

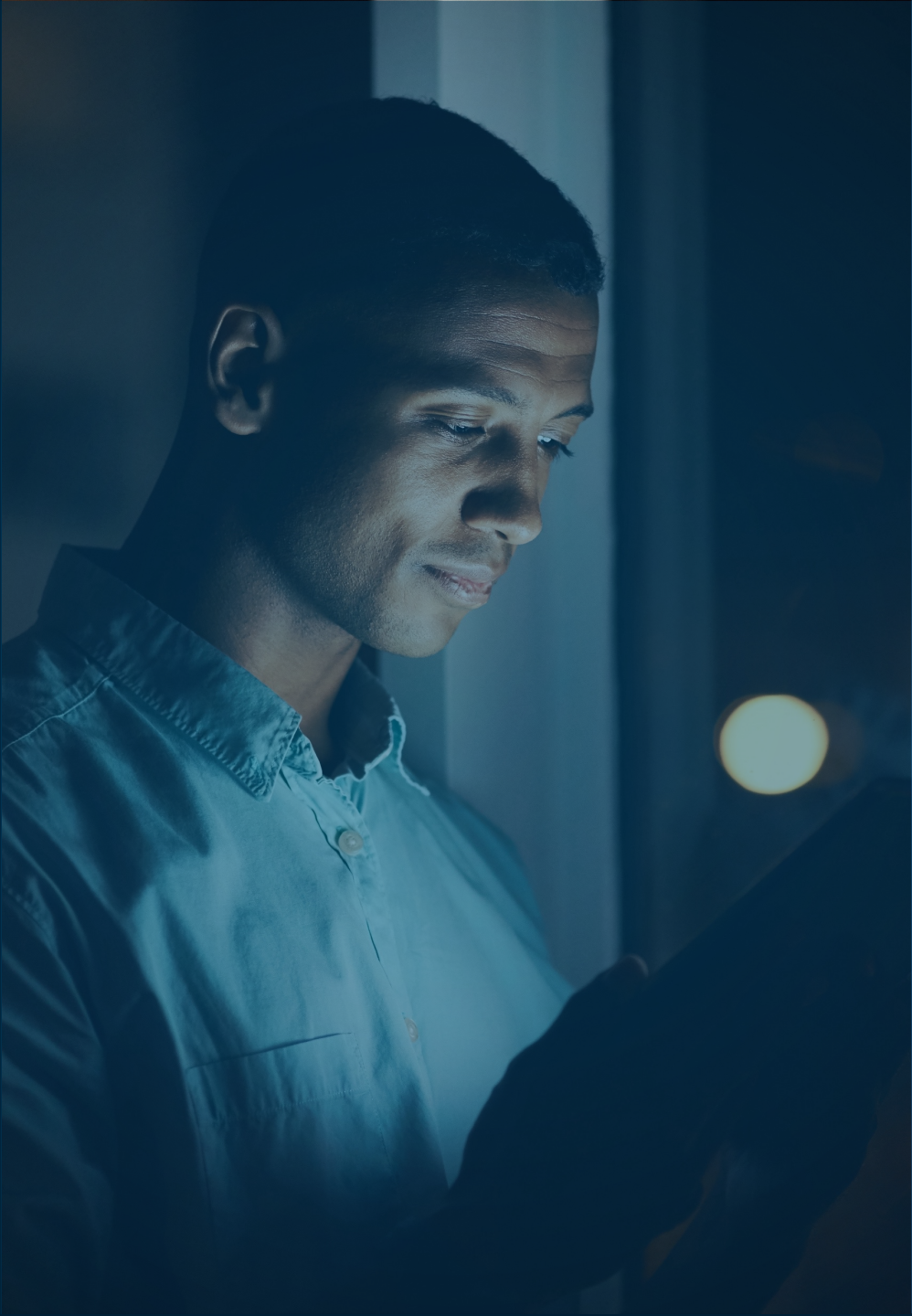
Microsoft and SAS : collaboration between health care technology leaders will positively impact clinical research



