive communication one-click away with Walkie Talkie

Efficiently manage and motivate your workforce

- Empower your workforce with self-service tools to manage their schedule, submit time-off requests, and clock in and out using Shifts
- Use Microsoft Planner and To-Do to manage tasks, oversee progress, and streamline approvals
- manage data collection, like pre-appointment questionnaires for patients, easily using Chatbots and Microsoft Forms
- Create and automate workflows to ensure consistency and reduce burden across your workflows with Power Apps and Power Automate
- Supply your frontline workforce with lightweight, healthcare-ready Microsoft Surface devices that are as versatile as the demands of the job



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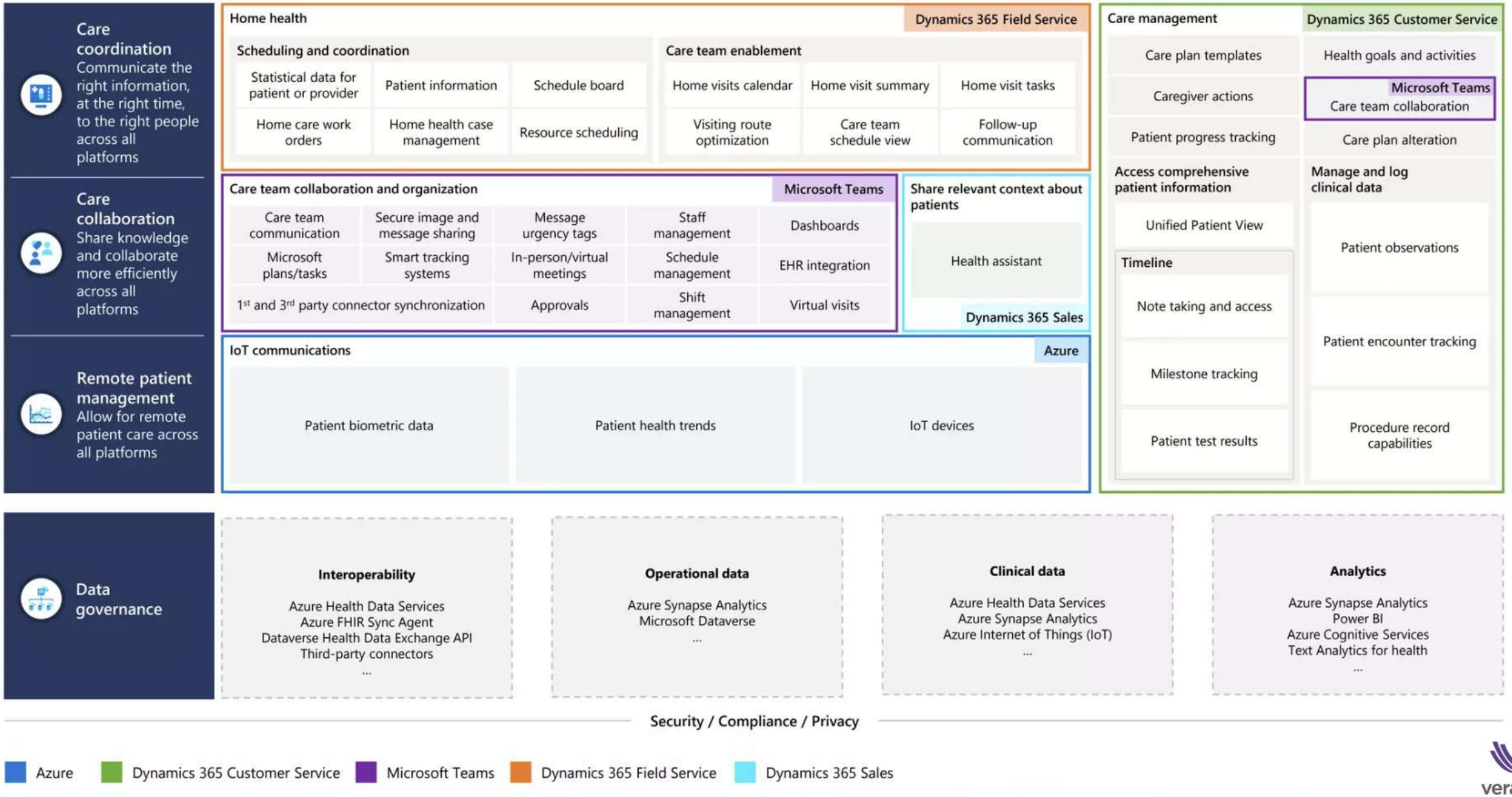
Empower Health Team Collaboration



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Remote Patient Monitoring

Enables the transfer and integration of remote device and sensor data to support care team management

IoT Devices

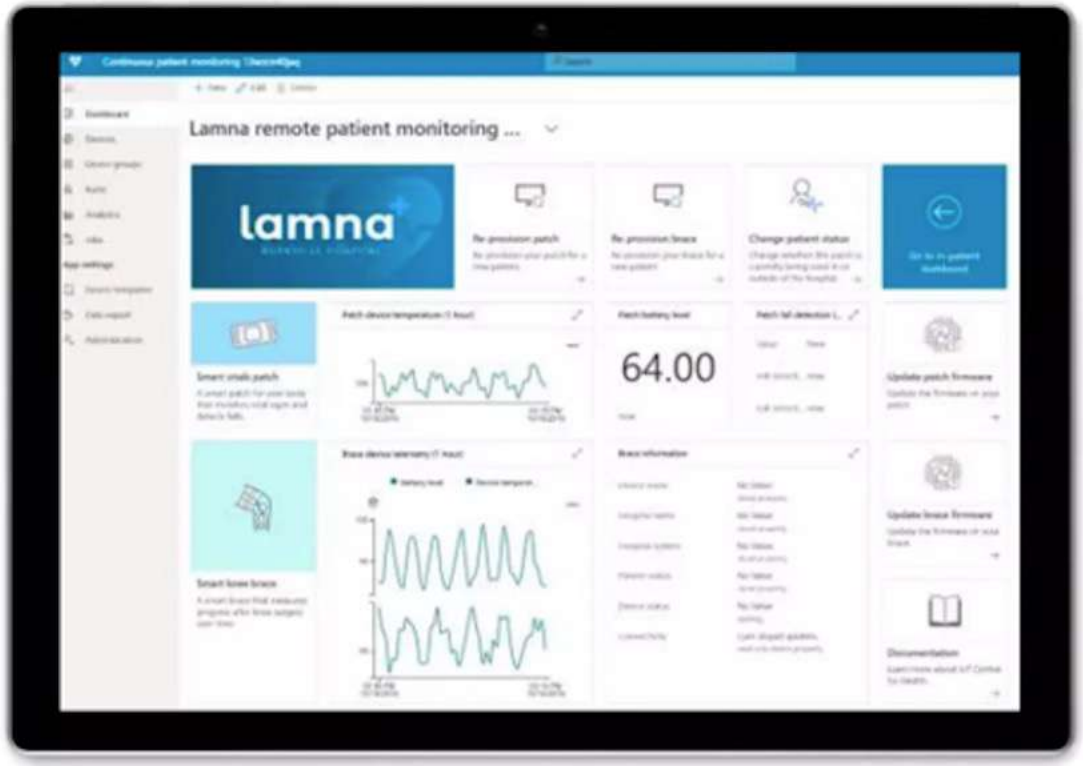
Ingest real-time information from wearables and IoMT devices using **Azure IoT** to track patient conditions remotely and engage as needed to promote effective recovery.

