The Next Generation Hospital

A journey rather than a destination

Dr Andrew Jones

Head of Digital Transformation, AWS

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What is a Next Generation Hospital?

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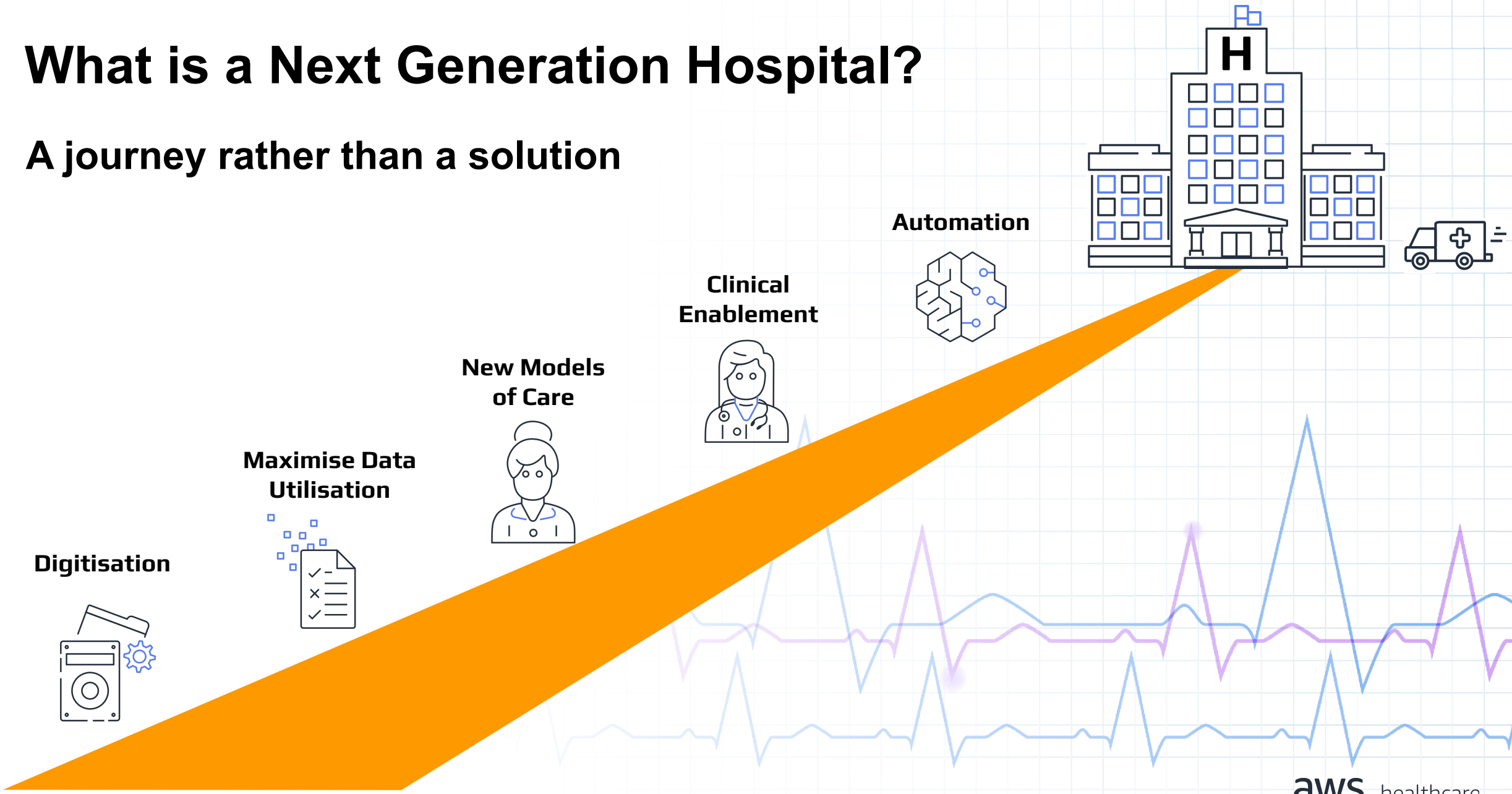
What is a Next Generation Hospital?

A journey rather than a solution



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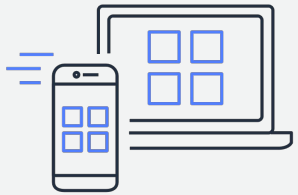
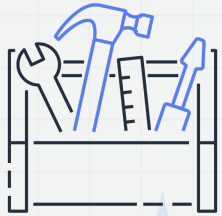
Digitisation



In the Cloud

Ingress Data at Scale



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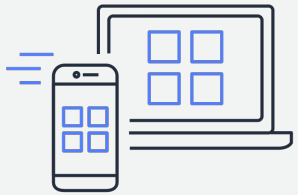

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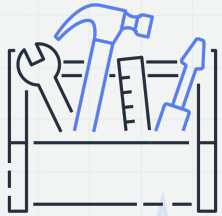

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In the Cloud

Improve the resilience, availability, performance & security of healthcare applications

Existing applications can be migrated

Several EPRs now available on AWS including Epic and Dedalus

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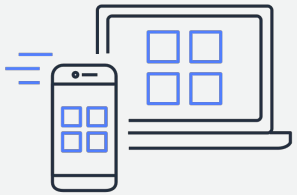
Use Cases



Move to the Cloud

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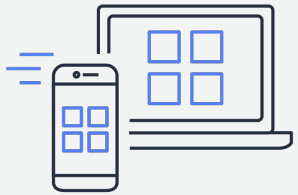

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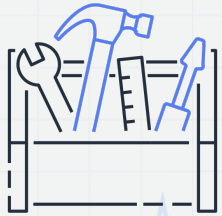

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Ingress Data at Scale

Multi-centre data collection & aggregation

Secure data environments

Patient generated data

System integration & IoMT

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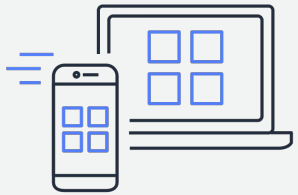

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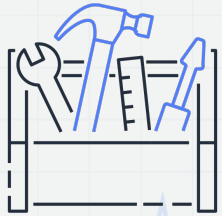

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Build new cloud applications

Fast cloud application development

Less than 12 weeks to develop national solutions during pandemic

Use new cloud services such as GenAI and ML

Scale to whole populations instantly

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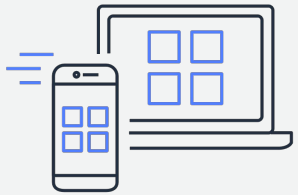

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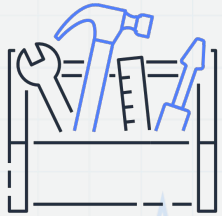

