



Module 1

Microsoft Cloud for Healthcare Overview

March 2022



Healthcare in transition



Virtual health

76% of patients are interested in trying telehealth, and 46% are actively using it to replace cancelled visits¹



Interoperability

90% of providers' data is unstructured and largely inaccessible for data-driven decisions²



Health outcomes

Up to 70% of the time providers spend looking for insights is wasted on data ingestion and unification³



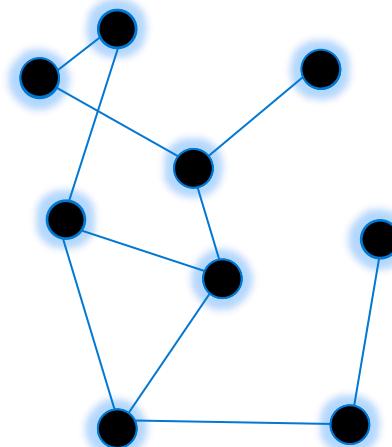
Security pressures

\$13.2 billion USD was lost to data breaches in 2020 amid growing pressures in security and compliance⁴

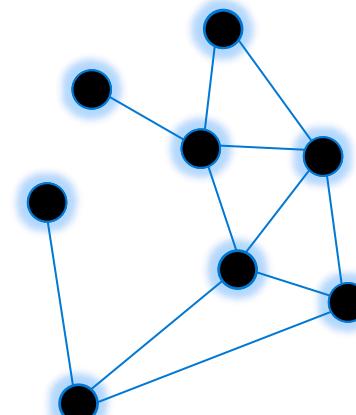


Unify your data across the healthcare organization

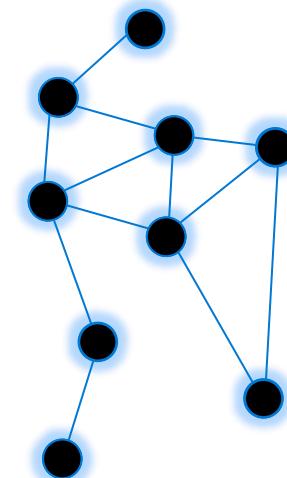
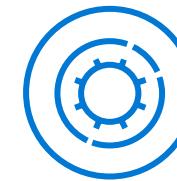
Patient
information



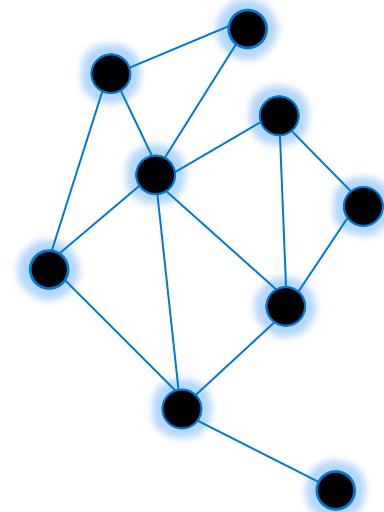
Care team
data



Operational
data



Population
health data



To overcome these challenges, healthcare organizations must harness the power of their data



The average healthcare system produces over 50 petabytes of data¹ per year across multiple siloed systems



Once integrated, data insights enhance patient care, health team efficacy, and organizational performance

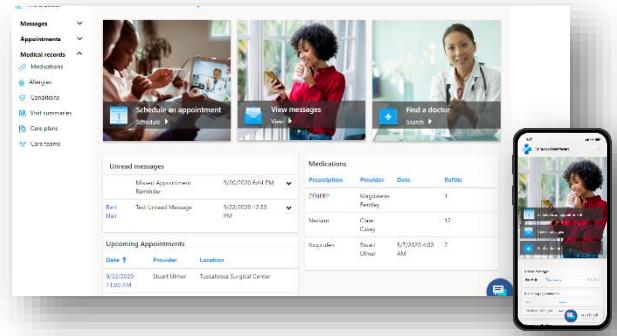
1. World Economic Forum, 2019



Through a **holistic**
approach to system
integration and
optimization

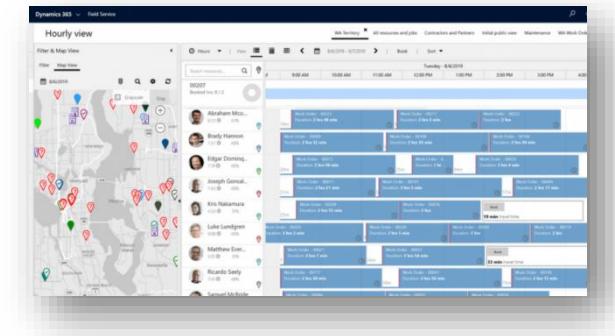
Microsoft Cloud for Healthcare

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



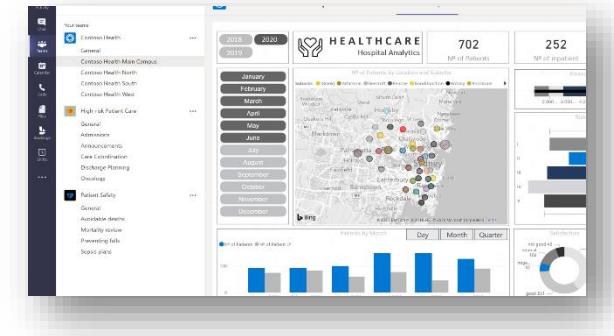
Enhance patient engagement

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



Empower health team collaboration

Accelerating health teams' ability to coordinate care in a secure environment and simplify complex workflow management



Improve clinical and operational insights

Connecting data from across systems, creating insights to predict risk and help improve patient care, quality assurance, and operational efficiencies

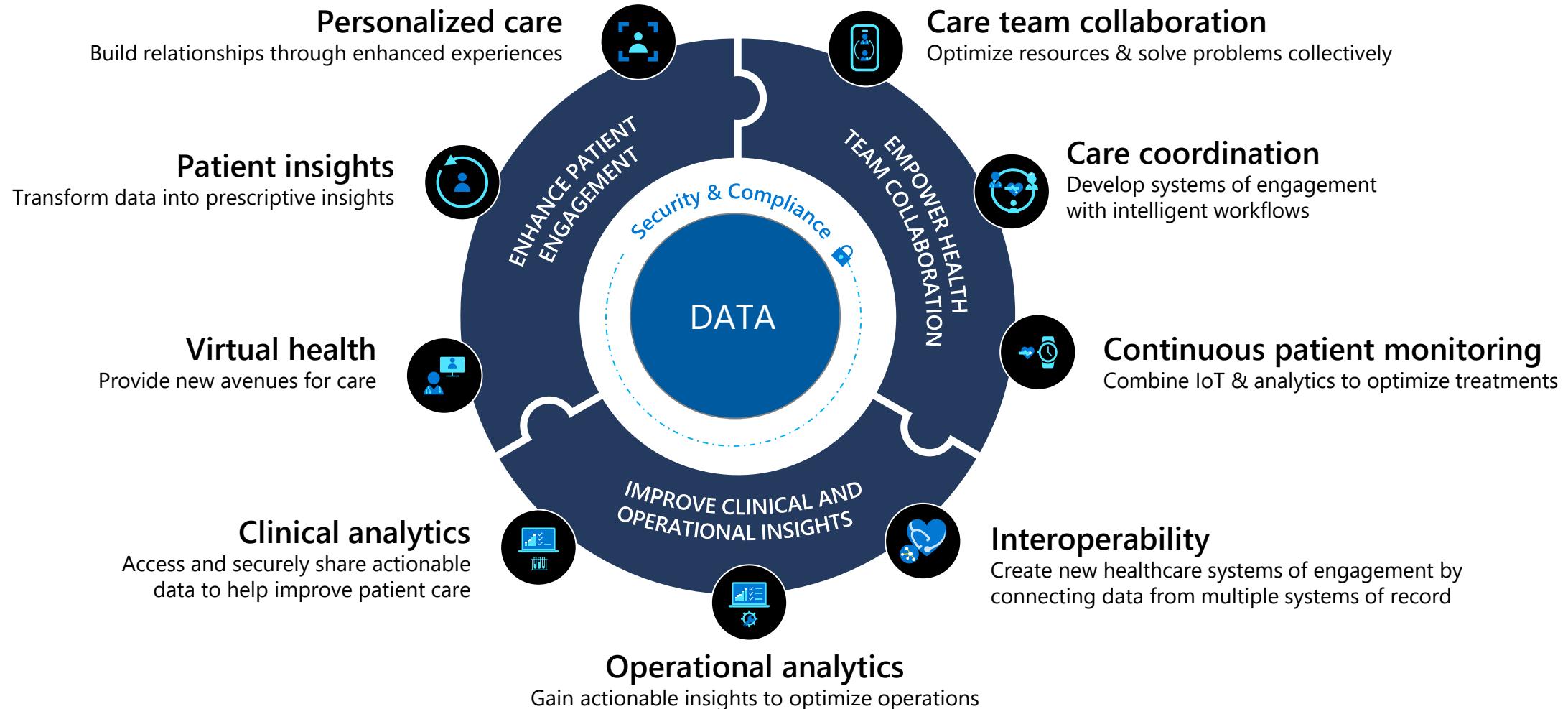


Protect health information

Protecting sensitive health data to support end-to-end security and privacy, manage evolving compliance regulations, and continually improve data governance and trust

