Healthcare Digital Transformation

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What happened when 1B people became connected?

- Social marketing emerged
- IT architecture virtualized
- Entertainment is digitized
- Communications mobilized
- Retail & ad transformed

Consumer Internet
What happens when 50B machines become connected?

In 2015 there were about 5 billion TOTAL Internet-connected devices.

While in 2020, 50 billion machines will be online.
Digital industrial revolution is happening

By 2020...

- Gas turbines connected: 10K
- Jet engines connected: 68K
- Light bulbs connected: 100M
- Cars connected: 152M
A convergence of enabling technologies is setting the stage for industry transformation

1. Internet of Things
   - “Hospital of Things” plethora of devices
   - Accelerating Bio-sensor market/use
   - Mobile healthcare explosion – $27B by 20171

2. Intelligent Machines
   - Machines protecting and treating patients
   - Devices for new care givers and settings
   - Algorithms as updatable content

3. Big Data
   - High volume of data from physiology monitoring
   - Care shift from population median to high-def individual

4. Analytics
   - Forecasting and predicting future health
   - End of fee-for-service models drives data collect and analysis

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1 $27B by 2017 for Mobile health services:

The market for mHealth services has now entered the commercialization phase and will reach $26 billion globally by 2017 according to new “Global Mobile Health Market Report 2013-2017” by research2guidance. The report is one of the leading publications in the mHealth market. Companies that have purchased previous editions of the report includes: Agfa Healthcare, DTAG, Fresenius, Fujitsu, GE Healthcare, LG, Nokia, Novartis, Pfizer, Qualcomm, Roche, Roland Berger, Sanofi Aventis and many more.
Forces Shaping Healthcare Delivery

Healthcare delivery challenges from seismic shifts in the post-reform era

1. Rising Consumerism
   Meet competitive and regulatory demands to measure and improve patient experience
   - Americans waiting in ER more hours than necessary
   - 1.1M PATIENTS PER YEAR
   - American College of Emergency Physicians

2. Growth and Profitability
   Address unprecedented productivity and growth imperatives, while improving profitability
   - Medicare/Medicaid underpayments to hospitals in 2013
   - $518
   - American Hospital Association

3. Expanding Care
   Expand access to care with a shrinking labor force and resource constraints
   - 75% total US health care spend towards the treatment of chronic diseases
   - 75% TOTAL SPEND
   - Center for Medicare & Medicaid Services

4. Managing Risks
   Assuming greater financial accountability for medical risk
   - Preventable adverse drug events in the US every year
   - 1.5M PER YEAR
   - Institute of Medicine

5. Improving Outcomes
   Value based reimbursement replacing fee-for-service model
   - One-third of US health care expenditures did not improve health outcomes
   - $700B
   - Office of the Congressional Budget
Challenges of Healthcare

- Patient records not easily available when needed
- Increasing cost and burden of managing data growth
- Lack of systems' interoperability resulting in workflow inefficiencies

35% of patient cases misdiagnosed, contributed by lack of collaboration and access

153 exabytes of health data in 2013

2,314 exabytes of health data in 2020

$30B a year

Healthcare data growth by 2020

Interoperability of systems could save healthcare ecosystems

1 "Types and Origins of Diagnostic Errors in Primary Care Settings," Journal of American Medicine, 2013
The Digital Industrial Platform

Get Connected

Get Insights

Get Optimized

Continuum of GE Solutions Powered by Predix
Rise of Analytics
Higher order insights and new technology

Level 0 ➞ Retrospective reports

Level 1 ➞ Export for specialized processing

Level 2 ➞ Trending and simple forecasting

Level 3 ➞ Ad-hoc query and configurability

Level 4 ➞ Actionable integrations

Level 5 ➞ Predictive and learning based

Business Value

Capability - Analytic Features
Low
• Single scope
• Single domain/system
• Single data source
High
• X/Enterprise scope
• Cross-cutting domains
• Multi sourced

Technologies
- R
- Python
- MATLAB
- Spark
- Hive
- Storm
- Hadoop
- Cassandra
- Redis
- Riak
- CouchDB
Digital Twins
The Digital Industrial Platform
Healthcare Digital Layer & Ecosystem Vision

Scalable, secure and connected ecosystem designed to deliver healthcare specific software functionality and applications ‘as-a-service’

On-Prem connectivity and managed compute for data access and analytics at edge

Cloud Apps deliver new business use cases that can cut across care boundaries

Open ecosystem fuels contributions and added value product adjacencies

Connected Devices, Systems & Facilities
GEHC and 3rd Parties

Applications
GE Health Cloud
Open Ecosystem

Partners and 3rd Parties
Services and Apps

Fuel business growth by addressing new digital opportunities and supplementing core business product lines
Leveraging cloud elastic processing for ubiquitous access to reconstruction and latest clinical insights algorithms

Could enable 15,000 GE Healthcare MRI units with risk quantification for Alzheimer's, Dementia, Multiple sclerosis, Trauma and Epilepsy.

Could enable 2,500 GE PET units with risk quantification for Alzheimer's and other Dementia, with FDG and Flutemetamol.

Could enable 30,000 GE CT units with on-demand model based reconstruction for lower dose on pediatric patients.

From 5 million today to 13.8 million Alzheimer’s patients in the US by 20501

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Any descriptions of future functionality reflect current product direction, are for informational purposes only and do not constitute a commitment to provide specific functionality. Timing and availability are subject to change and applicable regulatory approvals.
Take away messages

• Digital transformation is happening in every industry
• Cloud based storage, access and analysis provides potential benefits for healthcare
• Open ecosystem fuels collaboration