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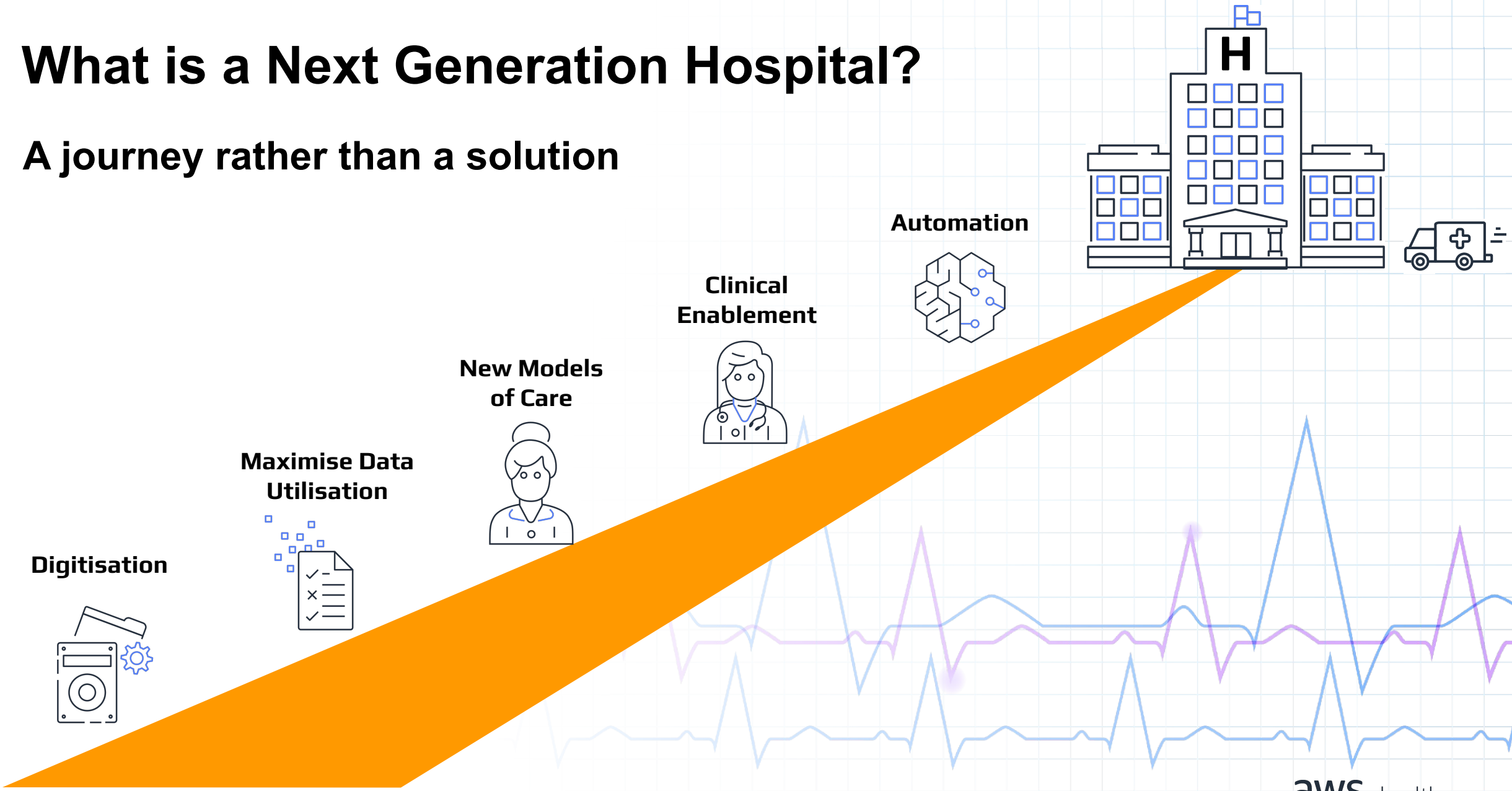

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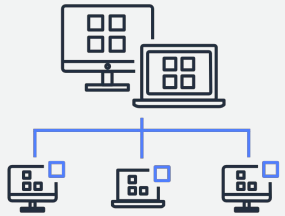
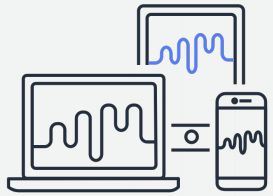
Maximise Data Utilisation



Increase Data Liquidity

- Free flow of data across the health economy
- Provide healthcare professionals with complete record
- Integration using open standards such as FHIR
- Procure solutions that enable data transfer and visualisation



Apply Advanced Analytics

- Use data to generate new insights into the needs of individual patients
- Improve health equity by identifying unmet population needs and risks
- Predict demand on care services to guide new services and investments

Transform Unstructured data

- Up to 80% of healthcare data is unstructured*
- Cloud based OCR, NLP and ML services can transform to structure information
- Amazon Comprehend Medical is an NLP trained on medical text

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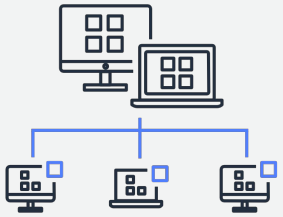

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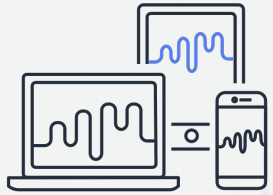
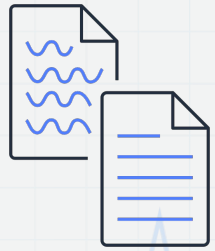


Insights & Prediction



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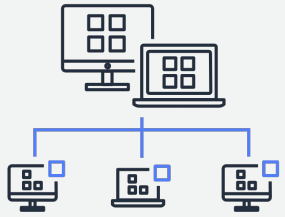

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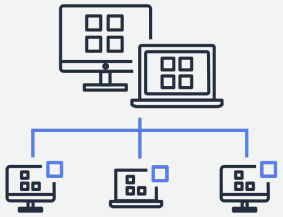

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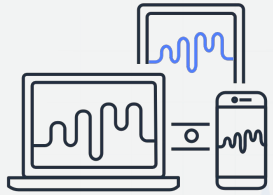

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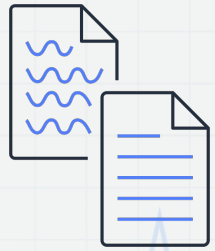

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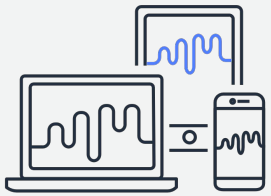

Insights & Prediction

Machine learning for insights and prediction

Intelligent document processing

Summarisation

GenAI / Foundation models

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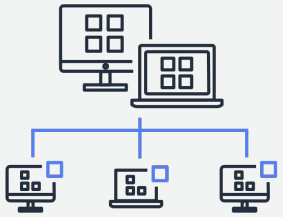

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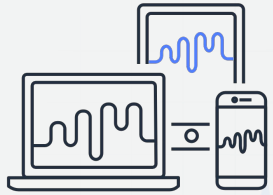

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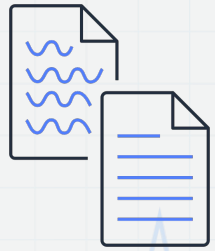

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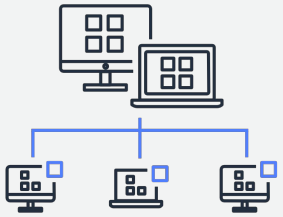

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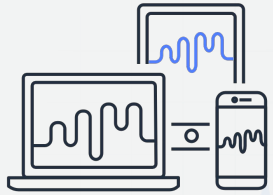

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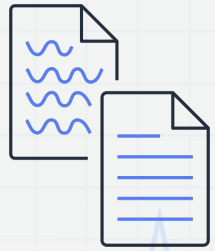