Custom Dashboards

Use your data to build a patient insights dashboards in **Power BI** or integrate it directly into an electronic medical record used by care teams.

Virtual Visits and Consults

Conduct patient virtual visits or provider virtual consults through **Microsoft Teams** and **Microsoft Bookings.**



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Continuous Patient Monitoring

1. Medical devices sending BLE data
2. Mobile phone or tablet gateway receiving BLE data and sending to IoT Central
3. Continuous data export of patient health data through IoMT FHIR Connector to Azure into the Azure API for FHIR compliant endpoint
4. Machine learning based on interoperable FHIR data
5. Care team dashboard built on FHIR data for patient monitoring

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Challenge

Finding new ways to adapt to staffing shortages and keeping high-risk patient safer, while maintaining consistent, high-quality care.

Solution

From clinical huddling and virtual visits with patients to an innovative new "tele-sitters" program to keep high-risk patients safer, Teams has become an integral part of how St. Luke's delivers patient care through its healthcare workforce on the frontline.

Virtual Visits and Consults

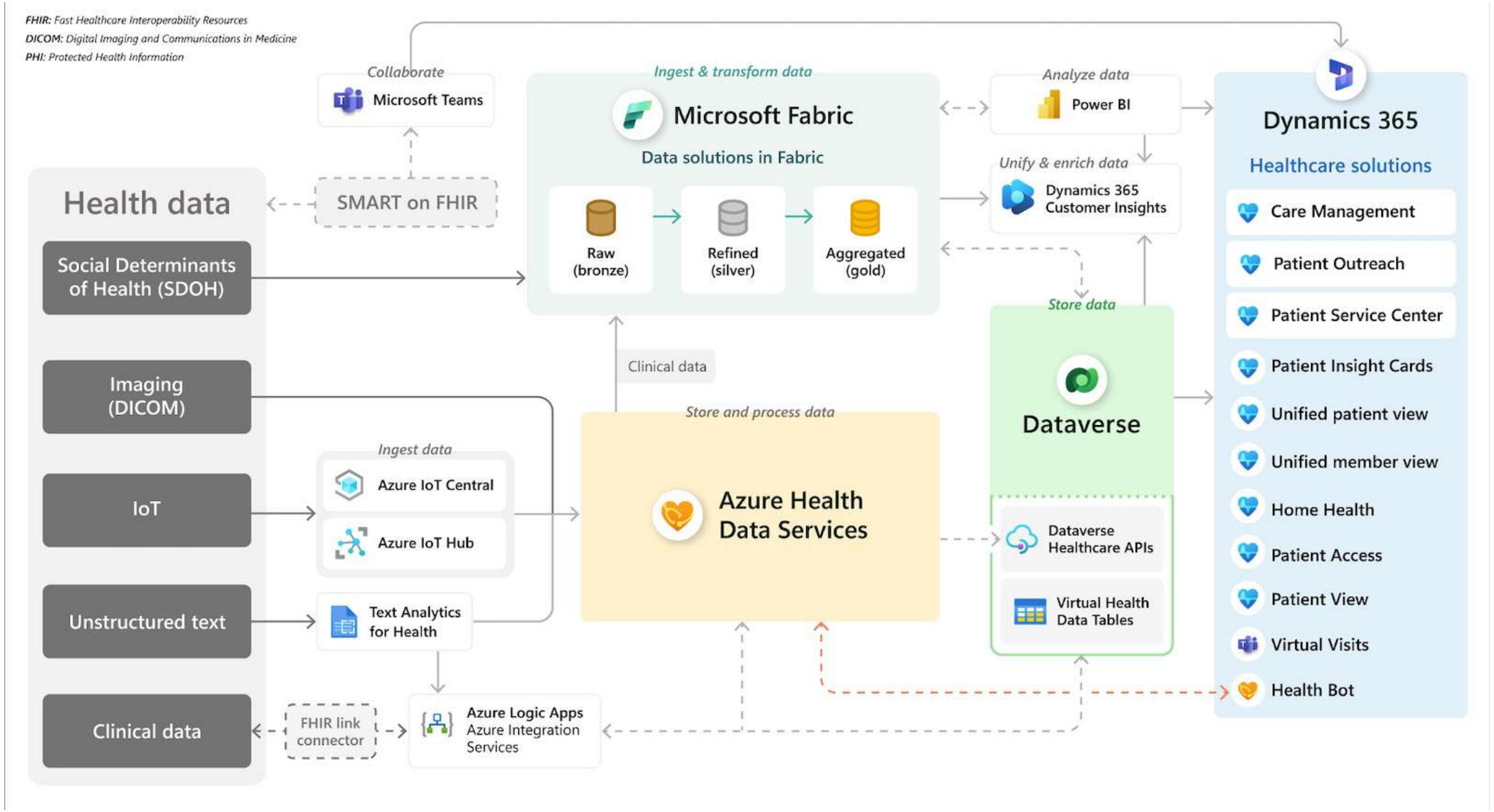
- Doctors use devices equipped with Teams to add calling capabilities to their clinical messaging application.
- For patient checkups, doctors use Teams to connect with patients in their rooms without the need for time-consuming travel to and from facilities or costly solutions installed in individual rooms.
- Microsoft Teams supports St. Luke's tele-sitters program, helping employees monitor high-risk patients remotely and effectively. The use of Teams for our tele-sitters initiative helped adapt to a staffing shortage and continue providing consistent quality of care.