Microsoft Cloud for Healthcare

Capabilities enabling better experiences, better insights, better care



Microsoft Cloud for Healthcare - Conceptual Architecture

Connected, highly-integrated healthcare platform

Trusted + global scale + security commitment

Complete, enterprise-ready, end-to-end workflow

Partner ecosystem

Enhance patient engagement

Personalized care

Patient insights

Virtual health

Empower health team collaboration

Care team collaboration

Care coordination

Continuous patient monitoring

Improve clinical and operational insights

Data interoperability

Clinical analytics

Operational analytics

Microsoft Cloud for Healthcare Add-On components

(e.g. Templates and workflows, configurations, apps, connectors, and services)



Ingest, enrich, and convert with FHIR, DICOM, and IoMT

(Azure API for FHIR and other connectors)

Your existing health data sources and systems

(e.g. Medical imaging, IoMT, HL7 CCDA, CRM, financial, -omics, third-party data, EMR)

Protected health information (PHI)

Compliance
(e.g. HIPAA, HITRUST, GDPR)

Enhance patient engagement

Develop personalized experiences and interactions that empower patients to take more control over their health.

Enhance patient engagement



Personalized Care



Patient Insights



Virtual Health

Increase patient engagement by encouraging more active participation through personalized experiences

Drive better health outcomes by establishing a 360-degree view of each patient to create tailored care plans

Expand care access and offerings by enabling secure, compliant virtual consultations with chat, video, or voice



Enhance patient engagement

Develop personalized experiences and interactions that empower patients to take more control over their health.

Scenario	Capabilities	Features
Enhance patient engagement	 Personalized Care  Patient Insights  Virtual Health	 Patient Outreach  Patient Access  Patient Service Center  Azure Health Bot

Patient Outreach

Streamline and tailor patient outreach leveraging pre-built segments and healthcare-specific event templates.



Feature Functionality

Patient Experiences

Patient Insights

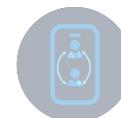
Patient Segmentation

Patient Journey Automation

Patient Campaign Management

Event Management

The screenshot shows the Dynamics 365 Patient Outreach interface. At the top, there's a navigation bar with 'Dynamics 365', 'Patient Outreach', and 'Get started'. Below it is a sidebar with 'My Work' and 'Patient Outreach' sections. The main area is titled 'Sandbox' and features a 'Welcome, EY' message: 'Turn prospects into business relationships'. It includes three cards: 'Create engaging emails' (with a 'Design email' button), 'Pinpoint your audience' (with a 'Create segment' button), and 'Build an automated campaign' (with a 'Create journey' button). There are also 'Learn more' links for building rich pages and forms, setting up events, creating journeys, and setting up lead generation. On the right, there's a 'Quota information' section showing 'Emails sent: 0 / 1,022,000' and 'Contacts reached: 84 / 122,000', along with a 'Litmus email previews remaining: 1,300'. At the bottom, there are buttons for 'See what's new and what's next', 'Ask questions to the community', and 'Share your thoughts and ideas'.



Patient Access

Give patients omnichannel access to services like scheduling, messaging, and health bot via an intuitive patient portal.



Feature Functionality

Patient Portal

Access to Medical Records

Patient Self-Scheduling

Secure Patient Messaging

Patient Triage with Health Bot

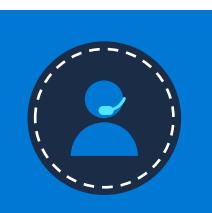
Physicians Directory

The image shows a screenshot of the Contoso Healthcare patient portal. At the top, there's a navigation bar with the Contoso Healthcare logo and a dropdown for 'Kelsey Miranda'. Below the navigation is a 'Welcome Kelsey Miranda' message. The main content area has several sections: 'Schedule an appointment' (with a link), 'View messages' (with a link), 'Unread messages' (empty), and 'Upcoming appointments' (empty). To the right, a hand holds a smartphone displaying a mobile version of the same portal, showing a step-by-step appointment scheduling process and a 'Refills' section. The background of the main screen features images of a child using a tablet, a woman on a phone, and a doctor in a consultation.



Patient Service Center

Engage effectively with patients using built-in guidance while managing interactions and communications.



Feature Functionality

Conduct Patient Conversations

Get Patient 360 Information

Agent Scripts with Smart Assist

Knowledge Article Coaching

Monitor Sentiment Analysis

Patient Satisfaction Survey

The screenshot displays the Dynamics 365 Patient Coordination interface. On the left, a transcript shows a conversation between a customer (Doogie Howser) and a nurse (Sophia Adne). The customer asks about fevers, and the nurse responds with 'Yes'. The customer then asks about medications, and the nurse says 'Escalating to an agent, please wait...'. On the right, a 'Sandbox' view of a patient record for Sophia Adne is shown, including contact information, relationships, and a timeline. A hand is holding a smartphone in the foreground, displaying a patient satisfaction survey with questions like '3. Do you live with anyone who is currently feeling ill or shows signs of illness?' and '4. Anything about your health you'd like to share?'. The survey includes 'Yes' and 'No' radio buttons and an 'Enter your answer' text field with a 'Submit' button.



Azure Health Bot

Provide a self-service engagement channel by building chatbots from templates with built-in and custom scenarios.



Feature Functionality

Built-in Conversations



Scenario Templates



Custom Scenarios



Authored Cards

Language Model Extensibility

Escalate to Call Center

The screenshot shows the Azure Health Bot Service interface. On the left, there's a sidebar with options like Scenarios, Language, Models (selected), Configuration, Integration, Analytics, Users, and Resources. Under Models, the 'Language models' section is active, with a sub-section titled 'Medical information requests'. It lists various intents with their corresponding URLs: ConditionInformation, ConditionSymptoms, ConditionCauses, ConditionComplications, ConditionResources, ConditionDoctorSpecialties, Medical complaints (Triage), Drugs and medications (DrugInformation), Greetings (greeting), Help (help), View terms (terms), Privacy queries (need_to_know), View personal data (user_info), Delete all data (forget_me), Feedback (feedback), View conversation history (log), and Escalate. On the right, a hand holds a smartphone displaying a Microsoft Health chatbot. The screen shows a welcome message, a user's name (Douglas Hawser), and a message about having issues with COPD. Below this, there are buttons for Symptoms, Causes, Complications, and More resources. A detailed description of COPD is shown at the bottom.



Empower health team collaboration

Accelerate health teams' ability to coordinate care in a secure environment and simplify complex workflow management.

Empower
health team
collaboration



Care Team Collaboration



Care Coordination



Continuous Monitoring

Enable **secure collaboration and messaging** across the organization – from housekeeping to billing – from a single, highly configurable platform

Enable **effective care management, scheduling, and resource optimization** by empowering care team members with the right operational tools

Optimize patient treatments from anywhere, anytime by unlocking the power of IoT and analytics to monitor health



Empower health team collaboration

Accelerate health teams' ability to coordinate care in a secure environment and simplify complex workflow management.

Scenario	Capabilities	Features
Empower health team collaboration	 Care Team Collaboration  Care Coordination  Continuous Monitoring	 Care Management  Care Team Member  Home Health  Virtual Clinic

Care Management

Manage Care Plans and Care Teams



Feature Functionality

Holistic Patient Information

Care Plan Management

Care Team Management

Care Team Support

Patient Health Timeline

Health Analytics



Dynamics 365 | Care Management

SANDBOX

RF Reed Flores
Contact · Patient

MRN0708-4361
Medical Record Number | 423-555-0100
Business Phone | Reed.Flores@contoso.com
SYSTEM Owner

Home Recent Pinned

Administration

- Health Analytics
- People
- Organizations
- Locations

Care Management

- Care Plans
- Care Plan Activities
- Care Plan Goals

Clinical Data

- Observations
- Encounters
- Procedures
- Appointments

Assigned Care Plans All Time: 8

Activities Complete New and Existing Care Plans: 13%

Goals Complete New and Existing Care Plans: 0%

CARE PLANS

Filter By: Active

Reed Flores - Care Plan - for MRN6167-4 Care Team Members	Reed Flores - Care Plan - for MRN4313-4 Care Team Members	Reed Flores - Care Plan - for MRN8130-4 Care Team Members
KC RR AJ TS	KC RR AJ TS	KC RR AJ TS
Last Modified: 12/1/2020 4:44 AM	Last Modified: 12/1/2020 4:44 AM	Last Modified: 12/1/2020 4:44 AM
Cancel Pause Complete	Cancel Pause Complete	Cancel Pause Complete

Save



Care Team Member

Care Team view that provides a complete picture of all people collaborating to provide the best care for the patient.