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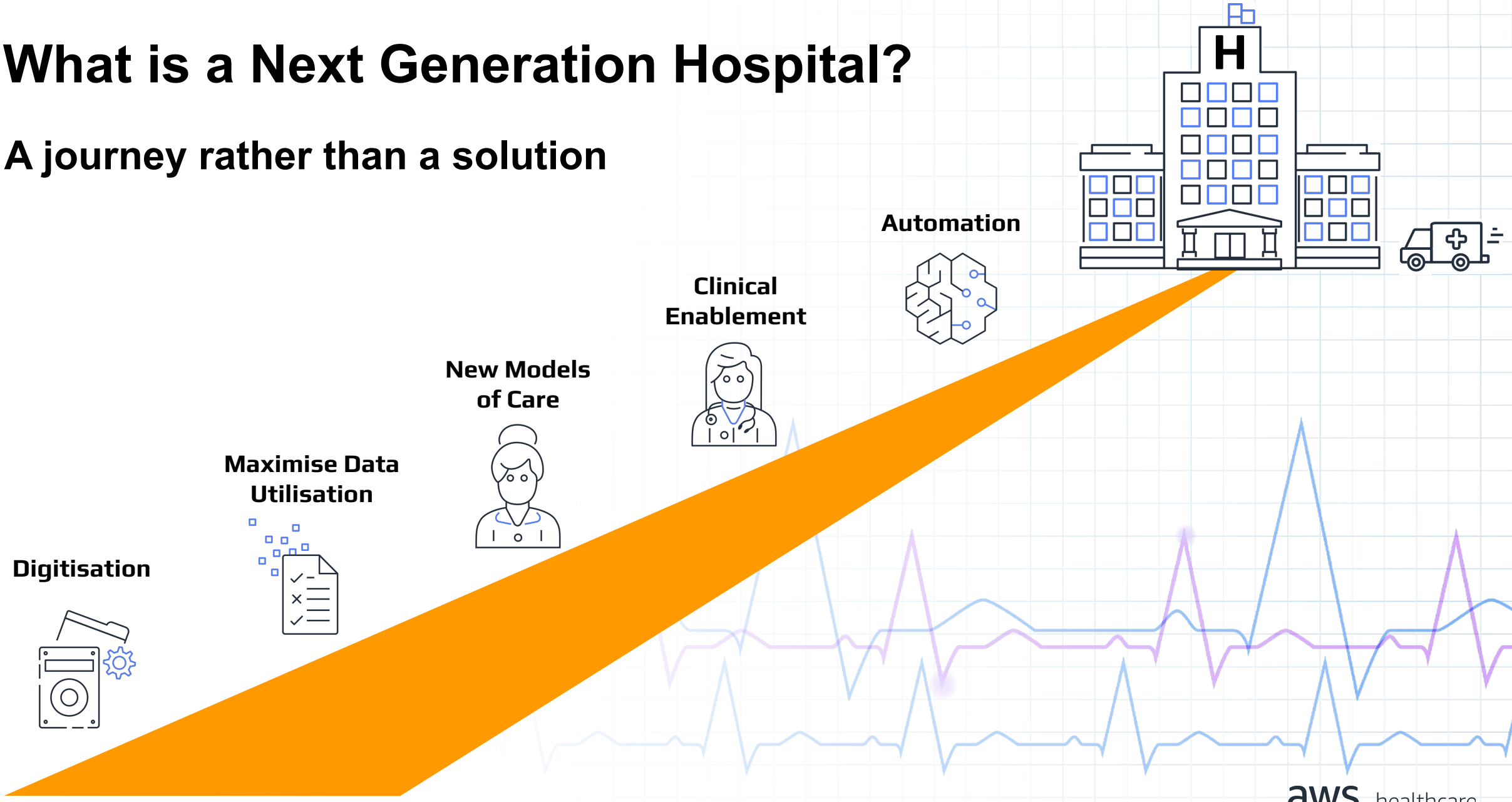

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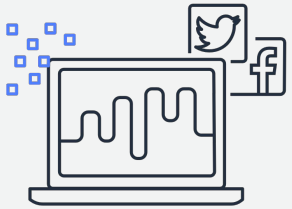
New Models of Care



New Patient Experiences

- Integration of health system centred around the patient
- Digital Front Door
- Multiple channels of communication including social media
- Increased mobility in where care is delivered

Virtual Care

- Remote monitoring in virtual wards has had a proven impact in reducing hospital admissions
- The quality of care remained unchanged
- Virtual consultations rose by 3000% over the pandemic

Personalisation with AI and ML

- Multichannel care customised to patient preferences
- Guidance responsive to phenomic patient data
- Increased precision by combining clinical records with genomic data

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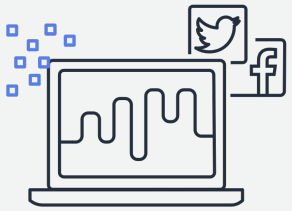

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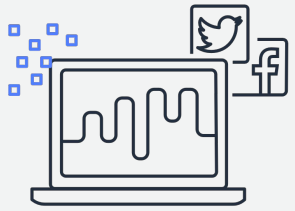

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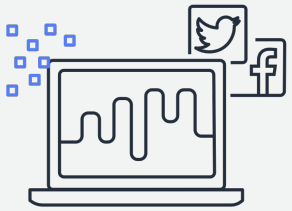

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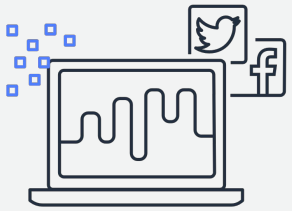

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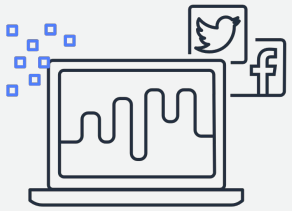

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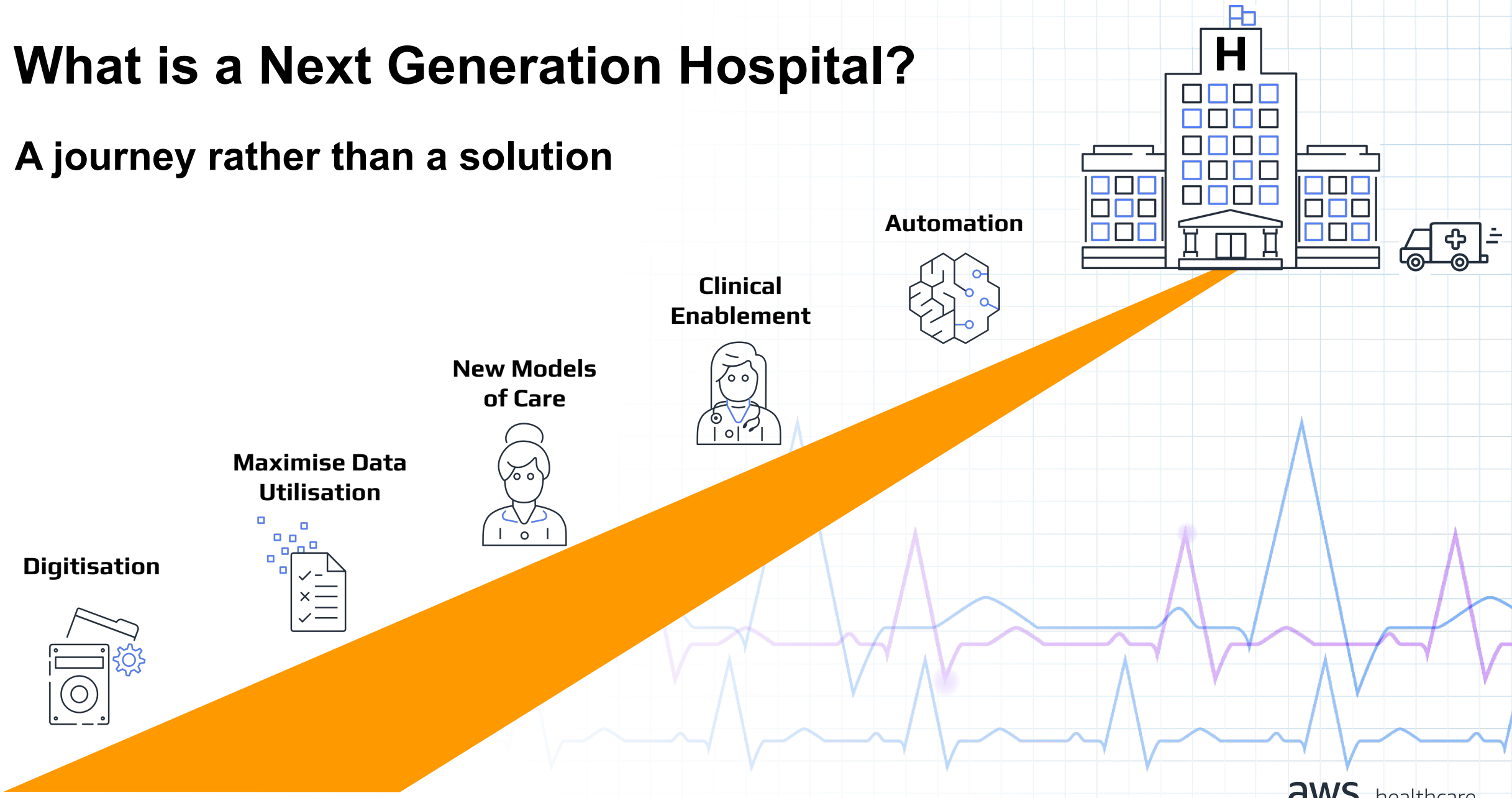