Mark Lambrecht
Director, HLS




Andrew Warrington
Senior Industry Advisor
 Microsoft



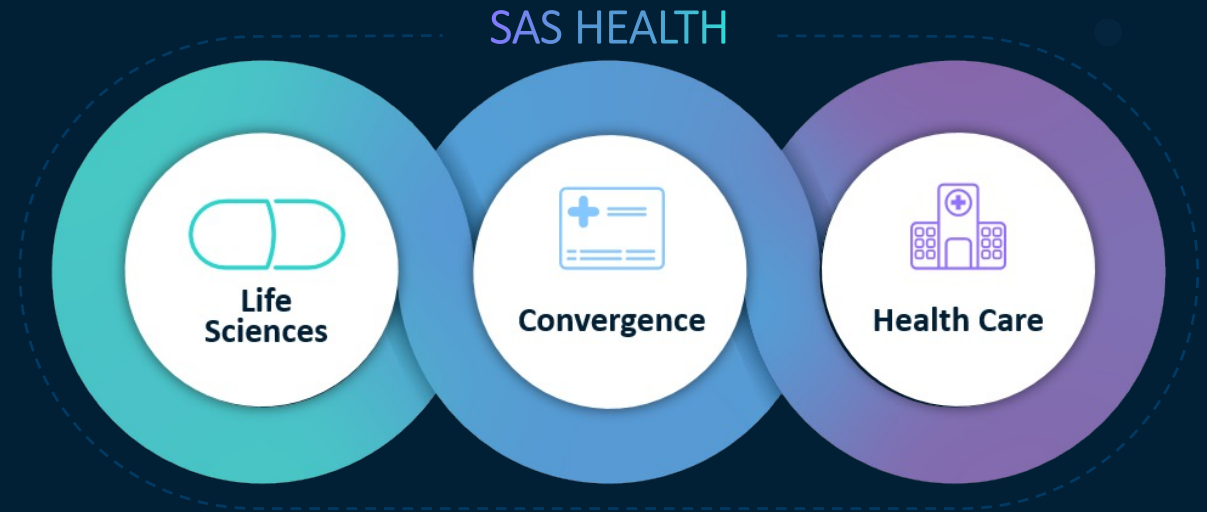
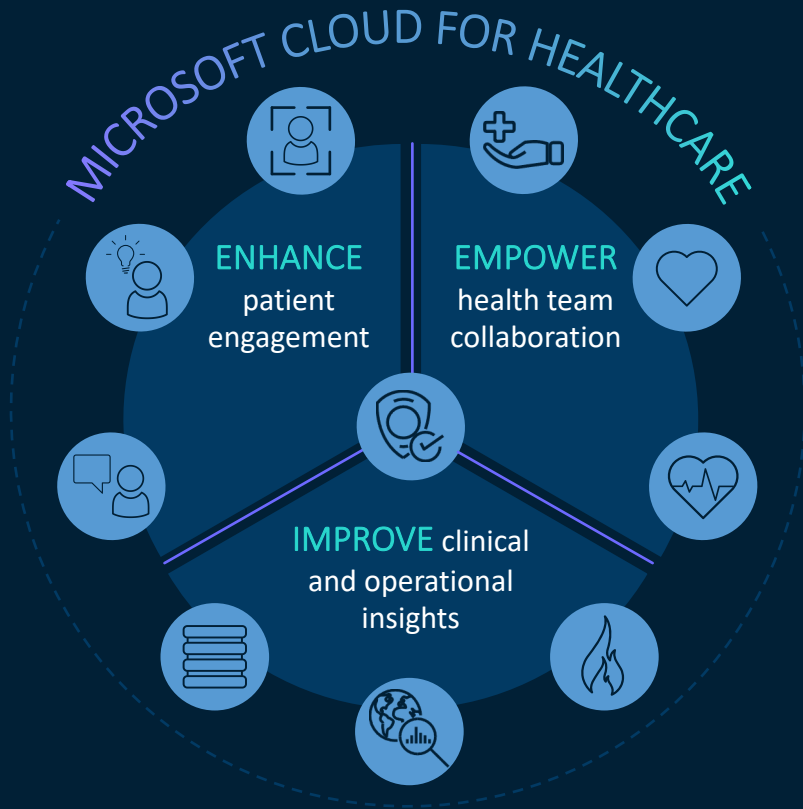
SAS and Microsoft in Life Sciences

Bringing pharmaceutical industry analytics to the cloud in a **SAS-managed environment on Azure**.