Feature Functionality

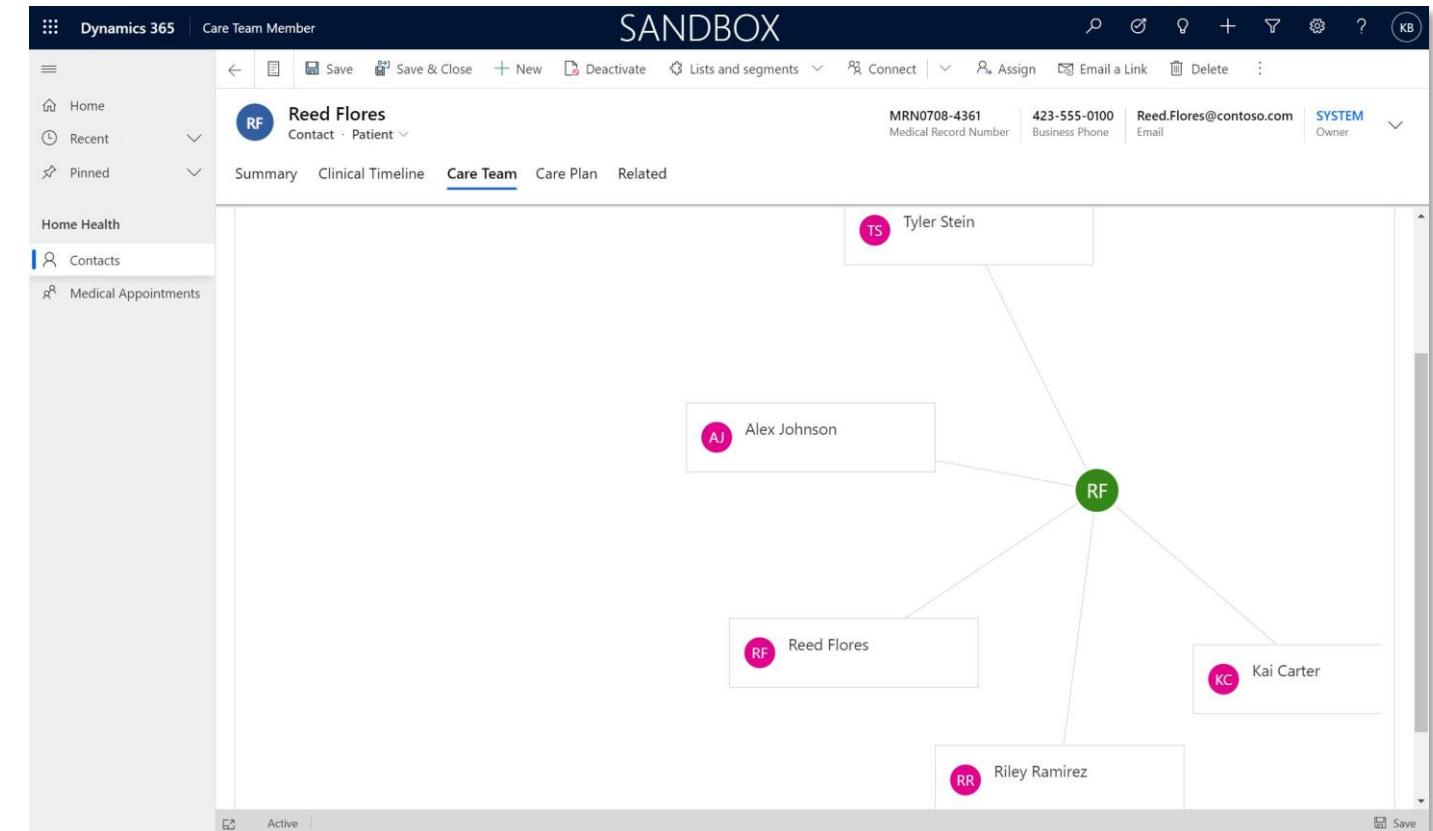
Holistic Patient Information

Home & Virtual Patient Care

Care Team Collaboration

Patient Health Timeline

Health Analytics



Home Health

Streamline home care with resource management and route optimization tools.



Feature Functionality

Scheduled Home Visit

Home Patient Care

Home Care Management

Visit Tracking Notifications

Provider Schedule Management

Scheduling Optimization



Virtual Clinic

Utilize video conferencing to provide high-quality, personalized, and affordable consultations.



Feature Functionality

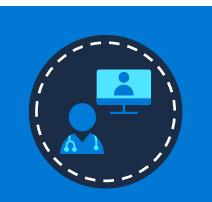
Scheduled/Instant Virtual Appts



Virtual Clinic Dashboards



Video Calls via Microsoft Teams



Multiple Client Options

Embedded App Experience

Access Holistic Patient View

The screenshot displays the Microsoft Dynamics 365 Virtual Clinic application. At the top, there's a navigation bar with icons for Activity, Chat, Teams, Calendar, Calls, and Files. The main area shows an 'Appointment for MR' record. The 'Clinical Timeline' tab is selected, showing a timeline from April 17, 2021, to April 23, 2021. Key events include 'Latex Allergy' (Allergy intolerance) on April 18, 'Knee Evaluation Appointment (EMR)' on April 21, 'PT Exercises Care plan' on April 22, and 'Knee Issue Patient encounter' on April 23. To the right, a sidebar shows 'Previous events' for January 5, 2021, and December 9, 2020, with a thumbnail of a video call with Christie Cline. The bottom of the screen shows the Windows taskbar with various pinned icons.



Improve clinical and operational data insights

Connect data across systems, creating insights to predict risk and help improve patient care, quality assurance, and operational efficiencies

Improve clinical
and operational
analytics



Data Interoperability



Operational Analytics



Clinical Analytics

Simplify data governance and compliance by unifying data on a single, secure data platform

Improve operational efficiency by synchronizing management efforts across clinicians and administrators

Transform health outcomes using data-driven insights to improve clinical decision-making and care experiences



Improve clinical and operational data insights

Connect data across systems, creating insights to predict risk and help improve patient care, quality assurance, and operational efficiencies.

Scenario	Capabilities	Features
Improve clinical and operational analytics	 Data Interoperability  Operational Analytics  Clinical Analytics	 Dataverse  Azure API for FHIR  FHIR Sync Administration  Healthcare Administration

Dataverse

Securely store and manage data that's used by Microsoft Cloud for Healthcare applications.



Feature Functionality

- Securely Store & Manage Data**
- Build Apps Against your Data**
- Quickly Access your Data**
- Reusable Business Logic**
- Built-in Validations**
- Integration with Other Systems**



The screenshot shows the Microsoft Power Apps portal interface. On the left, there is a navigation sidebar with options like Home, Learn, Apps, Create, and Data. Under the Data section, the 'Tables' option is selected, which is highlighted in purple. The main area displays a list of tables with columns for Name, Type, and Customizability. The 'Tables' section also includes links for Choices, Dataflows, Export to data lake, Connections, Custom Connectors, Gateways, Flows, Chatbots, AI Builder, and Solutions.

Table ↑	Name ↓	Type ↓	Customizability
	Account	Standard	✓
	Activity	Custom	✓
	Address	Standard	✓
	Appointment	Standard	✓
	Attachment	Standard	✓
	Business Unit	Standard	✓
	Contact	Standard	✓
	Currency	Standard	✓
	Email	Standard	✓
	Email Template	Standard	✓
	Fax	Standard	✓
	Feedback	Standard	✓
	Knowledge Article	Standard	✓
	Letter	Standard	✓
	Mailbox	Standard	✓
	Organization	Custom	✓
	Phone Call	Standard	✓
	Position	Standard	✓
	Privilege	Custom	✓
	Product	Standard	✓
	Recurring Appointment	Standard	✓



Azure API for FHIR

Rapidly exchange data and securely connect and interact with any system that utilizes FHIR APIs.