"We use Microsoft Bookings in Teams to schedule checkups with patients.... Connecting this way saves our doctors valuable time and helps ensure that patients still enjoy exceptional care."

Chad Brisendine
Vice President and Chief Information Officer
St. Luke's University Health Network

Microsoft Cloud for Healthcare

End-to-end Workloads with FHIR-based PHI Store



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How can we help?

Business Outcome Strategy Workshop & Roadmap

Understand the complexities and best practices to get you where you want to be. A complimentary 2-hour advisory session to assess your current state and provide the guidance you need.

Improve Clinical & Operational Outcomes

Enhance Patient Engagement

Accelerate Scientific Innovation

First steps in the right direction

Leverage Veraqor's advanced specialization of Data and AI specifically build to transform life sciences operations. Pick one of the following ways to sign up:

1. Drop your contact info in the chat box
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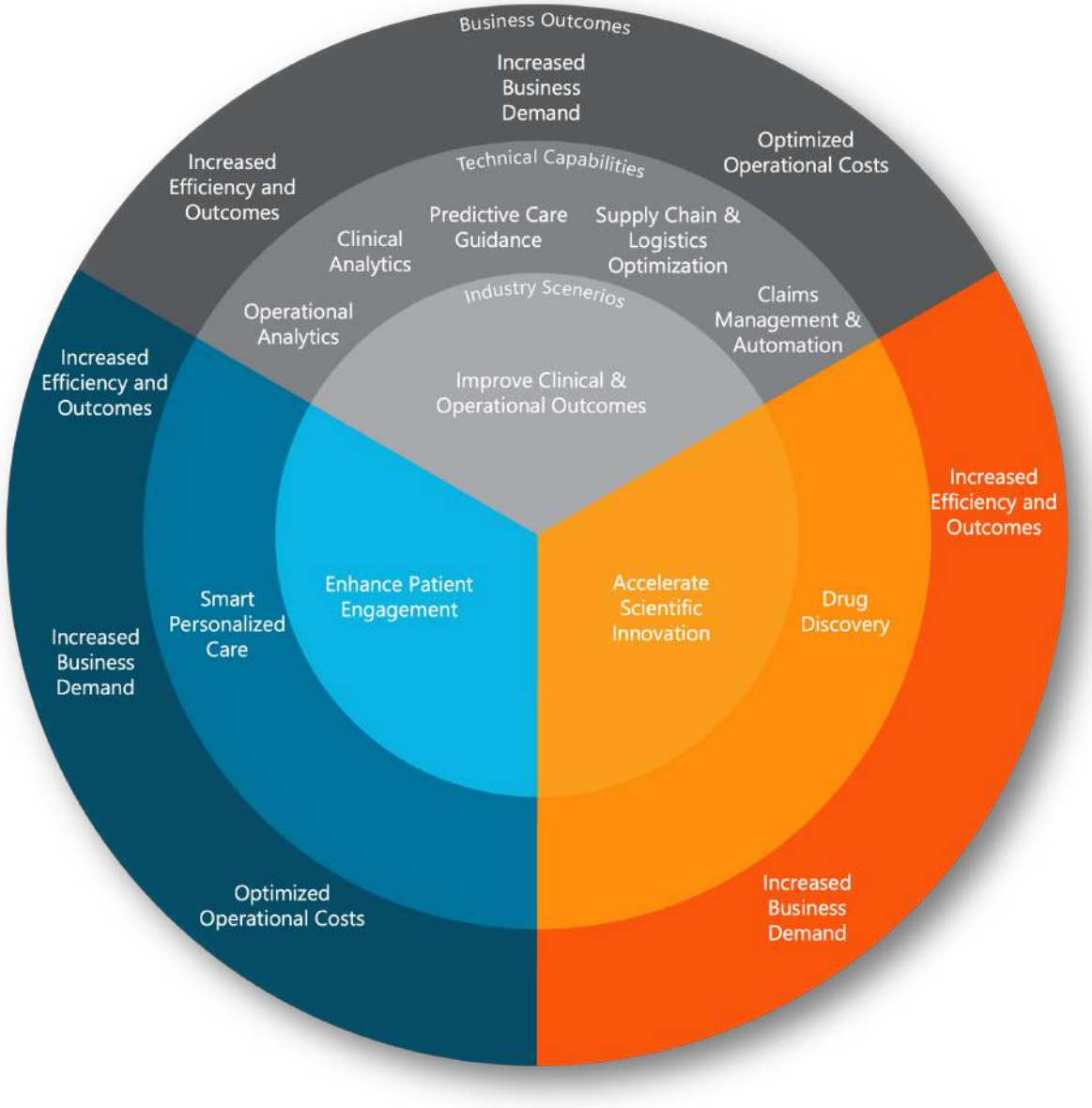
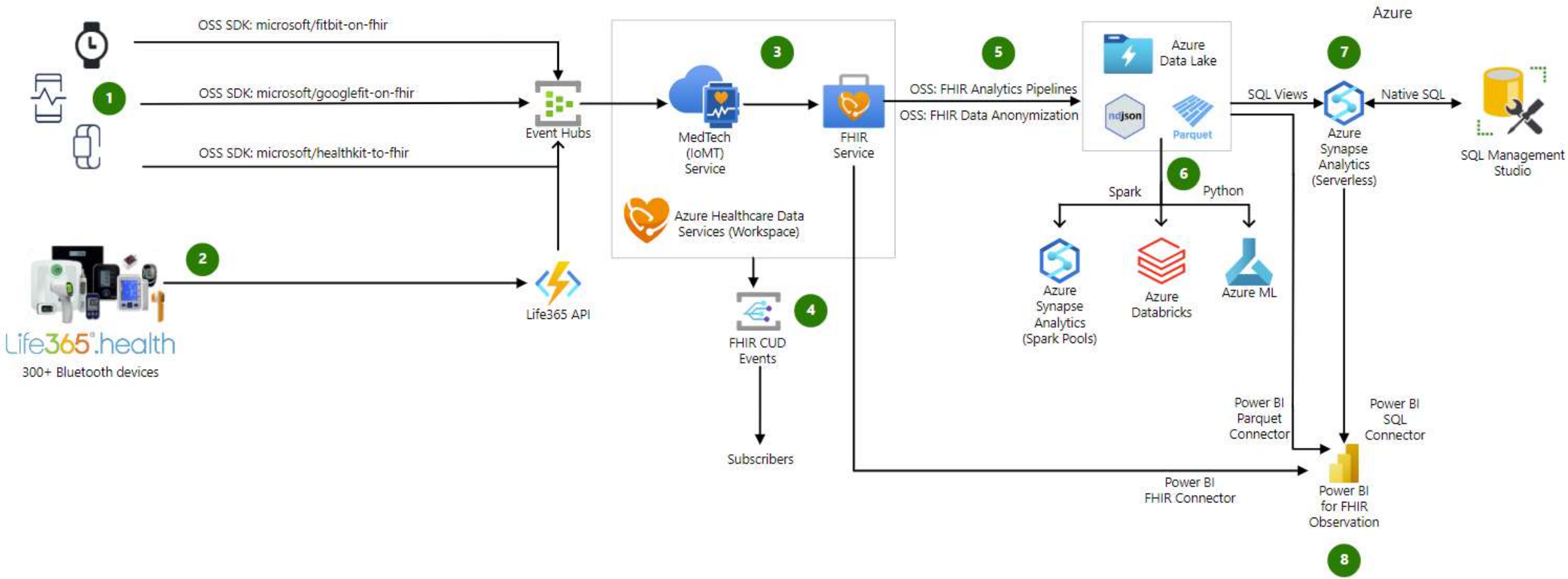
Key Areas of Impact