SAS and Microsoft bring life sciences organizations the digital environment they need to efficiently generate insights and drive innovation **throughout the pharmaceutical life cycle**.

SAS® Health can be hosted on **Microsoft Azure** to create frictionless environments that allow compliance with government regulations and industry data interoperability.

Better Together



Cross-workload Integration			Dashboards, Portals, Templates and Workflows	Connectors, Extensions and Custom Controls
Industry-specific Configuration	Healthcare APIs	Healthcare Common Data Models	Pre-trained AI Services and Tools	

 Microsoft Dynamics 365  Microsoft Azure  Microsoft Power Platform  Microsoft 365

We're witnessing a
historic influx of data,
data that can help save lives
If managed effectively



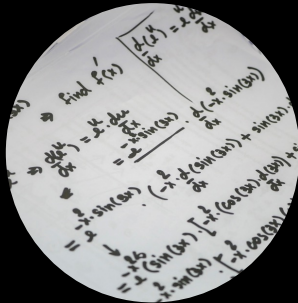
Four decades of accelerated health technology innovation

1980's/90's



Evidence-based medicine

2000's



Hand-crafted models & scarce data

2010's



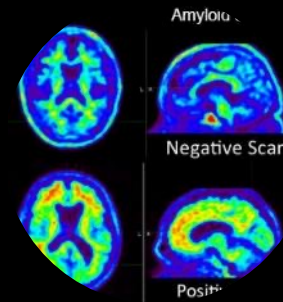
Electronic Health Records and Big Data

2010's



Models start to be learned from fuller data

2020's



Multimodal AI (unstructured text + imaging)

2020's



Personalization & well-being
Responsible AI

2020's



Population Health & Smart Cities

Clinical Audit/Governance
1-way: research → practice

Learning Health Systems
2-way: research <-> practice

Precision and Population Health Systems
360-degree view of the patient

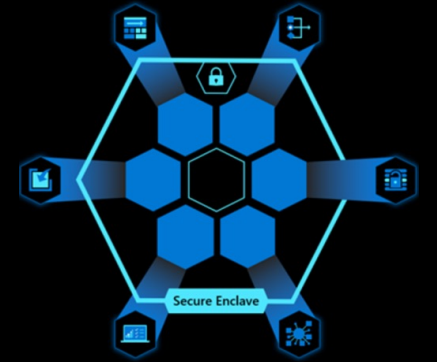
Trusted Research Environments

Research collaboration is the key to unlocking precision health, and yet data are too sensitive to share openly.

Microsoft Azure provides secure, flexible and governed research environments so collaboration can take place while protecting data & IP.



Privacy-enhanced platforms enhance collaboration for algorithm owners and data stewards