Feature Functionality

Rapidly Exchange Data

Holistic View of FHIR Data

Adapt and Extend Dataverse

Enrich Disparate Data Sets

End to End Data Pipeline



Microsoft Azure

Overview Solutions **Products** Documentation Pricing Training Marketplace Partners Support Blog More [Free account >](#)

Home / Services / Azure API for FHIR

Azure API for FHIR

Easily create and deploy a Fast Healthcare Interoperability Resources (FHIR®) service for health data solutions

[Start free](#) [Get started with GitHub](#)

Product overview Features Security Pricing Documentation Customer stories FAQs

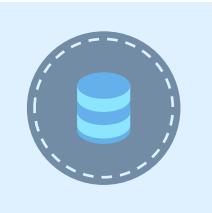
Manage health data in the cloud

Rapidly exchange data in the [HL7 FHIR](#) standard format with a single, simplified data management solution for protected health information (PHI). Azure API for FHIR lets you quickly connect existing data sources, such as electronic health record systems and research databases. Create new opportunities with analytics, machine learning, and actionable intelligence across your health data.



FHIR Sync Administration

Manage your FHIR mappings, resources, and integration settings for Dataverse.



Feature Functionality

- Configure Azure FHIR Resources**
- Create & Manage Entity Maps**
- Create & Manage Attribute Maps**
- Analyze FHIR Sync Data**
- Track FHIR Sync History**
- Manage Integration Settings**



Dynamics 365 | FHIR Sync Agent Administration | SANDBOX

Show Chart | New | Delete | Refresh | Email a Link | Flow | Excel Templates | Export to Excel | ? | KB | Search this view |

Active Update Service Entity Maps

Entity Name	Code (Azure FHIR Resource)	Supported Messages	Is Disabled	Enable Write Back to FHIR
msemr_encounter	Encounter	Update	Yes	Yes
msemr_device	Device	Update	Yes	Yes
msemr_observation	Observation	Update	Yes	Yes
msemr_appointmentmr	Appointment	Create; Update	Yes	Yes
msemr_medicationrequest	MedicationRequest	Update	Yes	Yes
msemr_allergyintolerance	AllergyIntolerance	Update	Yes	Yes
msemr_procedure	Procedure	Update	Yes	Yes
account	Organization	Update	Yes	Yes
msemr_location	Location	Update	Yes	Yes
msemr_appointmentemrslot	Appointment	Update	Yes	Yes
msemr_relatedperson	RelatedPerson	Update	Yes	Yes
msemr_claim	Claim	Update	Yes	Yes
msemr_diagnosticreport	DiagnosticReport	Update	Yes	Yes
msemr_condition	Condition	Update	Yes	Yes
msemr_medication	Medication	Update	Yes	Yes
msemr_careplan	CarePlan	Update	Yes	Yes



Healthcare Administration

View and manage your healthcare data all in one place.



Feature Functionality

Holistic View of Healthcare Data

Manage Patient Information

Manage Clinic Information

Track Claims & Coverages



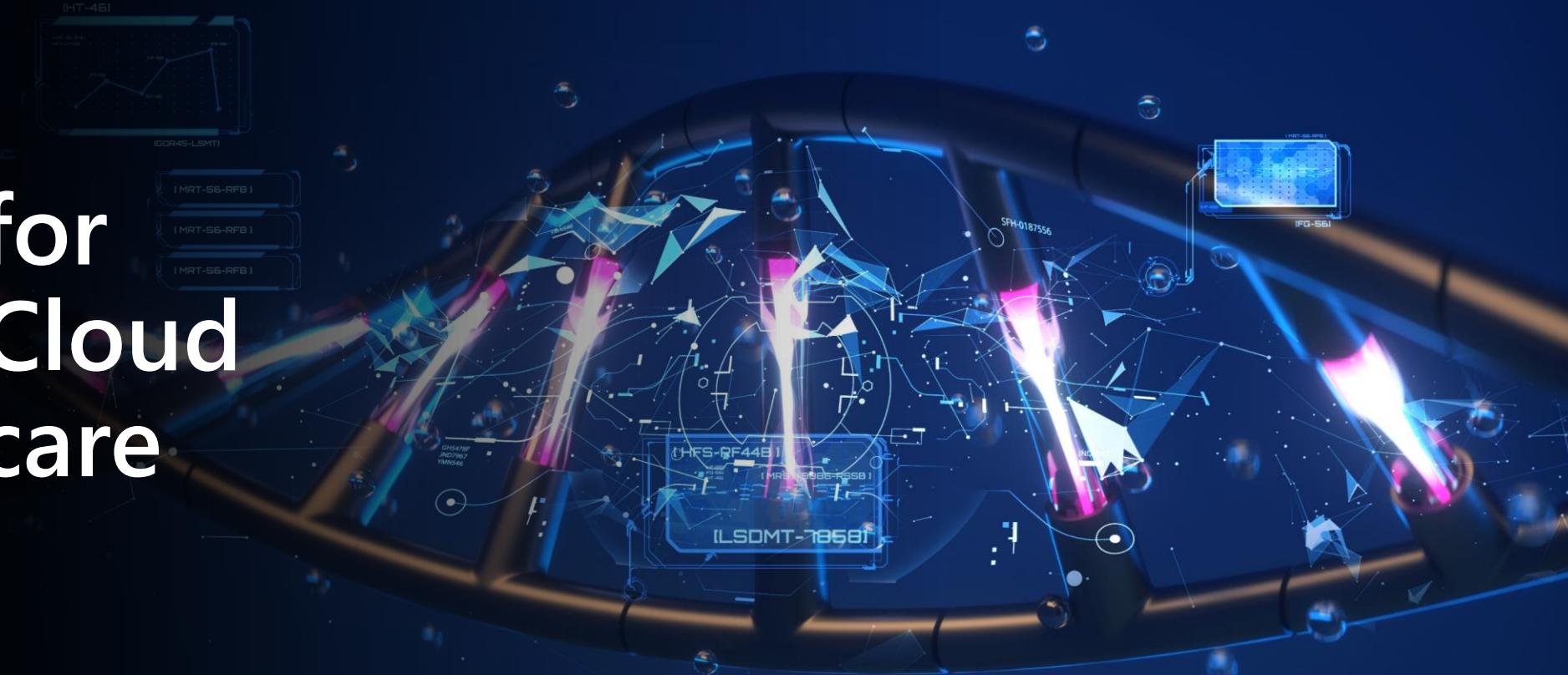
Active Coverages						
Name	Beneficiary (Patient)	Coverage Start Date	Group Plan	Network	Type	
Contoso AAA Coverage	Amari Rivera	12/31/2019	Healthcare Plan	EPO	---	
Coverage Amber Rodriguez - for MRN0586-0755	Amari Rivera	12/31/2019	Healthcare Plan	HMO	---	
Coverage Casey Jensen - for MRN8714-3180	Amari Rivera	12/31/2019	Healthcare Plan	EPO	---	
Coverage Elizabeth Moore - for MRN2018-3323	Amari Rivera	12/31/2019	Healthcare Plan	PPO	---	
Coverage Jessie Irwin - for MRN3318-3848	Hayden Cook	12/31/2019	Healthcare Plan	EPO	---	
Coverage Kayla Lewis - for MRN5067-7547	Rory Nyuyen	12/31/2019	Healthcare Plan	EPO	---	
Coverage Madison Butler - for MRN0057-0776	Mikaela Lee	12/31/2019	Healthcare Plan	PPO	---	
Coverage Monica Thomson - for MRN3136-5866	Mikaela Lee	12/31/2019	Healthcare Plan	PPO	---	
Coverage Nicole Wagner - for MRN2270-5011	Mikaela Lee	12/31/2019	Healthcare Plan	EPO	---	
Coverage Olivia Wilson - for MRN1017-3361	Mikaela Lee	12/31/2019	Healthcare Plan	PPO	---	
Coverage Reed Flores - for MRN0746-8183	Croa Thomas	12/31/2019	Healthcare Plan	EPO	---	
Coverage Remy Morris - for MRN2712-8458	Mikaela Lee	12/31/2019	Healthcare Plan	HMO	---	
Coverage Renata Hall - for MRN3611-2276	Mikaela Lee	12/31/2019	Healthcare Plan	PPO	---	
Coverage Rowan Murphy - for MRN5344-2201	Mikaela Lee	12/31/2019	Healthcare Plan	EPO	---	
Coverage Sara Perez - for MRN8540-3445	Mikaela Lee	12/31/2019	Healthcare Plan	PPO	---	