THANK YOU!

Get in touch with us at

mtu@veraqor.io
info@qdsnet.com


Azure
OSS SDK: microsoft/fitbit-on-fhir
OSS SDK: microsoft/googlefit-on-fhir
OSS SDK: microsoft/healthkit-to-fhir
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3
4
5
6
7
8
Event Hubs
Life365 API
MedTech (IoMT) Service
FHIR Service
Azure Healthcare Data Services (Workspace)
FHIR CUD Events
Subscribers
OSS: FHIR Analytics Pipelines
OSS: FHIR Data Anonymization
Azure Data Lake
ndjson
Parquet
Spark
Python
Azure Synapse Analytics (Spark Pools)
Azure Databricks
Azure ML
SQL Views
Native SQL
Azure Synapse Analytics (Serverless)
SQL Management Studio
Power BI Parquet Connector
Power BI SQL Connector
Power BI FHIR Connector
Power BI for FHIR Observation
Life365°.health
300+ Bluetooth devices

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Priority Use Case: Continuous Patient Monitoring

Enhance Patient Engagement

Customer Audience

Chief Medical Officer, Chief Digital Officer, Chief Science Officer

Overview

- Continuous patient monitoring is the use of digital technologies to continually monitor a person's health and offer care when required. Sensors, wearables, mobile devices and other healthcare equipment record patient data and communicate it to the doctors and physicians.
- Providers want to expand their portfolio of services to broaden access to care and strengthen long-term relationships with patients by delivering intelligent & connected care solutions.
- These capabilities are uniquely helpful for treatment and care during COVID-19 since it allows clinicians to monitor patients through IoT-enabled devices and RT analytics.
- Data from wearable health devices empowers organizations with valuable new insights that drive improved patient outcomes, more comprehensive care plans, and better, more effective treatments.

Why It Matters

- Lower treatment costs, especially for patients who require care for longer periods of time
- Increase operational efficiencies by reducing emergency department occupancy
- Lower hospital readmissions by helping providers to assess the patient's care requirements early
- Optimize patient health by modifying care plans that are informed by analytics and patient health insights

OUTCOME + EVIDENCE

+x%

Insert your own customer evidence with meaningful business results driven by this use case

KEY ASSETS

Healthcare DREAM Demo

Healthcare DREAM Demo in a Box

OUR OFFER

Insert your own Solution/Offer for Use Case

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Priority Use Case: Smart Personalized Care

Enhance Patient Engagement

TRANSFORMATION

Service patients in real-time, any time, on any device & through any digital channel with AI

SOLUTION

Employ natural language as the primary user interface and personalize the experience to fully engage customers

OUTCOMES

Patients experience satisfying service that is fast, helpful and always available to them anywhere

Customer Audience

Chief Physician, Hospital Director, Patient Services Director, Chief Digital Officer

Organizational Challenge/Pain Points

- Emergency call lines are backed up with large volumes of patient inquiries and screening requests
- Medical facilities, staff and resources are being tied up responding to inquiries and are challenged with less time to provide critical patient care
- Public access to information is limited and not standardized resulting in potential for misinformation

Approach

- Deploy the Microsoft Healthcare Bot, which understands spoken/written medical language (though ML based language understanding service), and can interact with patients to perform tasks like screening and checking symptoms
- Healthcare knowledge is ingested via the Azure API for FHIR (Fast Healthcare Interoperability Resources, FHIR®) from both internal and external data sources
- Transcription of the interaction can be used to re-train the health bot to further improve value over time
- Health provider can review analytics of the bot using PowerBI

OUTCOME + EVIDENCE

+X% **Defined outcome** seen by X as a result of instantaneous service provided by sales assistant bot

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Solution Accelerator: **Virtual Assistant Deployer**

