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HLC302

Activating a resilient healthcare IoT strategy

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Ensuring healthcare accessibility, affordability, and availability for future generations **is my why.**

Hector Rodriguez, MBA
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WWPS Security Team

AWS for health



Omics



Healthcare



Life sciences

Accelerating innovations from benchtop to bedside

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Agenda

Introduction

Resilience and cyber-resilience vs. cybersecurity

The Internet of Medical Things (IoMT) landscape and potential

AWS security and IoT services

Protecting the enterprise IoMT: Let’s discuss a real scenario

Protecting the enterprise IoMT: Let’s strategize and whiteboard

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Introduction

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The rise of the IoMT

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Critical risks of IoMT and IoT devices

53%

IoMT and IoT devices contain critical risks

More than half of connected medical and other IoT devices in hospitals have a known critical vulnerability

79%

Devices used in the past 4 weeks

Most devices get used at least once a month, which is great for ROI but makes updates difficult

38%

IV pumps

73%

IV pumps with 1+ critical risk

Most patients need fluid during a hospital stay and infusion pumps help reduce the margin of error in treatment

92%

Critical risks addressed with segmentation

If a given healthcare IoT risk is critical, or a healthcare IoT device has a critical risk on it, segmentation is hugely beneficial

Source: The state of healthcare IoT device security, Cynerio, January 2022
https://www.cynerio.com/landing-pages/the-state-of-healthcare-iot-device-security-2022

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Resilience: Cyber-resilience vs. cybersecurity

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What is resilience?

RESILIENCE REFERS TO THE ABILITY FOR WORKLOADS TO RESPOND TO AND QUICKLY RECOVER FROM FAILURES

The mental model

High availability

Resistance to common failures through design and operational mechanisms



Core services, design goals to meet availability goals

Continuity of operations

Returning to operations within specific targets for more rare but highly impactful failures



Backup and recovery, data bunkering, managed RPO/RTO

Continuous resilience

CI/CD, code refinement, operational testing, observability/monitoring

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Enterprise resilience is the goal



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The IoMT landscape and potential

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Modern transformational drivers

- Change driven by relentless movement to value-based care and problems exposed by Covid-19 crisis
- Transformation paving way for **new design** fuses EHR with complementary systems, capabilities, and technologies
- Focus on patient experience and **“digital front door”** IoT and devices
- The pandemic has shown us healthcare collaboration at its best – the response mirrors **the new business model that we must build**

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AWS security and IoT services

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AWS security services to extend IoT resilience

Protect the network
Amazon VPC
AWS VPN
AWS Direct Connect
AWS Private 5G
AWS Wavelength
AWS Shield

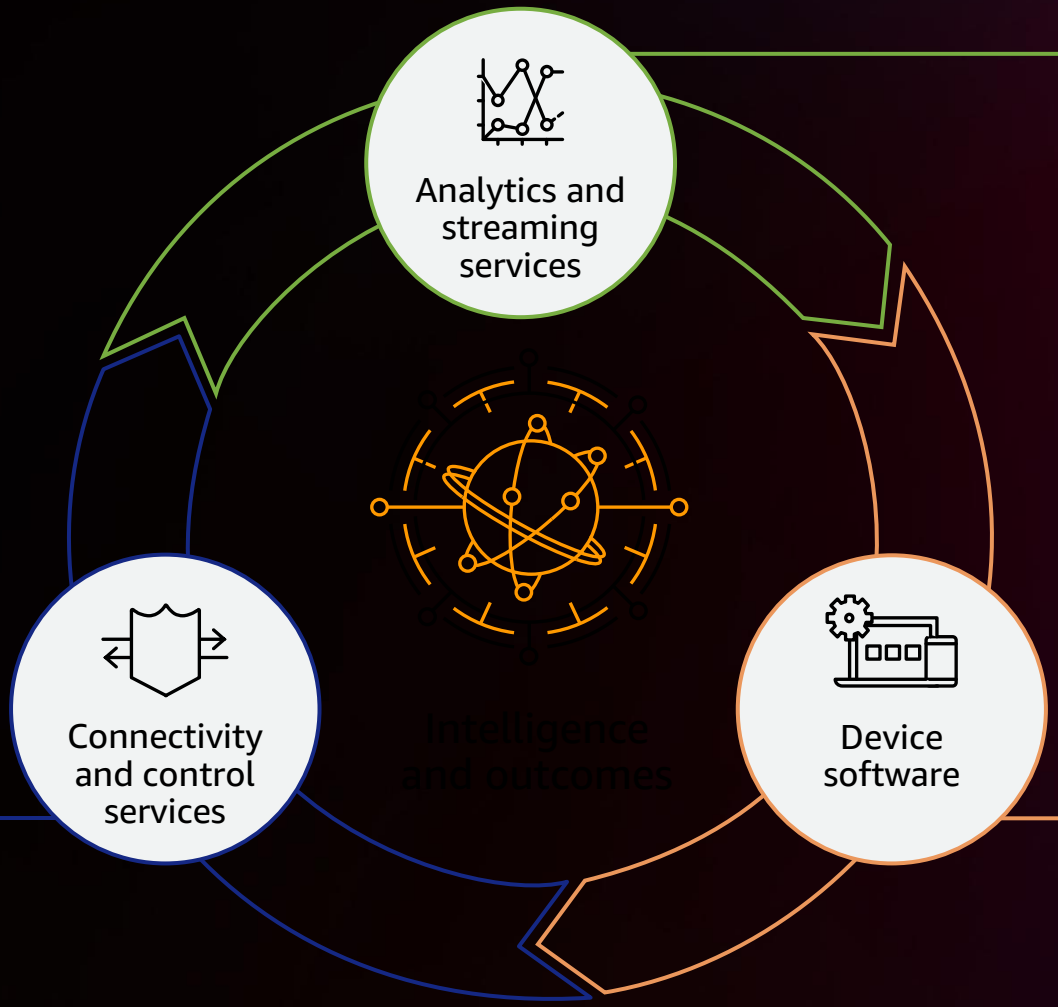
Protect the data
AWS KMS
Amazon S3
Amazon Macie