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Clinical Enablement

Backlog assistance

- Prioritise radiology backlogs using AI to identify high risk cases
- Automate the reporting of screening investigations
- Provide patients with self care options

Digital Scribes

- Combining voice recognition and natural language processing
- Capture the clinical consultation in structured data
- Removing the need for document creation and transcription

Reduce low value tasks

- 49% of Clinical time is spent on administration
- Robotic Process Automation
- Event based architectures
- Semi-automated workflows and pipelines with human in the loop

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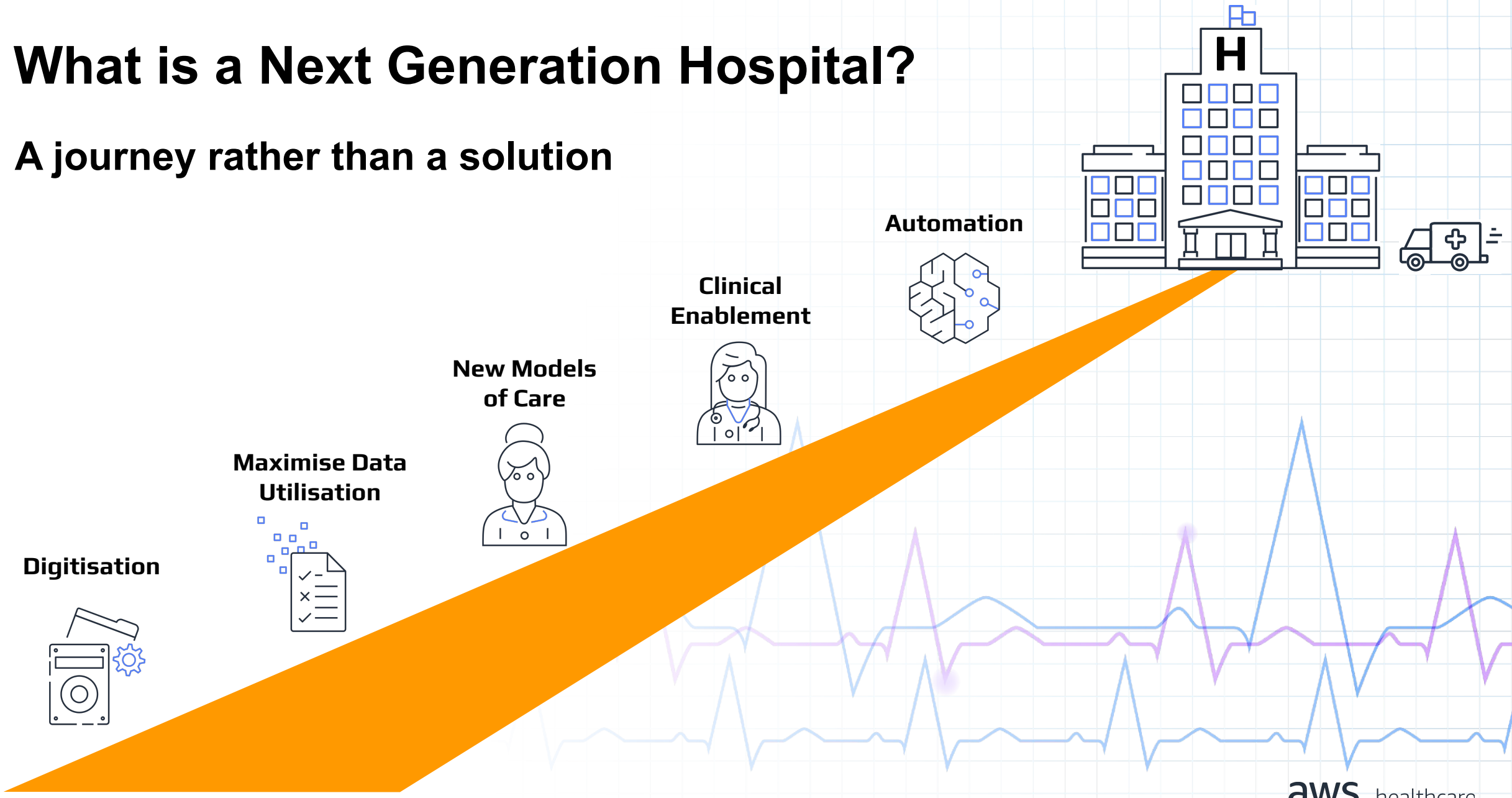

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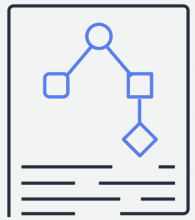
Automation

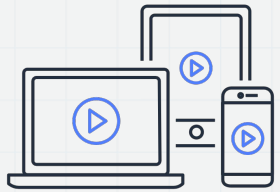
New ML models

- The increased availability of data allows for the creation of new machine learning models
- Amazon Sagemaker allows non data scientists to create their own models
- Accelerating the process of diagnosis, treatment and reducing risks to the patient



Event based architectures

- Event based architectures respond rapidly and at low cost
- Capable of delivering rule and model based decisions
- Relieve clinical and administrative staff of routine and low value tasks



AI driven Care Coordination

- Care coordination to automatically manage the patient journey
- Patient centric and responsive to individual needs
- AI to optimise pathway and improve communication

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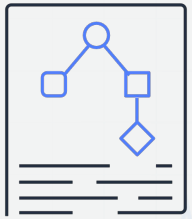
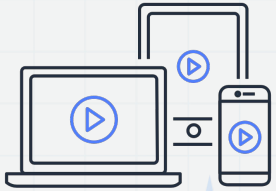
Automation

New ML and GenAI models



Event based architectures



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New ML and GenAI models

The increased availability of data allows for the creation of new machine learning and GenAI models

Amazon Sagemaker and Bedrock allows non data scientists to create their own models on your own data

Accelerating the process of diagnosis, treatment and reducing risks to the patient

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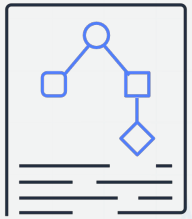
Automation

New ML and GenAI models



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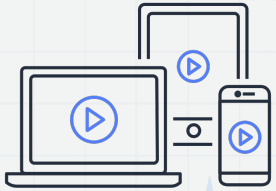

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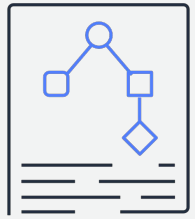

Event based architectures

Event based architectures respond rapidly and at low cost

Capable of delivering rule and model based decisions

Relieve clinical and administrative staff of routine and low value tasks

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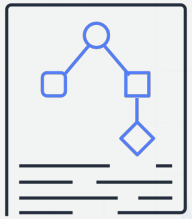

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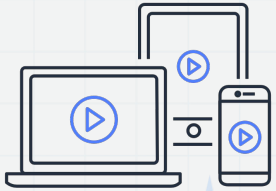

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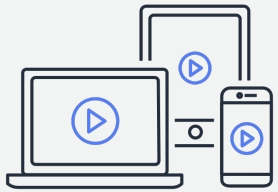

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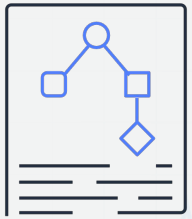

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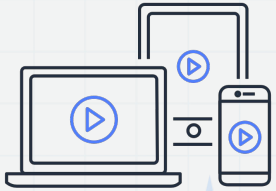