To-Customer **Campaign Guide and Assets**

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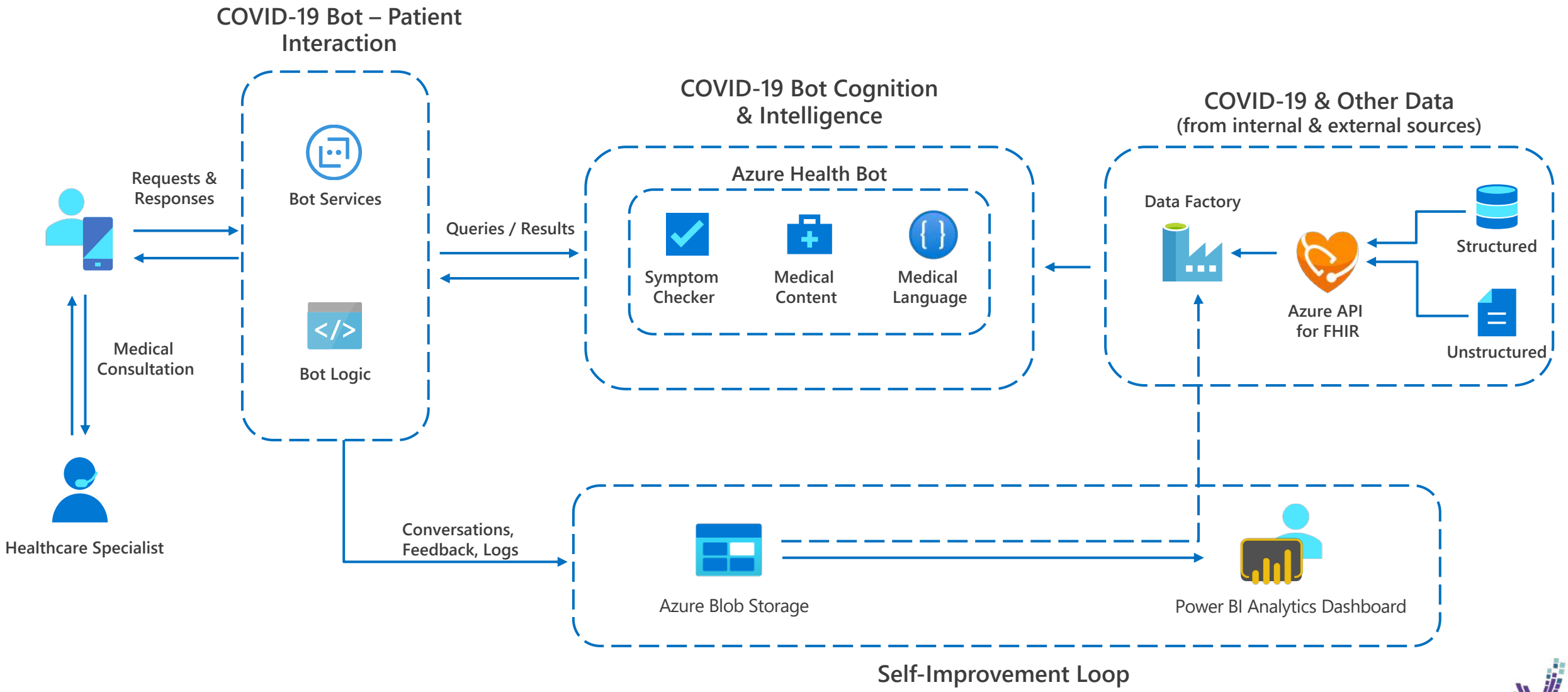
Smart Personalized Care Technical Overview

Help screen patients for potential COVID-19 infection and care

Enhance Patient Engagement



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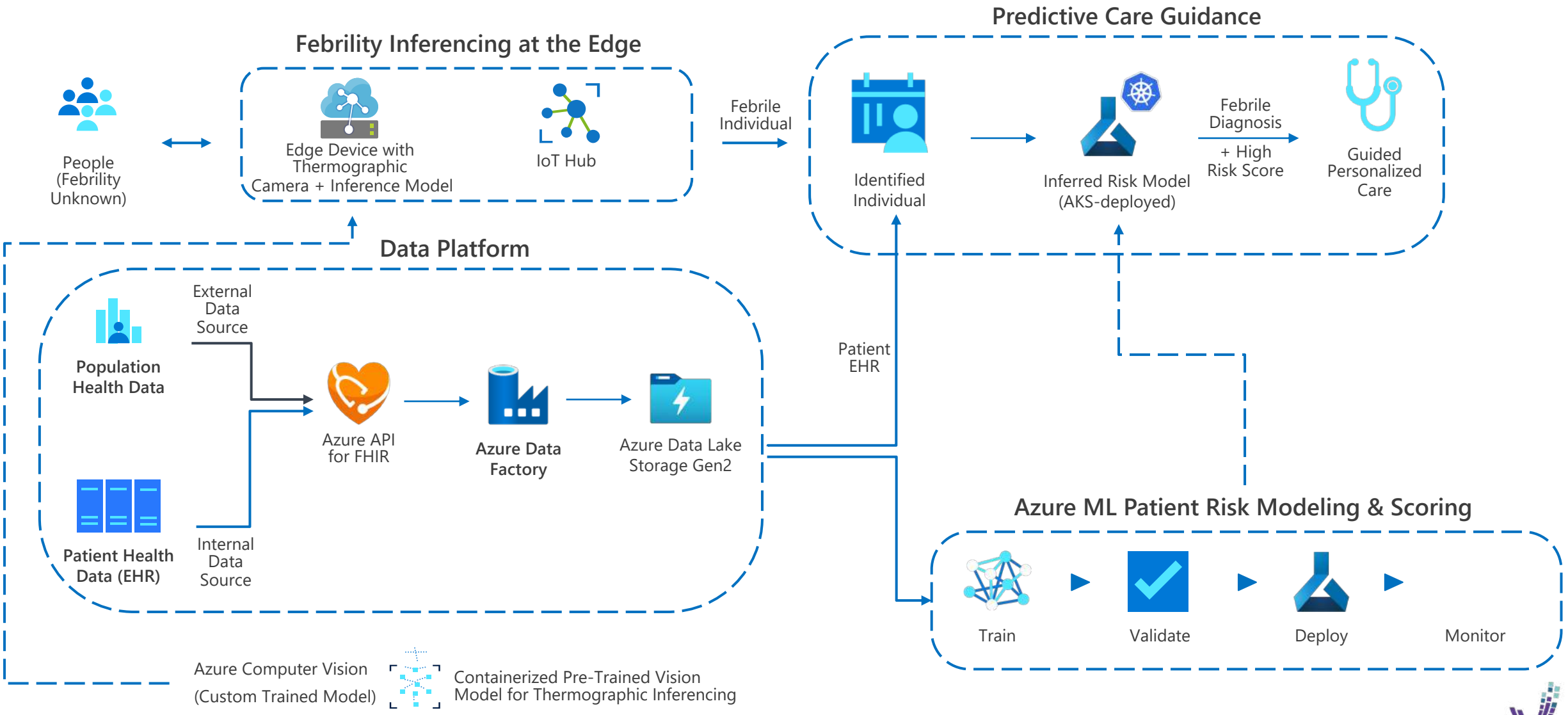
Predictive Care Guidance Technical Overview