Protect the app
AWS Resilience Hub
AWS WAF
AWS Outposts
AWS CloudTrail
Amazon CloudWatch
Amazon GuardDuty
FreeRTOS
AWS IoT Greengrass

Protect the device
AWS IoT Device Defender
AWS IoT Device Management
Rules for AWS IoT
AWS IoT Core

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IoT virtuous cycle



AWS IoT Events
AWS IoT Analytics
AWS IoT SiteWise
AWS IoT TwinMaker
Amazon Kinesis Video Streams

AWS IoT Core
AWS IoT Device Management
AWS IoT Device Defender
AWS IoT FleetWise
AWS IoT RoboRunner

FreeRTOS
AWS IoT ExpressLink
AWS IoT Greengrass
AWS IoT Device SDK

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Protecting the enterprise IoMT: Let’s discuss a modern remote patient monitoring (RPM) solution

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Scenario: RPM

Goal: Leverage in-home biometric sensors to monitor vital signs including body temperature, respiratory rate, pulse oximetry, and spirometry. Use sensor data to track patient progress and anticipate need for more advanced care.

Objectives: Keep patients at home, reduce nurse workload, reduce costs, avoid unnecessary emergency room visits, improve outcomes and patient and caregiver experience, leverage data and analytics to alert and prioritize cases.

Requirements: Security, privacy, compliance, availability, scalability, connectivity to rural locations, performance across large population of patients, analytics, automation, and integration in existing clinical workflows.

What's possible: Combine with apps and/or portals to improve automated symptom triage system and care recommendations.