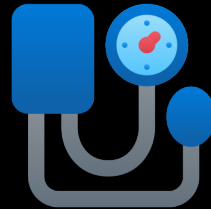
BeeKeeper AI



Protected Cloud
Storage



Encrypted Primary
Data



Healthcare Specific
Tools & Workflows



Secure Enclave
Technology



Middleman
and
Matchmaker

How Health Data Services enables asynchronous

Helping you extend patient care beyond the hospital walls



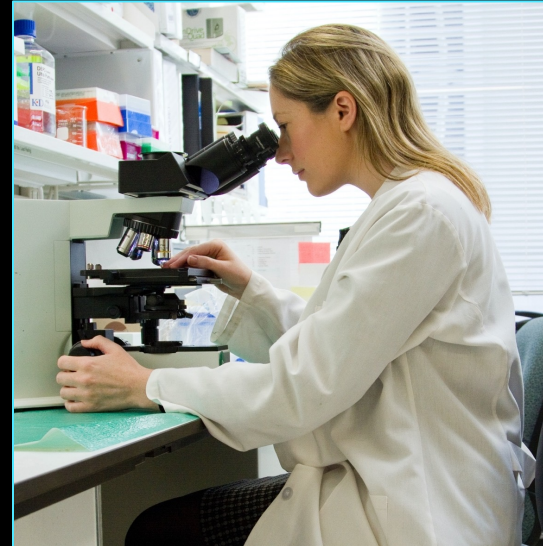
Chronic disease management

Empowers you to manage long-term and chronic diseases with IoT-enabled insights from connected home health devices.



In-home care & remote monitoring

Enable remote monitoring of patients and virtual care with the ability to see device data including data from wearables and incorporate it into building personalized care plans



Proactive & predictive care management

Enables you to move from a reactive care system to more proactive care by being able to track symptoms and patients progress, thereby having the chance to reduce hospital readmissions and provide preventative care.



Digital clinical trials

Harness the power of IoT and analytics to track telemetry for clinical trials across diverse geographic locations making trials quicker, more efficient and reducing time to market for life saving treatments .



Hybrid

66 Azure regions

Largest geographical footprint of any cloud provider operating regions in **28** countries on all continents.

Seamless integration and common management of resources across heterogeneous and hybrid environments



Secure

Microsoft Cyber Defense Operations Center

>3,500 full-time security professionals

6.5 trillion global signals daily

\$1 billion annual cybersecurity investment

91

Compliance offerings



Compliant

90+ Compliance Certifications

GLOBAL

- ISO 27001:2013
- ISO 27017:2015
- ISO 27018:2014
- ISO 22301:2012
- ISO 9001:2015
- ISO 20000-1:2011
- SOC 1 Type 2
- SOC 2 Type 2
- SOC 3
- CIS Benchmark
- CSA STAR Certification
- CSA STAR Attestation
- CSA STAR Self-Assessment
- WCAG 2.0 (ISO 40500:2012)

INDUSTRY

- PCI DSS Level 1
- GLBA (US)
- FFIEC (US)
- Shared Assessments (US)
- SEC 17a-4 (US)
- CFTC 1.31 (US)
- FINRA 4511 (US)
- SOX (US)
- 23 NYCRR 500 (US)
- OSFI (Canada)
- FCA + PRA (UK)
- APRA (Australia)
- FINMA (Switzerland)
- FSA (Denmark)
- RBI + IRDAI (India)
- MAS + ABS (Singapore)
- NBB + FSMA (Belgium)
- AFM + DNB (Netherlands)
- AMF + ACPR (France)
- KNF (Poland)
- European Banking Authority (EBA)
- FISC (Japan)
- HIPAA BAA (US)
- HITRUST Certification
- GxP (FDA 21 CFR Part 11)
- MARS-E (US)
- NHS IG Toolkit (UK)
- NEN 7510:2011 (Netherlands)
- FERPA (US)
- CDSA
- MPAA (US)
- FACT (UK)
- DPP (UK)