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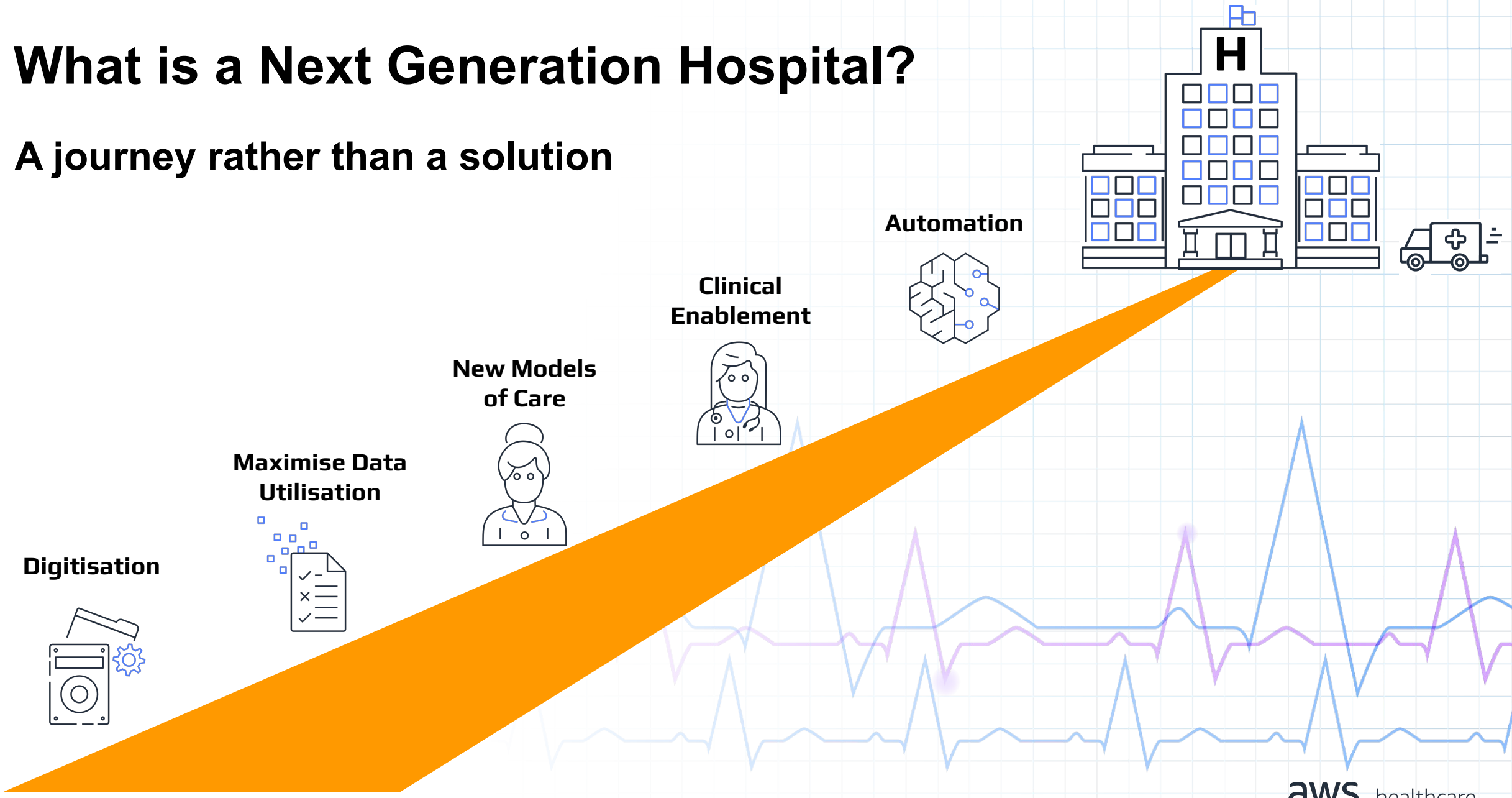
What is a Next Generation Hospital?

A journey rather than a solution



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Hospitals With and Without Walls

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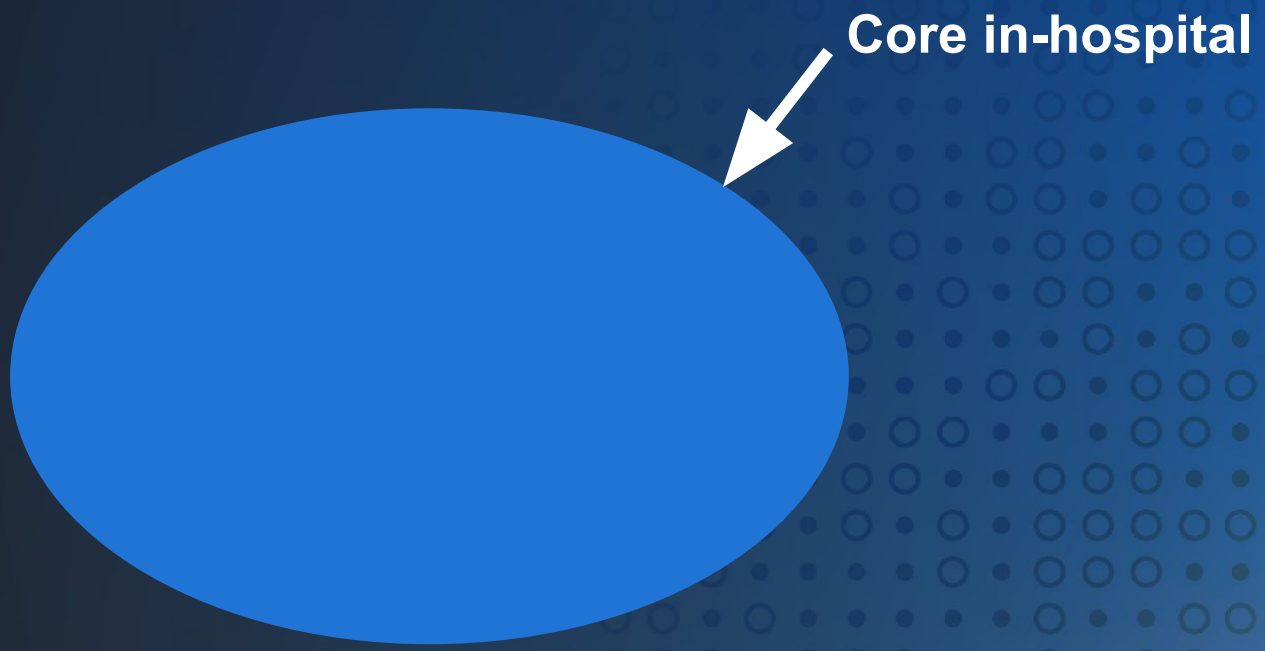
A Hospital With and Without Walls



