Re-architecting Healthcare

Challenges and Opportunities in THE Digital Age

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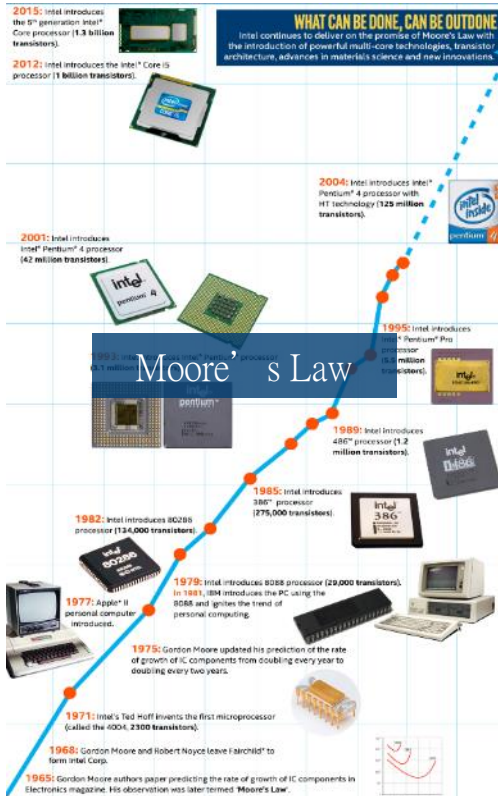# *Technologies 're-aRchitect' our daily lives*

Clothing

Food

Live

Transportation

Fission development of technologies sets the stage

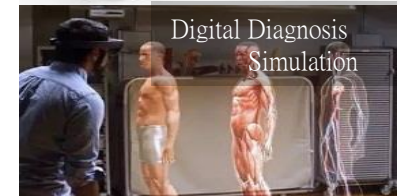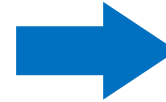More Computing
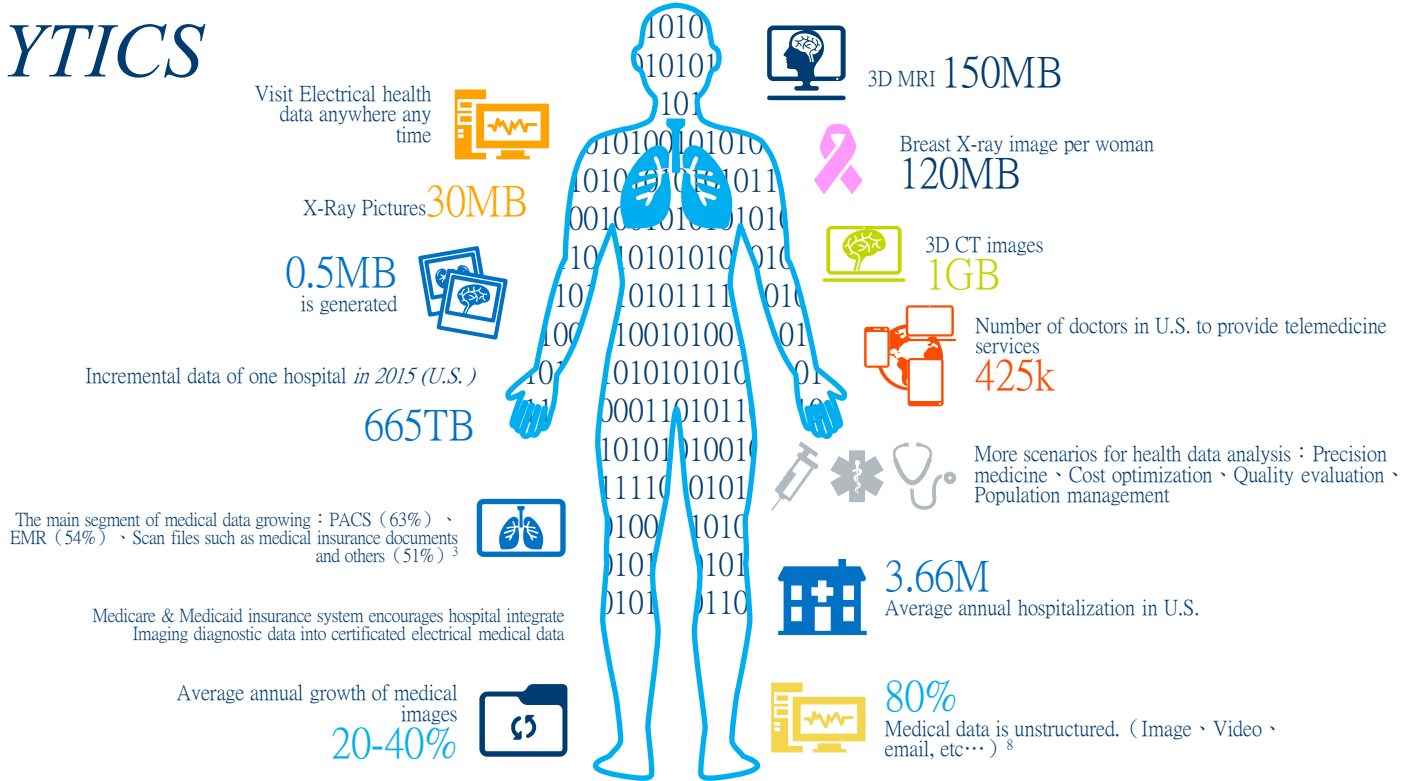
Greater Storage