REGIONAL

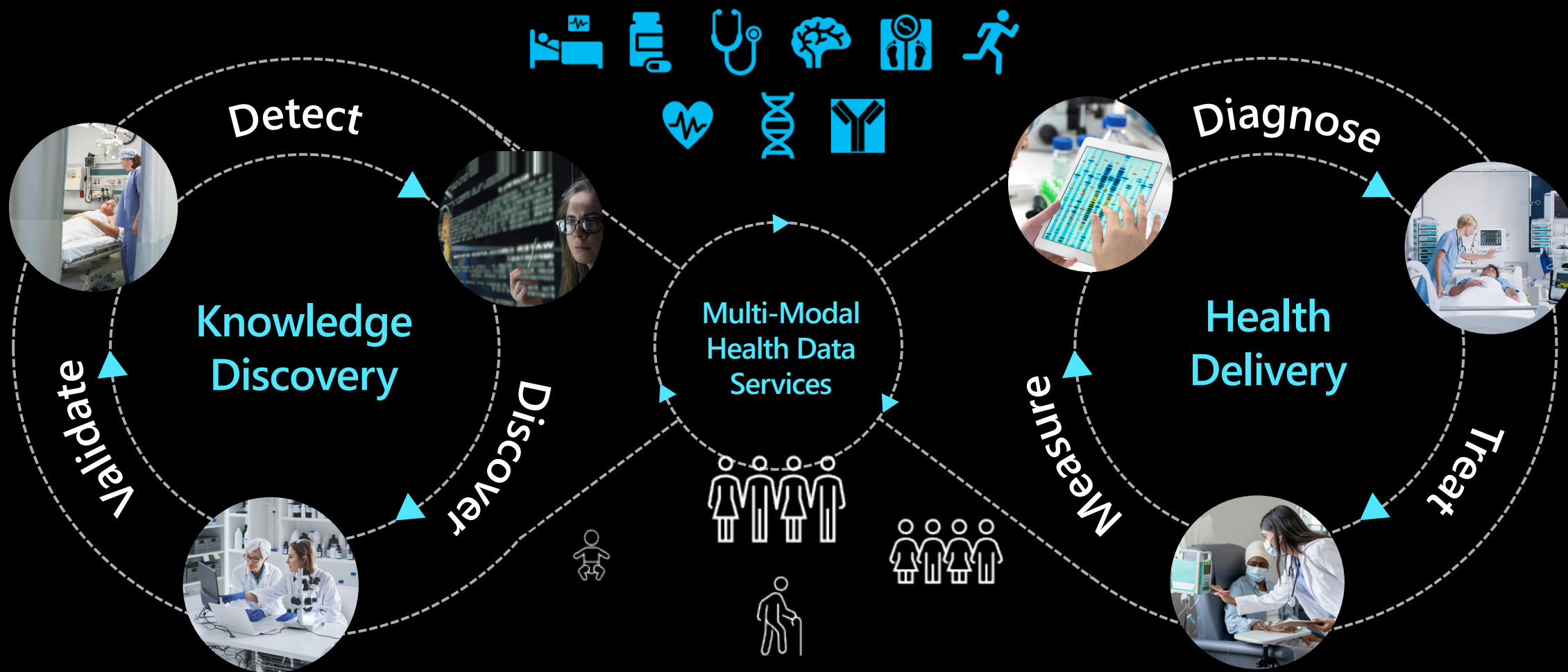
- Argentina PDPA
- Australia IRAP Unclassified
- Australia IRAP PROTECTED
- Canada Privacy Laws
- China GB 18030:2005
- China DJCP (MLPS) Level 3
- China TRUCS / CCCPPF
- EU EN 301 549
- EU ENISA IAF
- EU Model Clauses
- EU – US Privacy Shield
- GDPR
- Germany C5
- Germany IT-Grundschutz workbook
- India MeitY
- Japan CS Mark Gold
- Japan My Number Act
- Netherlands BIR 2012
- New Zealand Gov CIO Framework
- Singapore MTCs Level 3
- Spain ENS High
- Spain DPA
- UK Cyber Essentials Plus
- UK G-Cloud
- UK PASF

U.S. GOVT

- FedRAMP High
- FedRAMP Moderate
- EAR
- ITAR
- DoD DISA SRG Level 5
- DoD DISA SRG Level 4
- DoD DISA SRG Level 2
- DFARS
- DoE 10 CFR Part 810
- NIST SP 800-171
- NIST CSF
- Section 508 VPATs
- FIPS 140-2
- CJIS
- IRS 1075
- CNSSI 1253