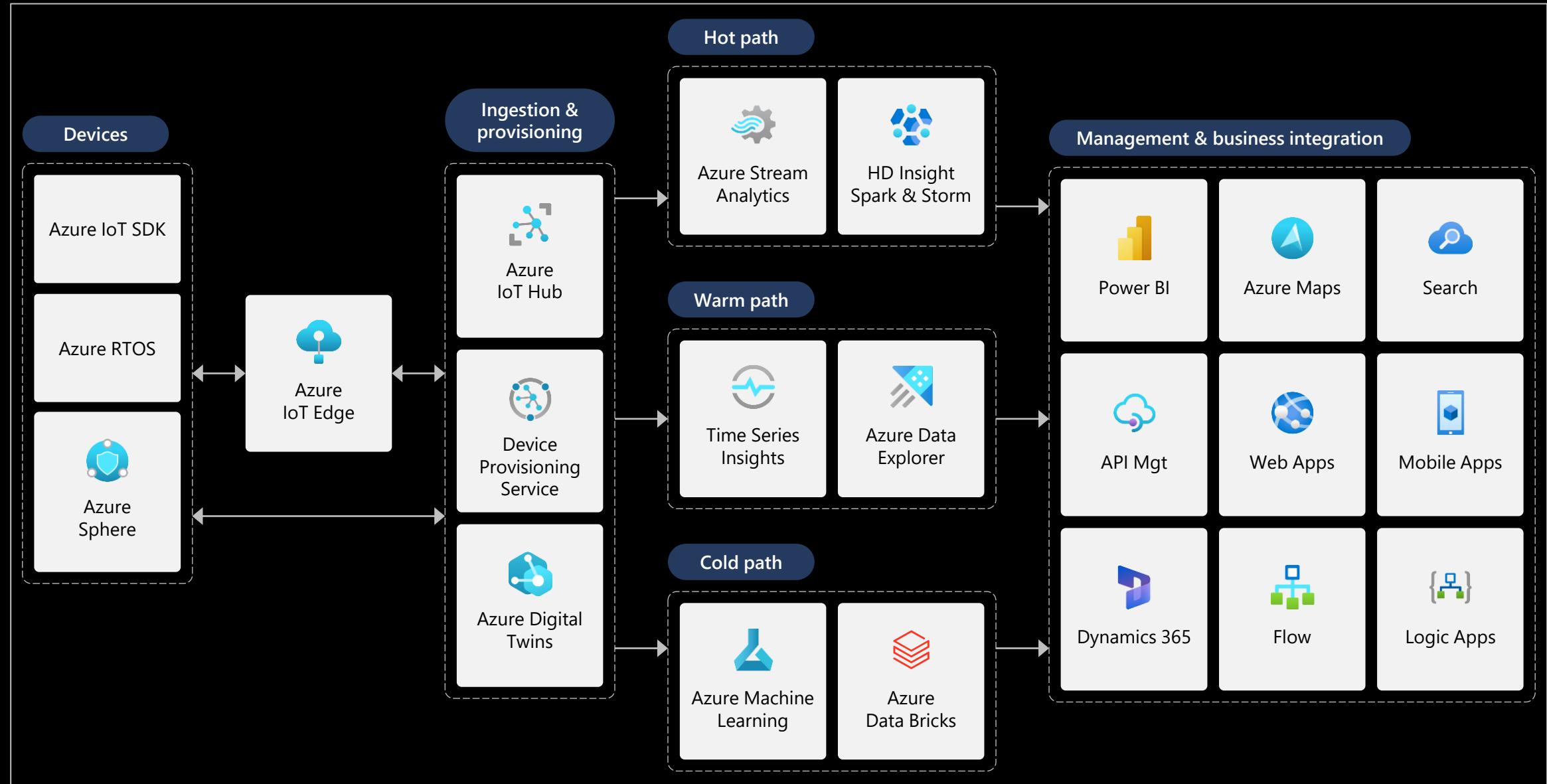
Azure IoT for Microsoft Cloud for Healthcare