Accelerate & ensure quality diagnostics for improved health, safety & lower costs

Enhance Patient Engagement



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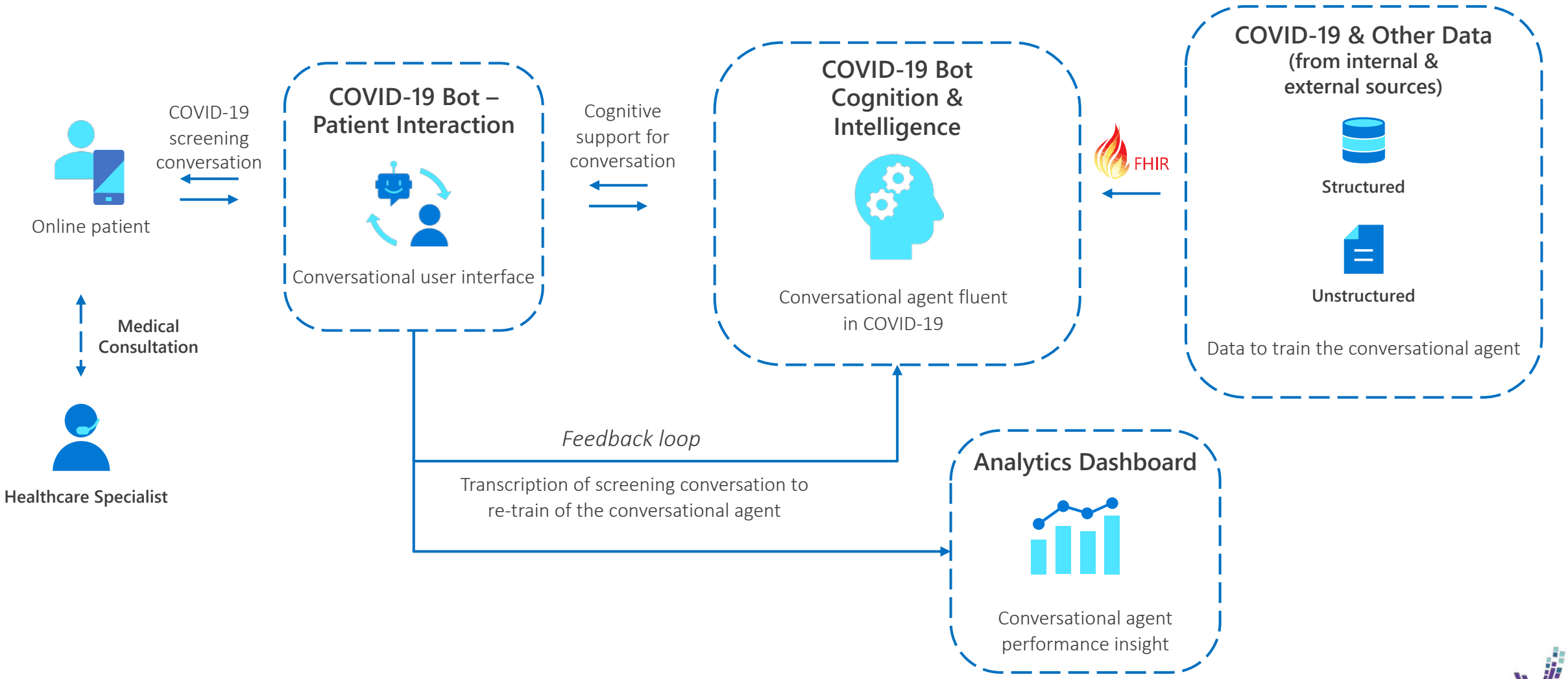