● Available region ○ Announced region ● Availability zone

Precision Health: AI enabled Discovery and Delivery



Analytics in the Age of Digital Health

Enablers

Digitalized Life Sciences

Outcomes

THERAPEUTIC LIFE CYCLE

DRIVING INNOVATIONS


ADVANCED ANALYTICS &
ARTIFICIAL INTELLIGENCE


AUTOMATED
PROCESSES


CLOUD COMPUTING


INTERNET OF MEDICAL
THINGS



MODERNIZED
CLINICAL TRIALS



REAL WORLD
EVIDENCE



PLANT OF THE
FUTURE



COMMERCIAL
INTELLIGENCE



INNOVATIVE THERAPIES
Personalized medicine



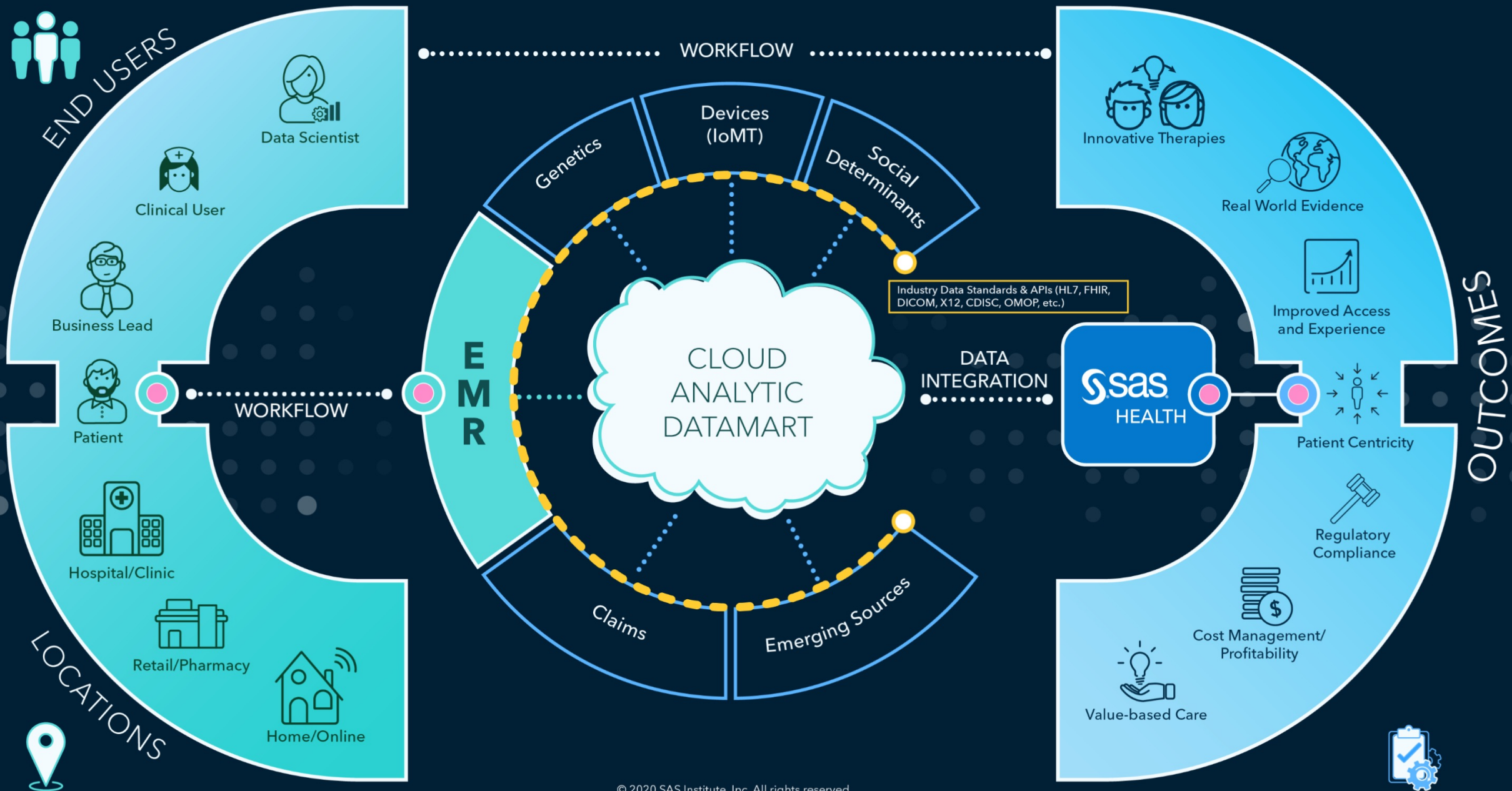
PROFITABILITY
*Speed to market with
optimized strategy*