Pradyumna Harish

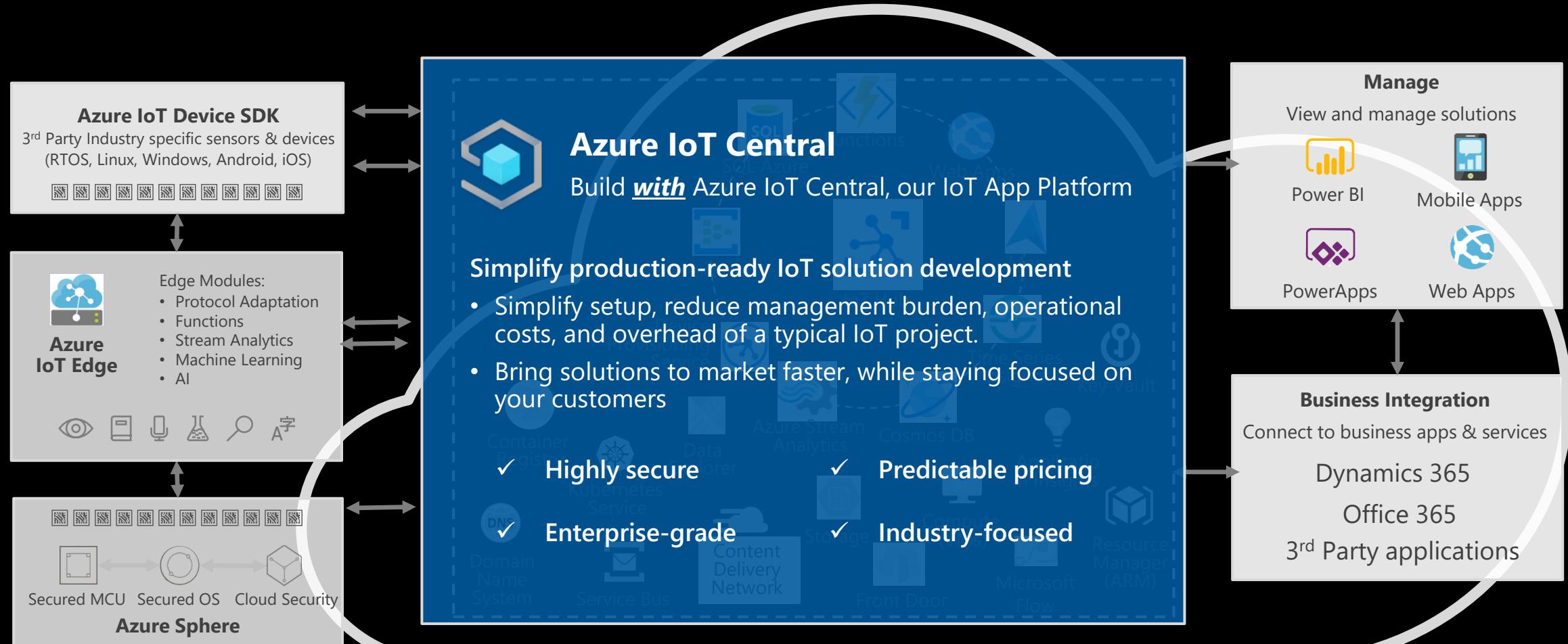


Let's look at Azure IoT

Azure IoT – The PaaS Solution Reference Architecture



Azure IoT Central – The SaaS Solution Reference Architecture

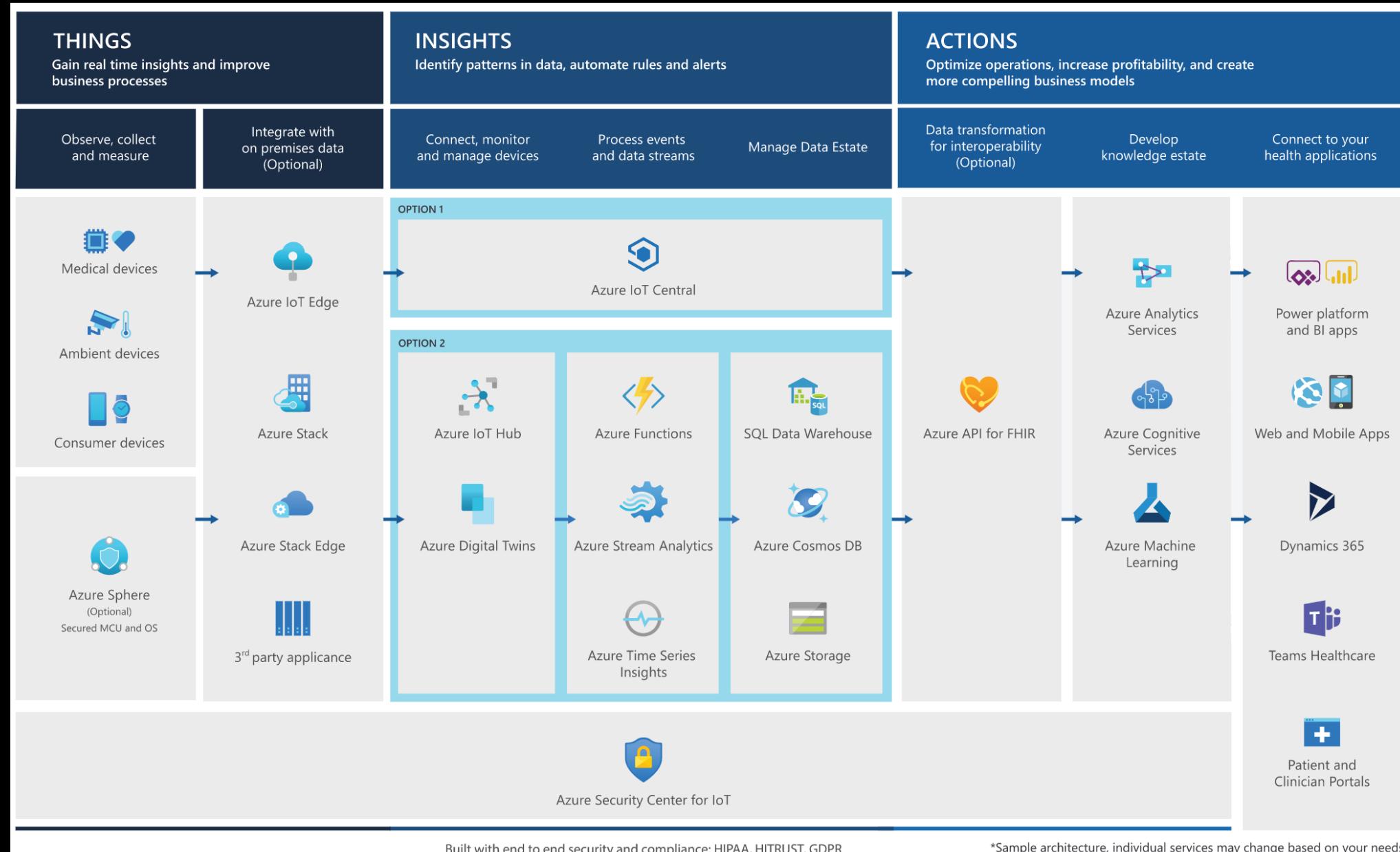


Azure Security Center for IoT

- Integrated view for [CISO & SecOps personas](#) to review enterprise security posture, including IoT solutions.
- Holistic view of IoT solution security posture for [DevOps](#) and [IoT solution managers](#) to review and manage day to day security status

Now, a look at Azure IoT for Healthcare

Azure IoT for Healthcare – integrated architecture



Azure, Azure Stack, IoT Edge, IoT, Azure Healthcare API's

Healthcare APIs

- MedTech service
- FHIR service
- DICOM service

Azure IoT Hub/Central

- Device connections/management/scale
- IoT Solutions for operations and deployment
- Time Series Insights (Device telemetry)
- Digital Twin

Azure Stack

- Azure Services & Management on-prem
- Managed by Azure or Locally

Azure IoT Edge

- Deploy and manage cloud services
- Managed by Azure or Azure Stack

Windows IoT, Linux

- Azure IoT Edge runs on Windows and Linux

Azure IoT Device SDK

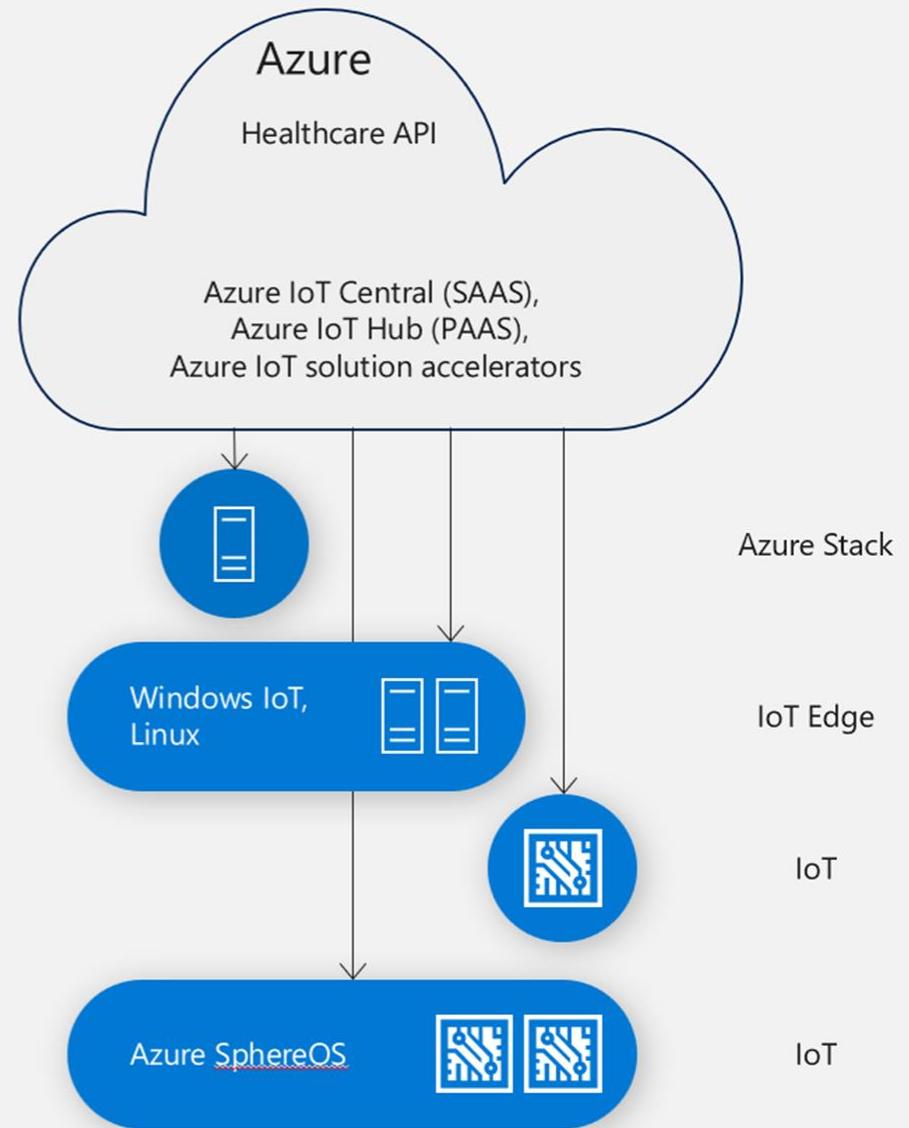
- Multi-device, multi-language, multi-OS
- iOS, Android, Windows, Linux