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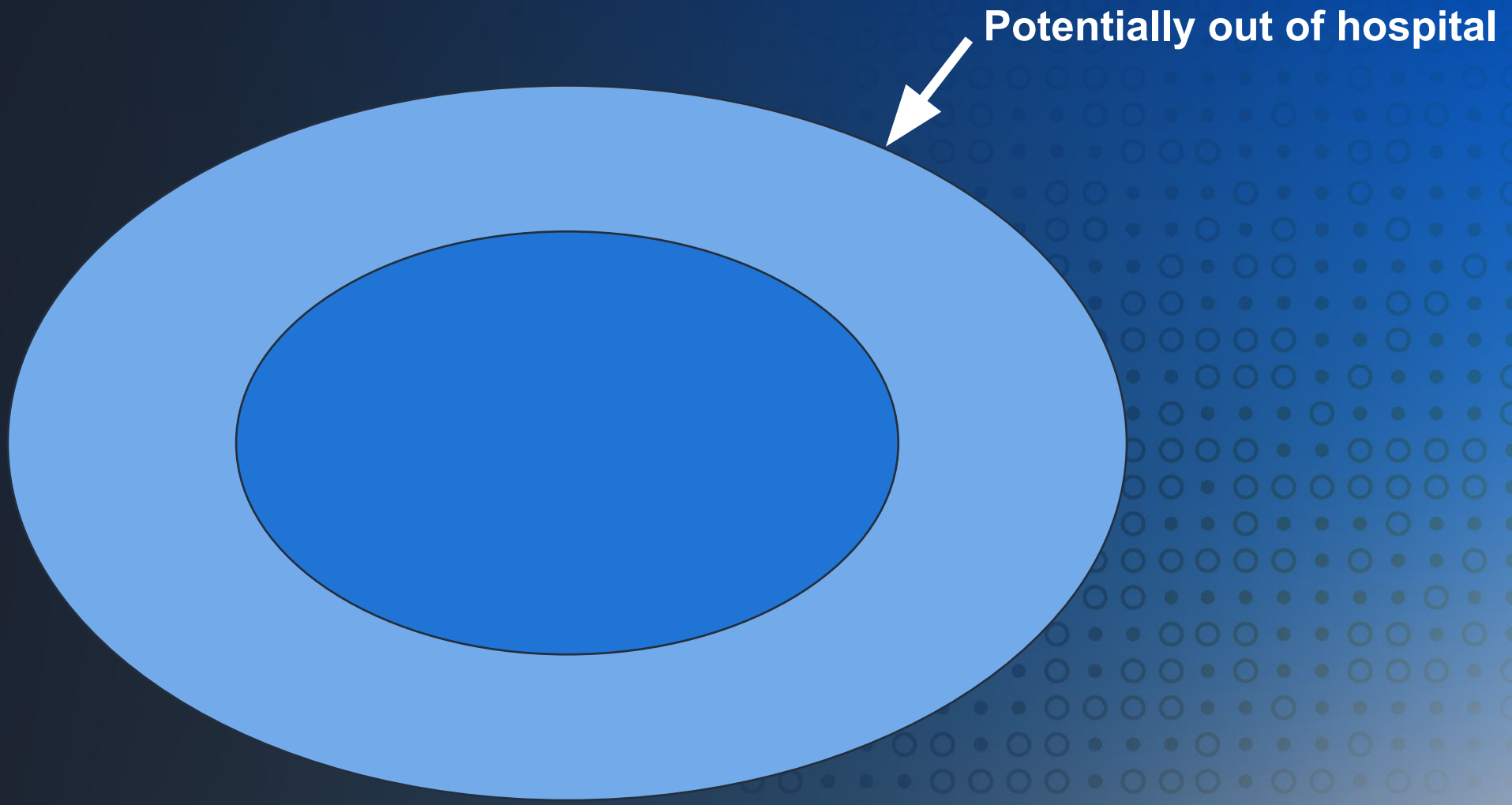
A Hospital With and Without Walls



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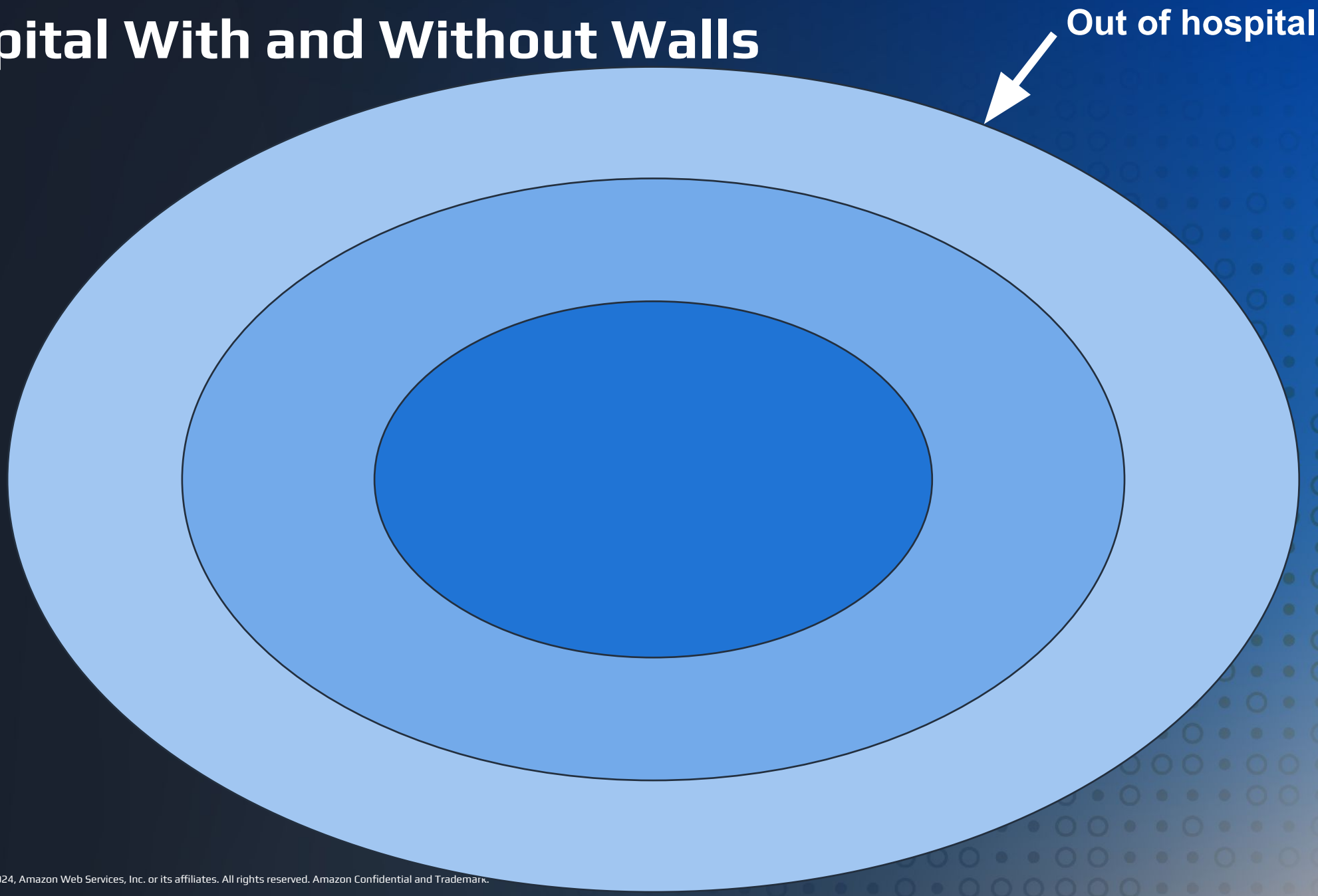