RISK MITIGATION
*Ensure patient safety and
reduce regulatory burden*



VALUED BASED CARE
*Deepen health care provider and
patient engagement*



Transforming Clinical Trial Analysis and Submission

Clinical data science with regulatory-grade analytics in support of decentralized patient-centric clinical trials



CHALLENGES

- Complexity of Clinical Trial Designs
- Handling new types of data (Sensor data, images, text, voice and Real-World Data collected outside RCTs)
- Speed to insight - Inability to investigate issues near real-time

Most life science organizations are optimizing, not transforming. Next-Gen Clinical Trials are needed.

IDEAL SOLUTION

- Secure analytics foundation and proven scalable flexible framework in the cloud
- Focus on data insights and collaboration
- AI, IoT and advanced analytical capabilities

Digital platform to support decentralized (hybrid) clinical trials and partner-eco system

DESIRED OUTCOMES

- Reduce development timelines
- Drive modernization of decentralized, PATIENT-CENTRIC clinical trials
- Ensure GxP qualified environment and 21 CFR Part 11 compliance

Accelerate development timelines while reducing cost 10 - 15%

Interoperability will decrease the importance of the classical EDC system



Interoperability will decrease the importance of the classical EDC system



The Standard

The Official Blog of Health Level Seven® International

HL7 Launches Project Vulcan FHIR Accelerator Program

Aug 17, 2020 12:10:29 PM / by Amy Cramer, MMCI, RN, CPHQ



Multi-stakeholder initiative aims to use widely accepted health care standard to enable data exchange to streamline translational and clinical research

HL7 recently announced the launch of its newest [FHIR Accelerator, Project Vulcan](#), which seeks to use its widely recognized data exchange standards to help health care researchers more effectively acquire, exchange and use data in translational and clinical research.

The effort, called Vulcan, intends to use a model for collaboration among diverse stakeholders in the translational and clinical research community to define a common set of standards that can be implemented internationally, built on current agreements to use the [HL7 Fast Healthcare Interoperability \(FHIR®\)](#) standard to facilitate data exchange.

"Improving data sharing can bring significant benefits to medical research, which is often a time-intensive and costly process that unnecessarily delays progress in discovering treatments for medical conditions because researchers are unable to share critical information," said HL7 International CEO Charles Jaffe, MD, PhD, "Project Vulcan aims to develop common solutions to help partners overcome these challenges."



Vulcan HL7 FHIR: Who Are We?