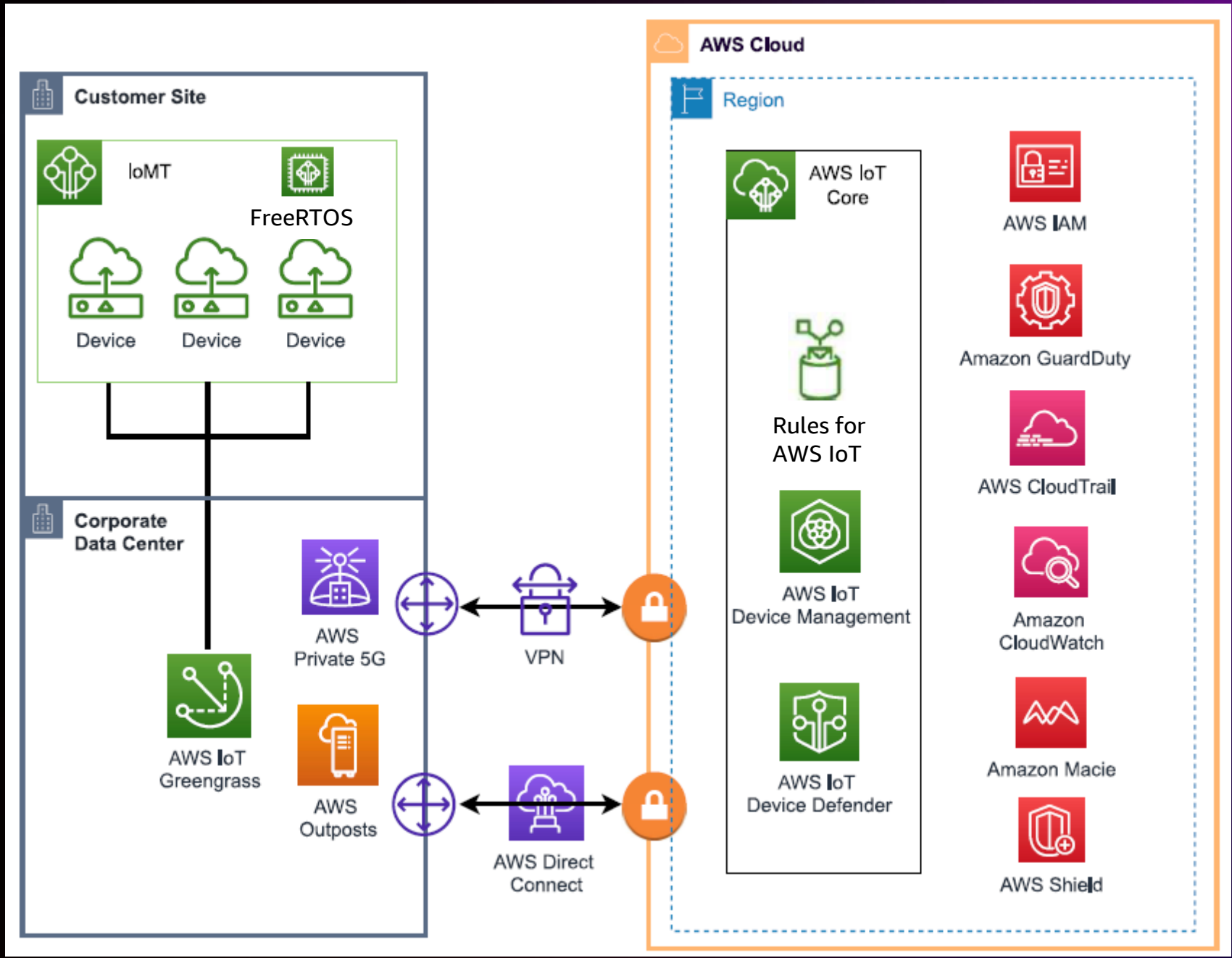
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Protecting the enterprise IoMT: Let’s strategize and whiteboard a solution architecture

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Conceptual resilient IoT architecture on AWS



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AWS IoT and security partners

- **Cynerio** - https://www.cynerio.com
  Goal of helping hospitals secure every connected asset, including IoMT, IoT, operational technology, and unmanaged IT and mobile devices.
- **Ioetec** - https://ioetec.co.uk
  Specialize in securing data for IoT devices. Technologies encrypt data at the point of generation and then securely communicate to the specified backend point.
- **CyberMDX** - https://www.cybermdx.com
  Solution to see and prioritize all device groups in a single pane of glass. Ability to research, track, alert, validate, analyze, and comply.
- **Megaport** - https://www.megaport.com
  Deploy a global, high-availability network in minutes on Megaport's industry-leading Network as a Service (NaaS) platform.

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AWS security and IoT resources

- AWS IoT services
- Build IoT devices for free on AWS
- Video: Transform your business with AWS IoT
- Security, identity, and compliance on AWS
- Data protection and privacy at AWS
- Raise your security posture with AWS services and infrastructure
- AWS Landing Zone Accelerator for healthcare

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Research resources

- Number of connected IoT devices growing 18% to 14.4 billion globally | IoT Analytics
- IoT connected devices worldwide 2019–2030 | Statista
- IoT in healthcare 2022: IoT medical devices and companies | Insider Intelligence
- 60+ IoT statistics, facts, and trends, 2022 edition | Comparitech

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AWS Health Lounge

Connect with **AWS Health experts** and other attendees in our dedicated lounge space for **informal discussions and networking.**

Explore **AWS Healthcare & Life Sciences demos** and new additions to the AWS for Health portfolio!

Location:
AWS Industries Networking Lounges, Caesars Forum Main Hall



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AWS + Children's National Hospital

Customer obsession = Patient obsession

Collect pins at the AWS for Health Lounge from child artists who are also patients at Children's National Hospital, learn about their inspiration and "their why"





Artwork provide by Alice, age 11, patient with neurological condition

"I drew a heart because I love all of the people that took care of me at Children's National."

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Thank you!

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