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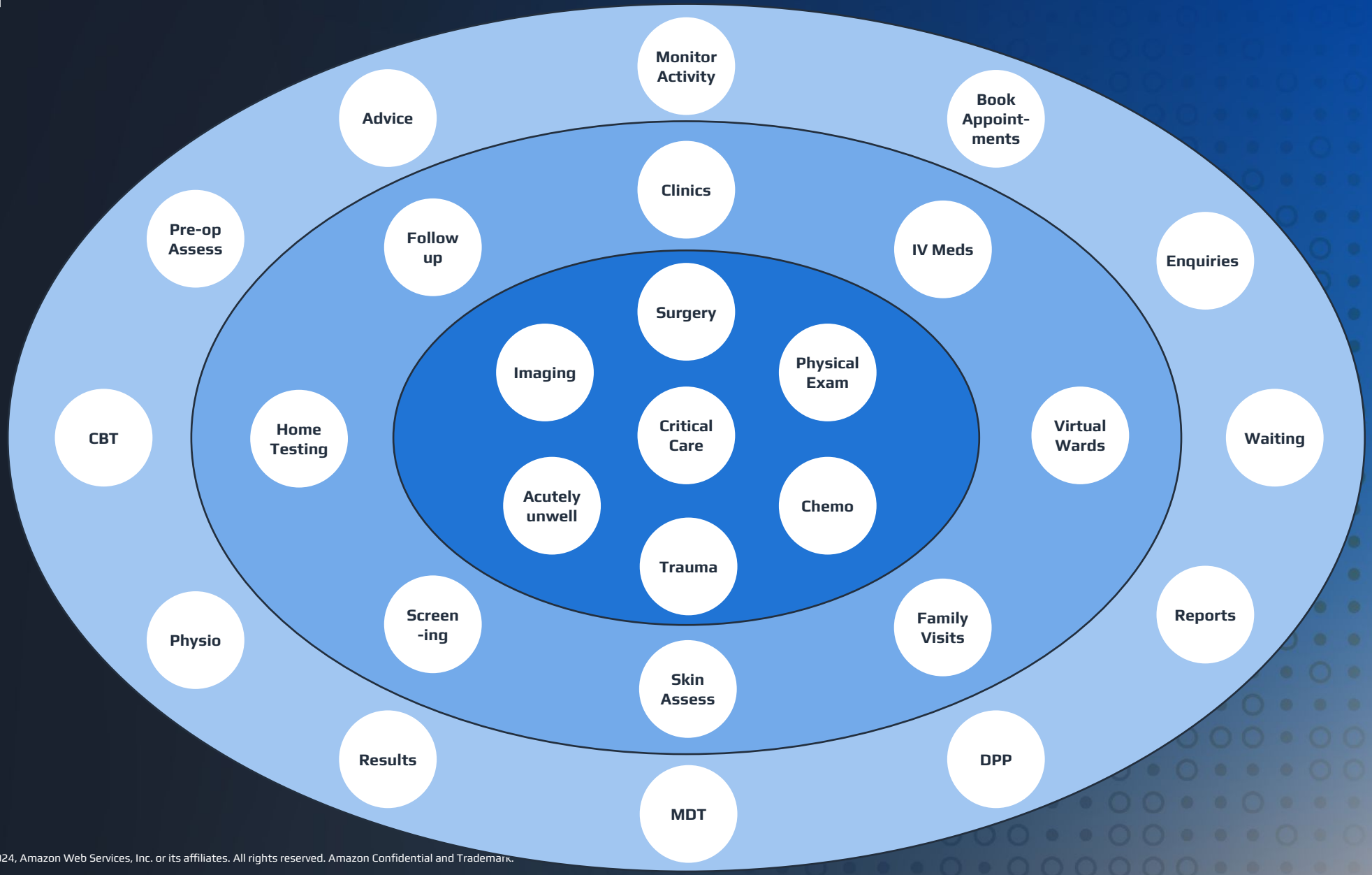

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The Target Architecture on AWS

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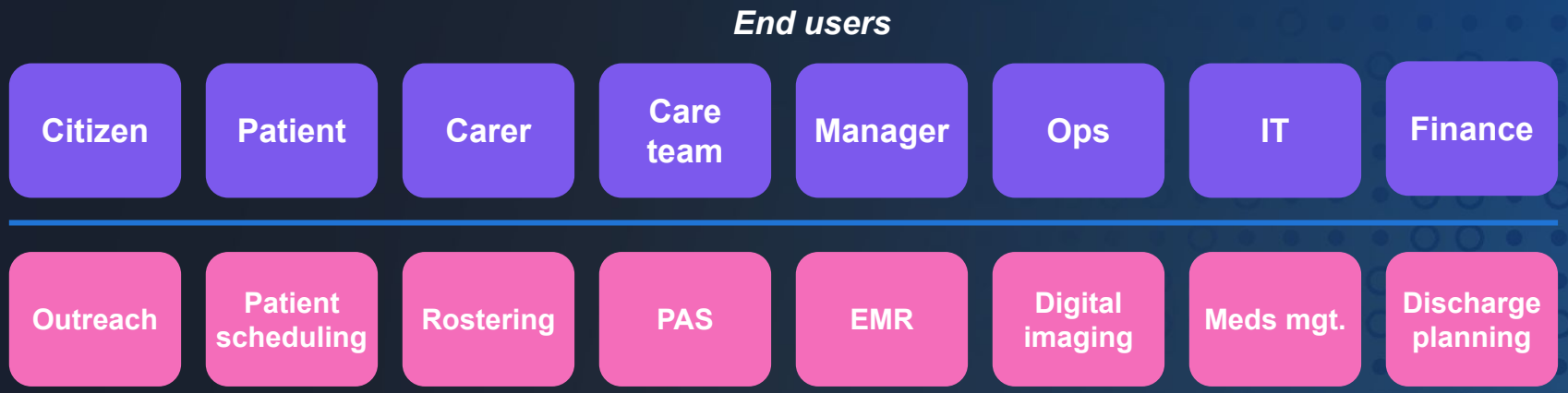

Design principles:

- Seamless integration of new services and delivery
- Self-generating data layer
- Simplified user experience
- Decreased unit cost of innovation

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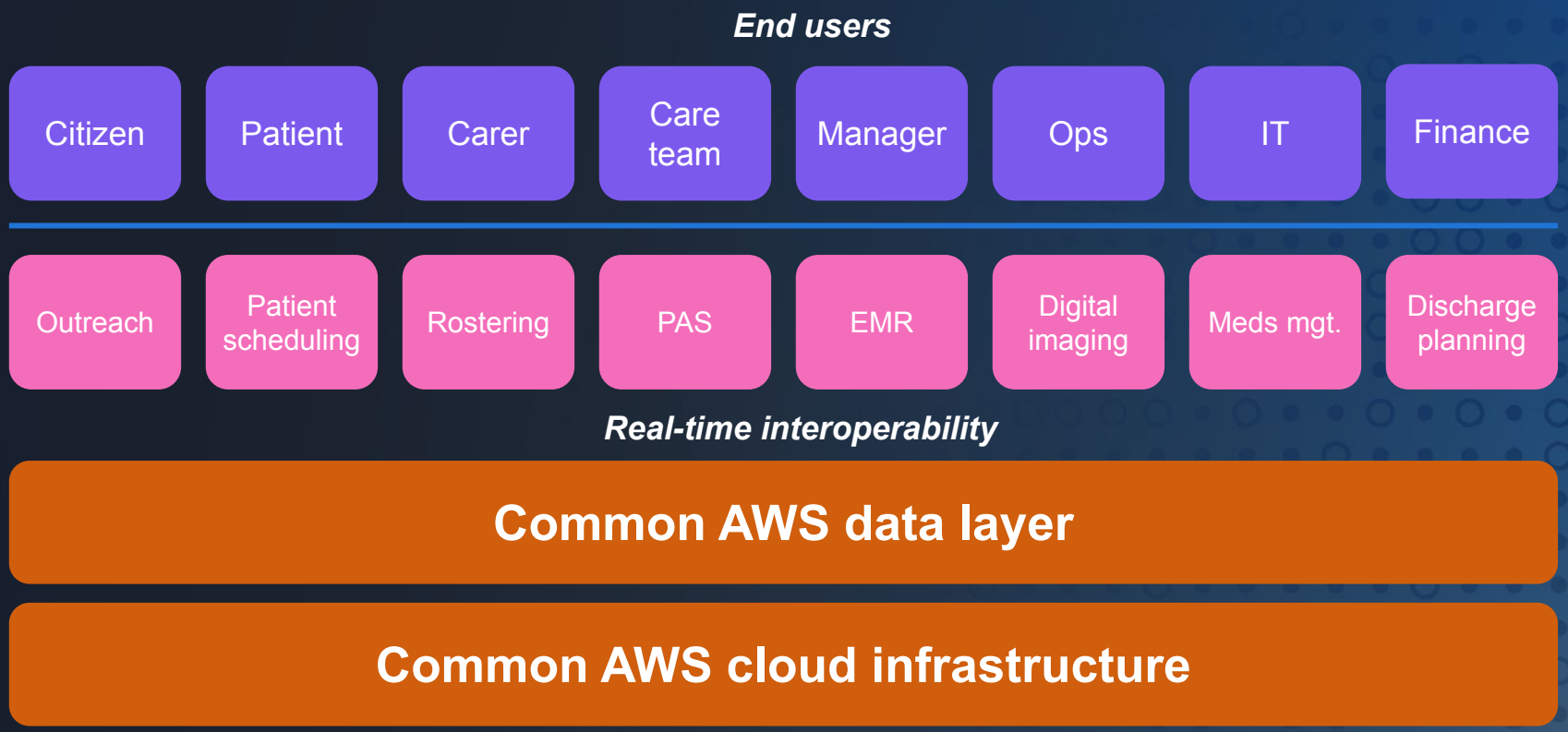