Members of the Clinical and Translational Clinical Research Communities

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Microsoft
Dynamics 365



Power Apps



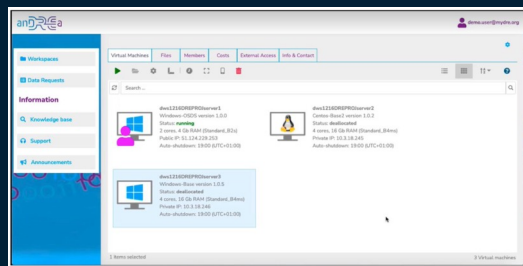
Power
Automate



Power BI

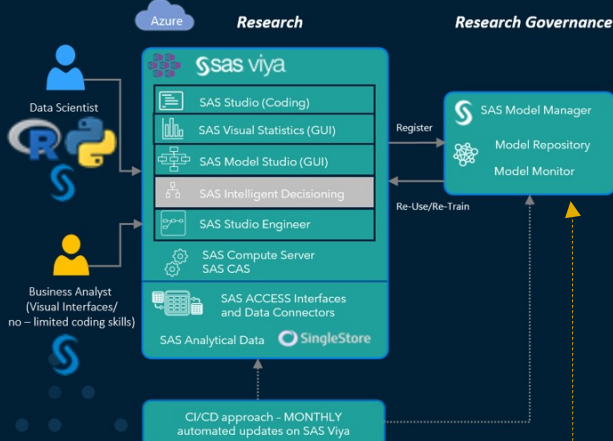
Consumption Layer

Digital/Trusted Research Environment - **WORKSPACES** Open Source and SAS (“following anDREa reinforcing principles”)



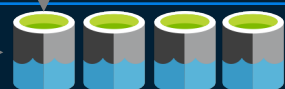
In Silico
Research
Scientist

External Researchers
through partnerships



Subscription External
Research Institution “A”
**IMPORTANT: the research
Data never leaves owners
subscription in MSFT cloud**

Subscription External
Research Institution “B”



Azure Data Lake(s)
e.g., RWD OMOP, OMICS, Imaging, ...



Azure Synapse
Analytics

Clinical Development 1/ Biometrics (DM, Stats Programming, BioStats); 2/ Quantitative Sciences (Modeling & Simulations); 3/ Real World Evidence use cases.



Data Layer



Azure Purview

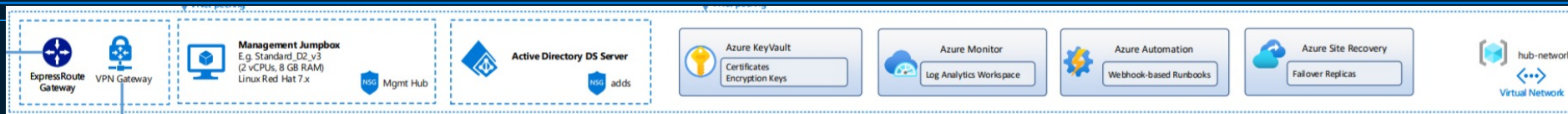


SAS Information
Governance



Access to Electronic Health
Records (EHR)

Data Governance & Access Layer



2021

HACKATHON >

#HackinSAS. More than just a competition

Microsoft

Intel

Core Compete



```
/*retrieve service endpoint*/
%let BASE_URI=%sysfunc(getoption(servicesbaseurl));

/* create filenames to hold responses*/
filename rcontent temp;

/* Make request */
proc http
    oauth_bearer=sas_services
    method="GET"
    url="&BASE_URI/reports/re-
    port?characteristics=visual%element"
    place responses in filenames */
    headers
    "Content-Type"="application/vnd.sas.col-
    lection+json";
run;
/*retrieve service endpoint*/
%let BASE_URI=%sysfunc(getoption(servicesbaseurl));

/* create filenames to hold responses*/
filename rcontent temp;

/* Make request */
```

The Health Track of #HackinSAS

<https://www.sas.com/sas/events/hack-in-sas.html>

31 initial teams in health track, 18 final projects
100 teams in overall competition

Hacker's Hub Health Track example projects:

- Incorporating biometrics, such as gait, into patient evaluations.
- Automating the workflow of adverse event reporting.
- Predicting future demand for medical imaging to optimize resources.
- Detecting sepsis and other hospital acquired infections earlier.
- Supporting cancer patients with personalized chatbots fueled by data and natural language processing.



Canada



Germany



Denmark



Sweden



Germany



Sweden



Italy



Turkey



Part of Pfizer
USA



Nederlands

AVANT

Japan

Deloitte.

Nederlands

Fifteen
(15)
use case

Thank you !

Microsoft and SAS : collaboration between health care technology leaders will positively impact clinical research



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