Azure Sphere

- Peerless

Azure Sphere OS

- Linux Kernel that modernizes MCU devices



Reference Architecture: Persona-Based Continuous Patient Monitoring

IoT Devices/Sensors

- Monitoring sensors
- IoMT devices
- Ambient devices
- Consumer devices

IoT Central

Event Hub

Azure API for FHIR

Logic App

Power BI

Device Technician



Azure Active
Directory

Healthcare Apps/Systems

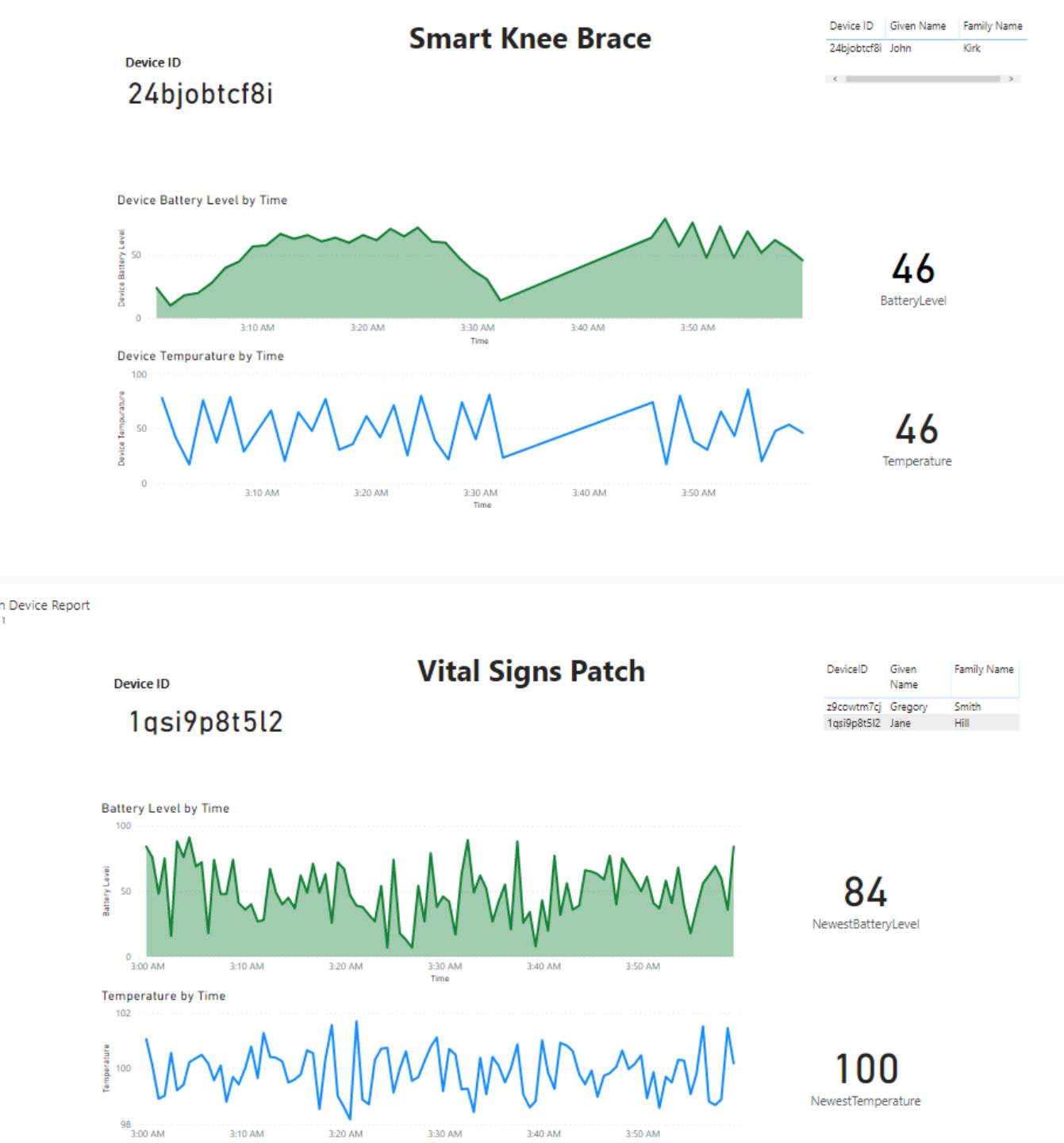
- Health Plans
- EHR
- Assessment Data

Azure AD Role-Based Access Control

Azure AD Role-Based Access Control

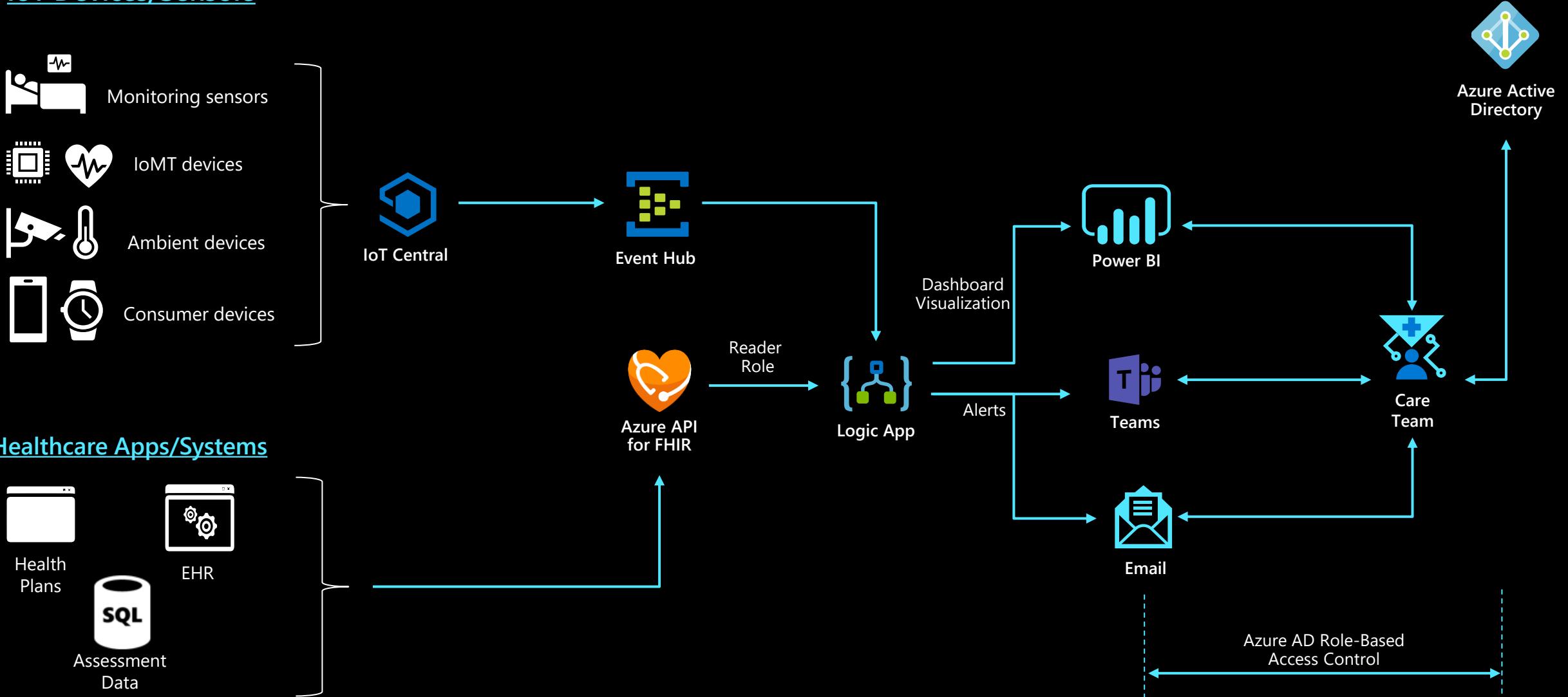
Azure AD Role-Based Access Control

Device Tech Dashboard

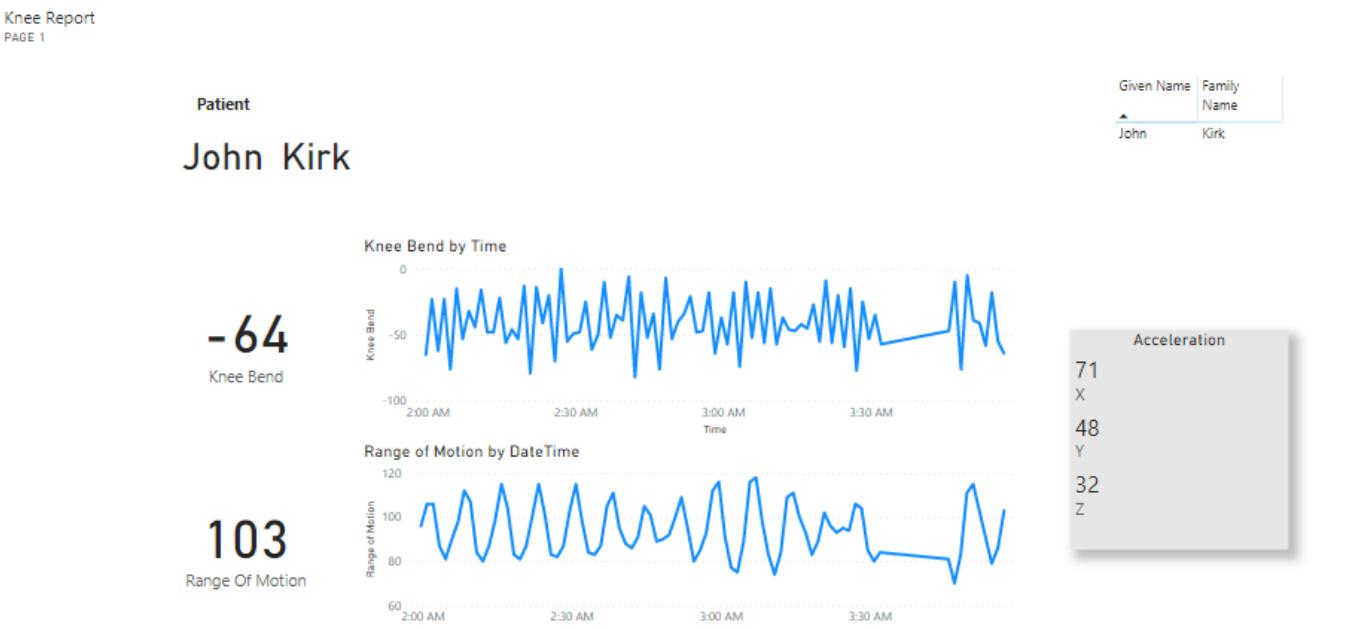
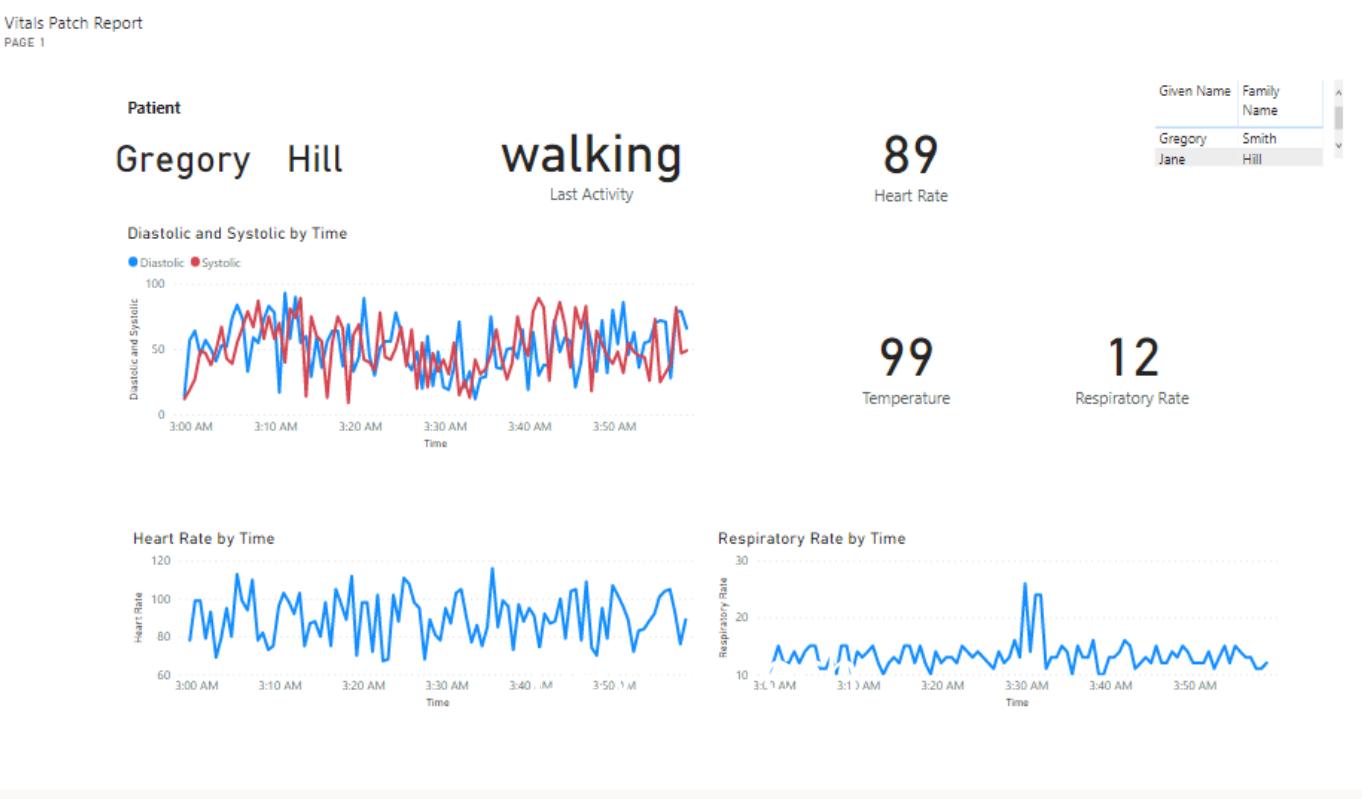


Reference Architecture: Persona-Based Continuous Patient Monitoring

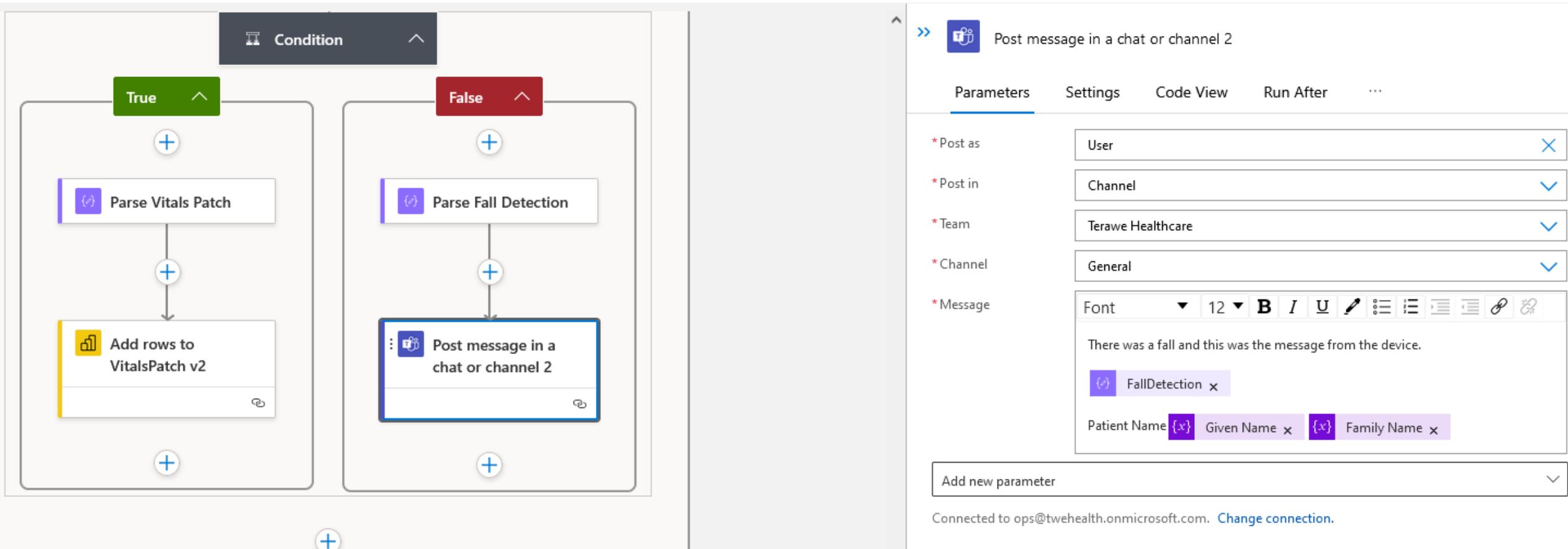
IoT Devices/Sensors



Care Team Dashboard



Using the Logic App to Parse for Alerts



Partner benefits deep dive

Data & AI	IoT	Teams experiences capabilities Canvas	Forms CDM Templates
Bring together and transform customer clinical, patient, and IoT systems of record at scale for BI and reporting	Connect, manage, and monitor medical wearables with Continuous patient monitoring IoT template and Azure API for FHIR	Integrate out-of-the-box or customized experiences with Microsoft Teams collaboration and intelligent meeting experiences, on a secure and compliant platform	Utilize Dynamics 365 apps with pre-built Patient 360 and Provider 360 care team and timeline forms
Harness Azure data, and Healthcare AI & ML capabilities to meet the evolving needs of the Healthcare industry	Leverage an ecosystem of trusted hardware partners that provide hundreds of IoT certified devices	Create Microsoft Teams virtual care capabilities for virtual consults and virtual visits from clinical systems	Utilize standard libraries, templates, and common integration patterns for a connective solution experience