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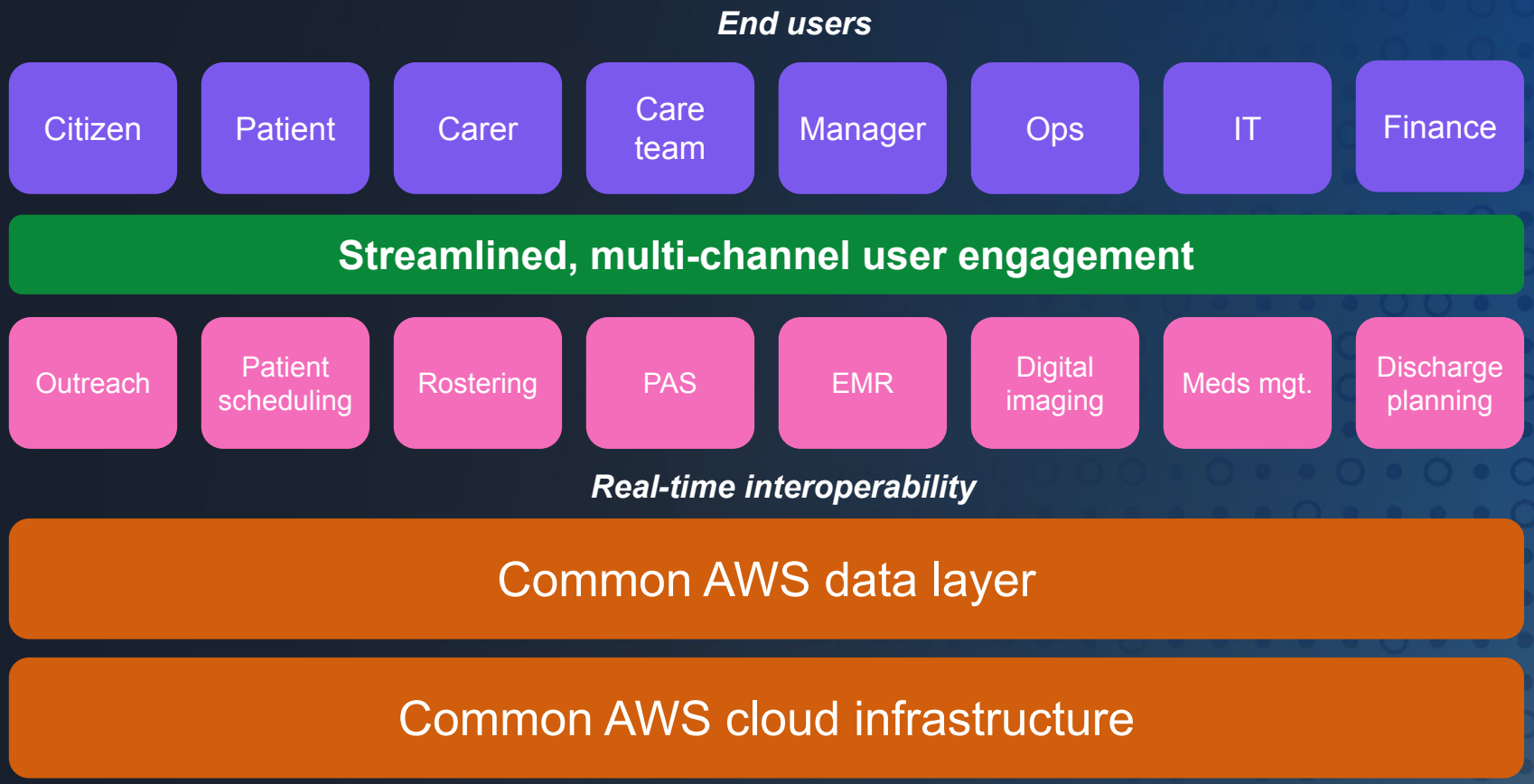

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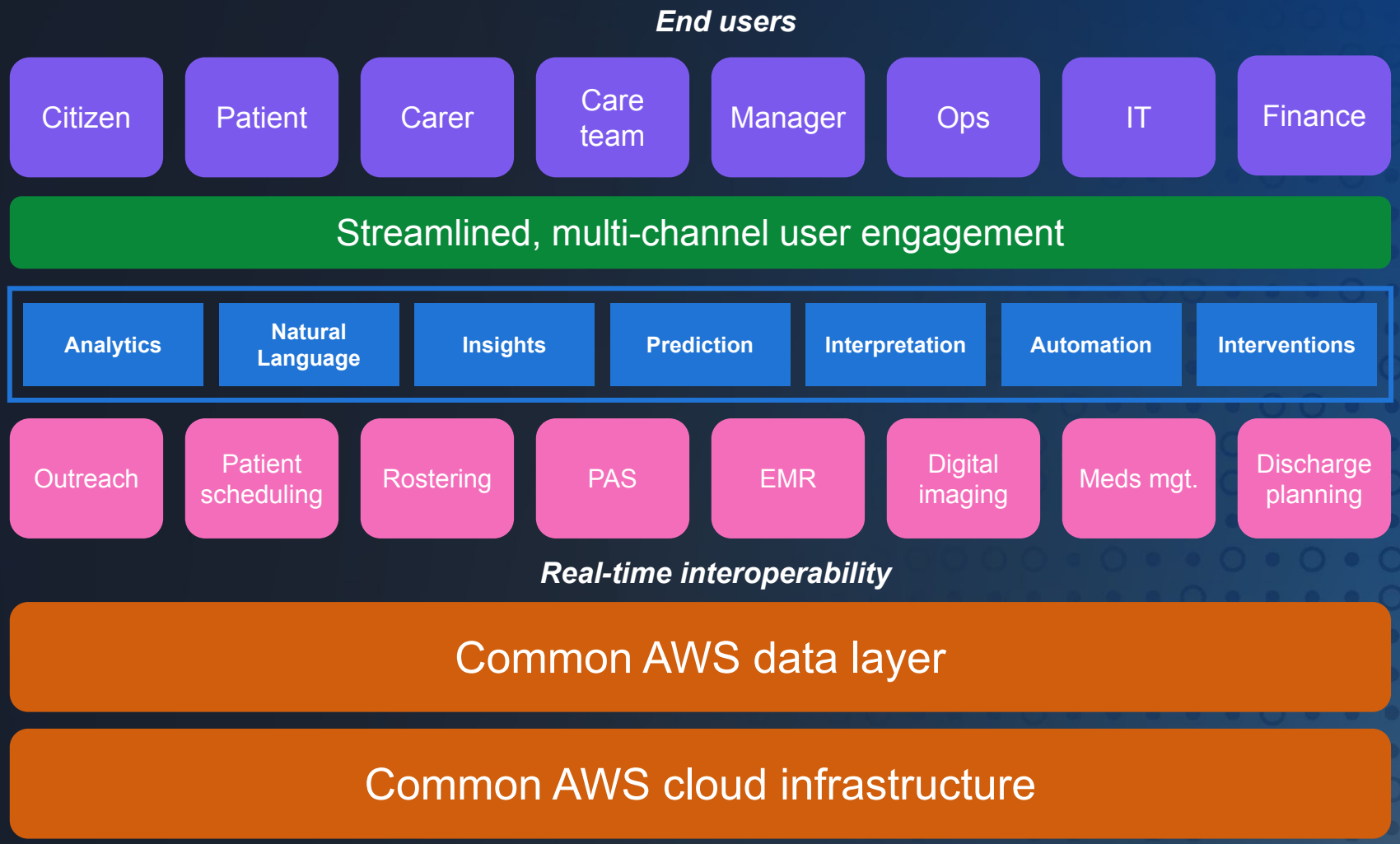

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Thank you!

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