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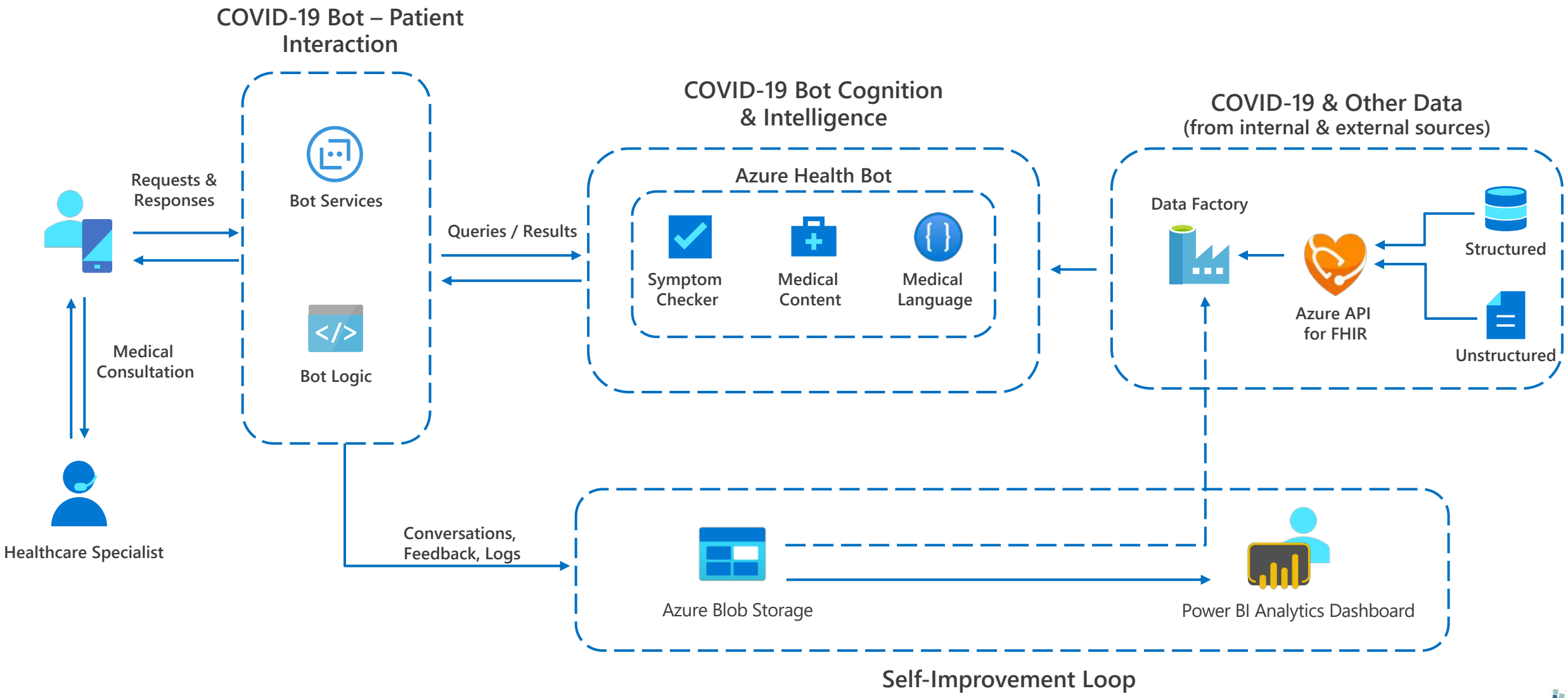

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Industry Priority Scenario: Enhance Patient Engagement

Data and AI Priority Use Case: Continuous Patient Monitoring

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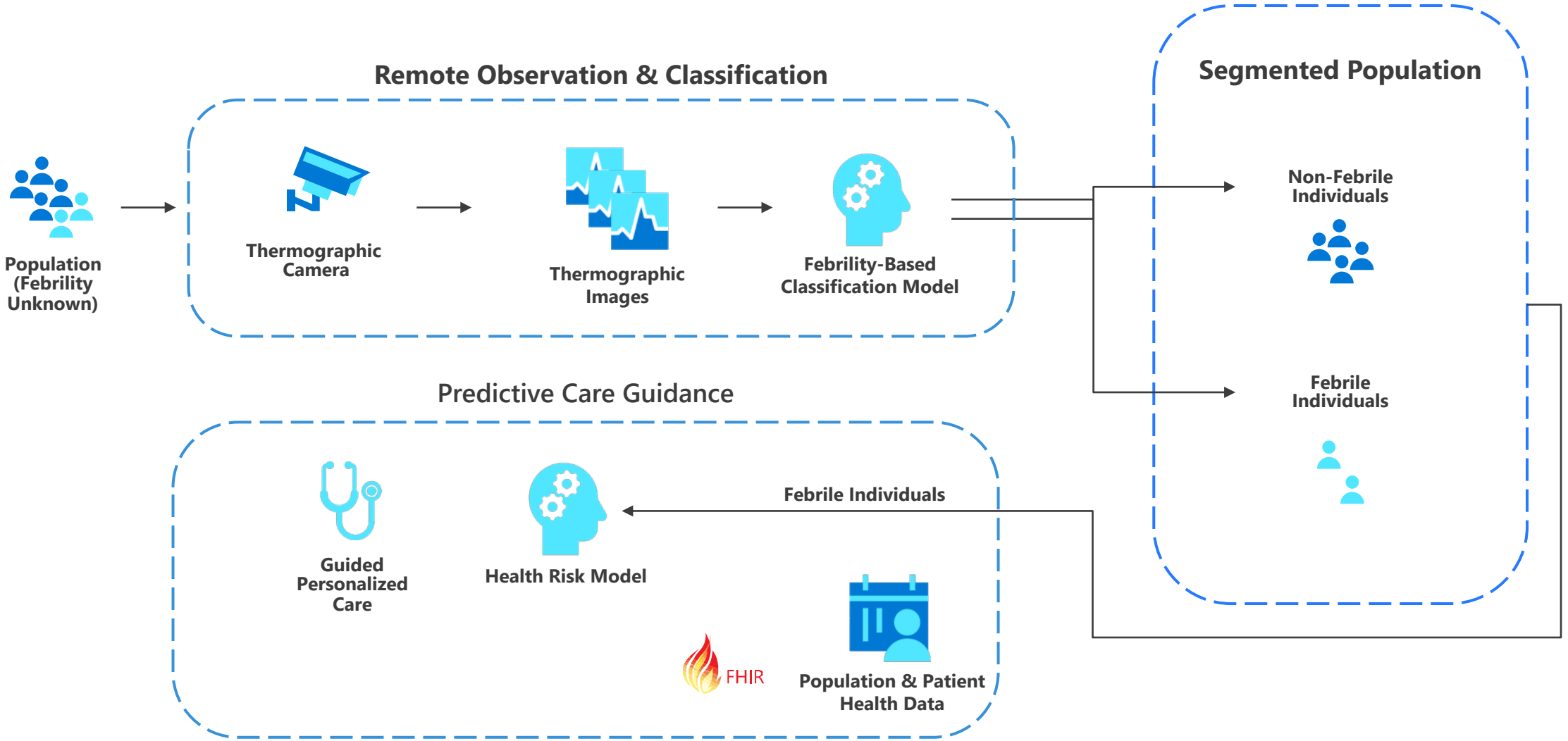

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Microsoft Cloud for Healthcare