Build secure IoT apps and devices with bi-directional communication and authentication, extending it from the cloud to the edge	Built-in device management and provisioning to connect and manage IoT devices at scale	Drive business process innovation for customers, leveraging pre-built workflows and tools for Power Platform within Microsoft Teams collaboration canvas	Leverage Healthcare CDMs based on HL7 FHIR standards and accrue benefits across Microsoft Dynamics 365, Microsoft Teams, Microsoft Power Platform, and your first party apps
Build and deploy Healthcare bot for AI-powered, compliant, conversational healthcare experiences		Drive business process innovation for customers, leveraging pre-built workflows and tools for Power Platform with Teams collaboration canvas	
Ingest, store, and share health data in the cloud with built-in support for health standards like FHIR			

In Summary...

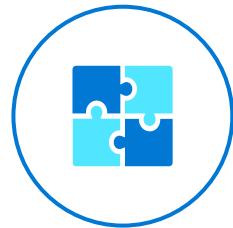


Unlock your data's full potential with the Microsoft Cloud for Healthcare



Trust

Consolidate data on a platform backed by investments in security, a commitment to privacy, and robust compliance offerings



Interoperability

Create a unified data estate that communicates seamlessly with external FHIR systems and critical business applications



Intelligence

Reveal actionable, intelligent insights by applying AI and ML tools to comprehensive institutional datasets



Agility

Increase institutional efficiency through custom apps, role-based dashboards, and automated workflows

Next Session:

Module 2

Microsoft Cloud Solution Center