Future Proof your healthcare solutions by investing in an enterprise-level platform

Clinician

Care Manager

Engagement Coordinator

External Caregiver

Social Worker

Call Center Agent

Quality Director

Home Health Nurse

Your healthcare organization

Partner ecosystem

The Microsoft platform

Microsoft Business Applications

Engagement | Advanced analytics | Productivity | Collaboration

Healthcare Common Data Model

Azure

Interoperability | AI/ML | Security and compliance | IoT Capabilities

Your existing data sources

Consumer-generated data | Claims data | Clinical data | IoMT data | Social determinants

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Microsoft Cloud for Healthcare

Better experiences, better insights, better care

Enhance patient engagement

Enabling enriched data to flow securely through every point of care to continuously improve patient's experience and health outcomes

Empower health team collaboration

Enabling enriched data to flow securely through every point of care to continuously improve patient's experience and health outcomes

Improve clinical and operational insights

Enabling enriched data to flow securely through every point of care to continuously improve patient's experience and health outcomes

Protect health information

Protecting sensitive health data to support privacy and effective security end-to-end, manage compliance and evolving regulatory changes, and improve data governance and trust on a continuous basis

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Blueprint for building the future of healthcare

Putting the healthcare consumer in control of their own wellness.

STEP 1: Aggregate

Systems of Record

Traditional Healthcare Sources

EHR, Claims, Case Management, Labs, Pharmacy, Clinical Trials, HR, Supply Chain/Financial, CRM, patient portal

Ecosystem Sources

Social sources, Bio-metric, Digital Wellness & Prevention, HIE, Integrated Clinical Networks

Patient Sources

Apple Health, Google Fit, PHR, Alexa

Connected Care Sources

Patient-Reported Outcomes, Glucose Monitor, Cardiac Monitoring, Medication Adherence

STEP 2: Curate

System of Insight

Enriched Longitudinal Health Record

Unified and enriched w social source data, Consumer / Behavioral / Preferences

Analytics Platform

Develop predictive, prescriptive and AI based models

Development/Integration Platform

Low Code, Pro Dev, emerging UI, API Management

Solution Store

Personalization Engine, Behavior Change, Next Best Actions

STEP 3: Orchestrate & Iterate

System of Engagement

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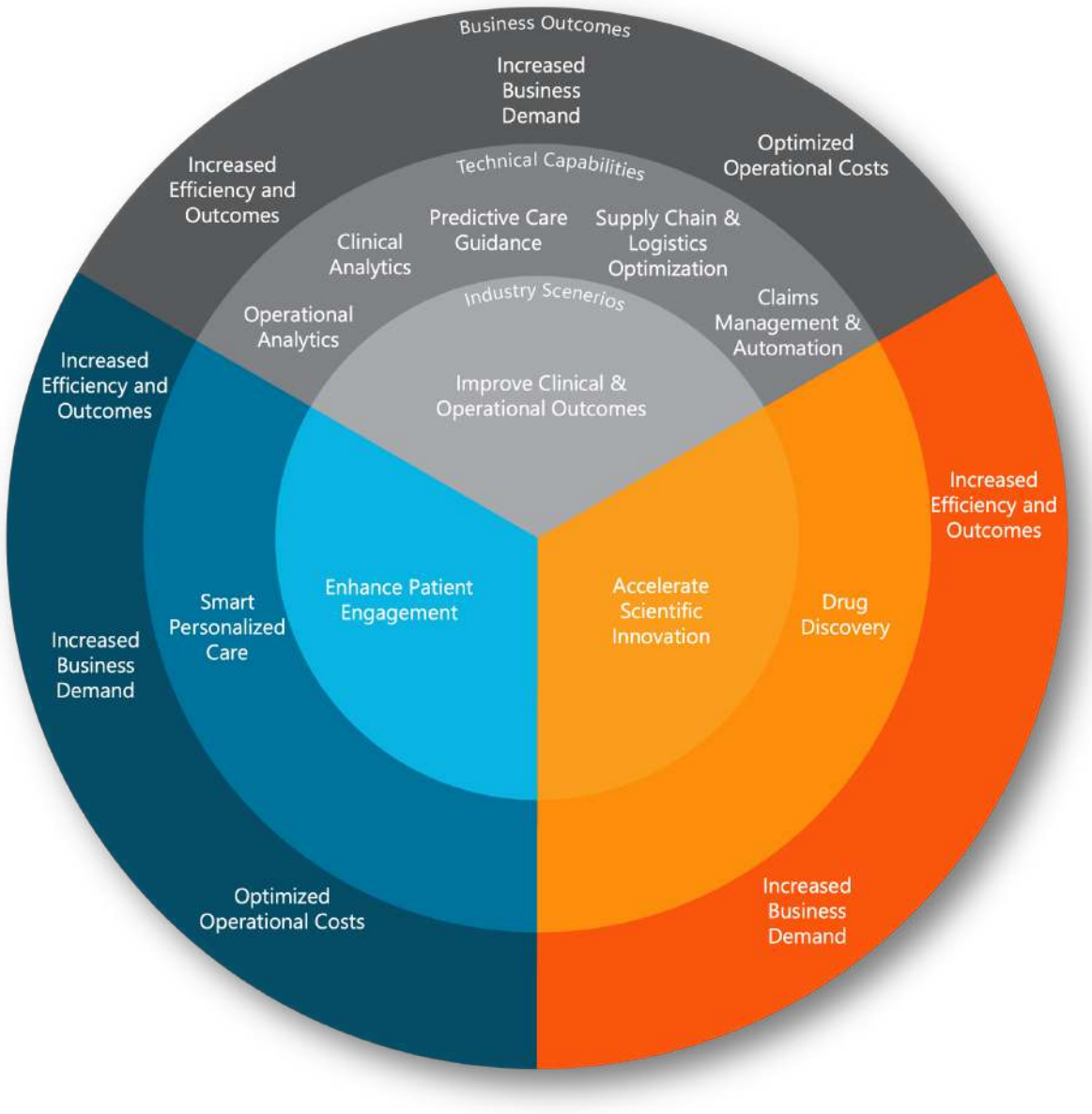
Key Areas of Impact