Fast Bandwidth

Smaller Physical Size
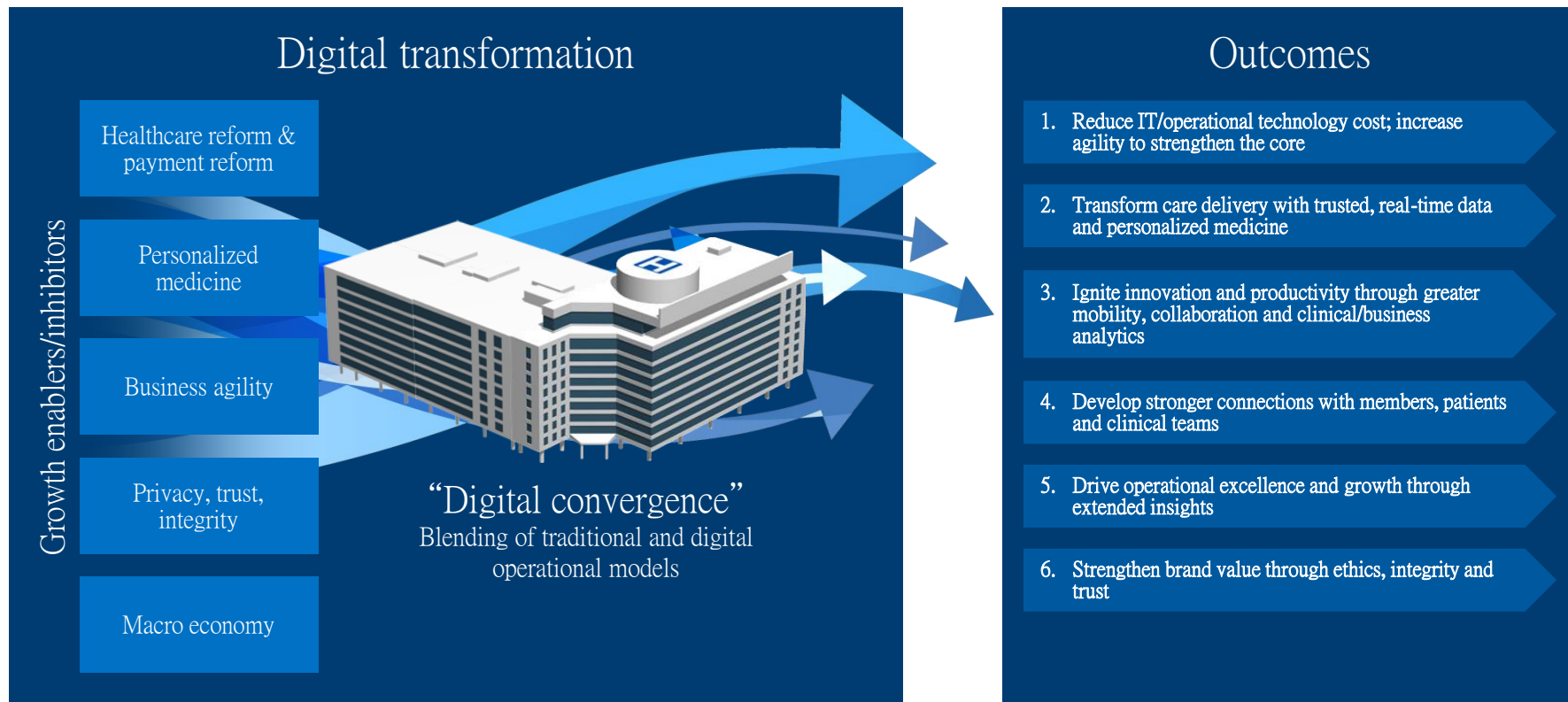
Intelligent Software

Lower Price

Moore's Law

Medical Data Analysis

Doctor-patient Remote Communication

Device Miniaturization Intelligentize

Digital Diagnosis Simulation

Data technologies dramatically promote health ANALYTICS

3D MRI 150MB

Visit Electrical health data anywhere any time

Breast X-ray image per woman
120MB

X-Ray Pictures 30MB

3D CT images
1GB

0.5MB is generated

Number of doctors in U.S. to provide telemedicine services
425k

Incremental data of one hospital *in 2015 (U.S.)*
665TB

More scenarios for health data analysis：Precision medicine、Cost optimization、Quality evaluation、Population management

The main segment of medical data growing：PACS（63%）、EMR（54%）、Scan files such as medical insurance documents and others（51%）[3]

3.66M
Average annual hospitalization in U.S.

Medicare & Medicaid insurance system encourages hospital integrate Imaging diagnostic data into certificated electrical medical data

80%
Medical data is unstructured.（Image、Video、email, etc…）[8]

Average annual growth of medical images
20-40%

Vortex of change – what are your expectations?

Digital transformation

Growth enablers/inhibitors

- Healthcare reform & payment reform
- Personalized medicine
- Business agility
- Privacy, trust, integrity
- Macro economy

"Digital convergence"
Blending of traditional and digital operational models

Outcomes

1. Reduce IT/operational technology cost; increase agility to strengthen the core
2. Transform care delivery with trusted, real-time data and personalized medicine
3. Ignite innovation and productivity through greater mobility, collaboration and clinical/business analytics
4. Develop stronger connections with members, patients and clinical teams
5. Drive operational excellence and growth through extended insights
6. Strengthen brand value through ethics, integrity and trust

Intel's vision

Next 10 Years

50% Medical service will occur outside the walls of medical institutes ……

One size does not fit all. What is your use case?

Consume vs. create

Online vs. offline

Peripherals availability

Real-time performance

Sanitize and ruggedize

Software availability

Wi-Fi vs. cellular service

Multitasking

coordinated care: Integration of health management and medical services

Consumer Health Service Provider	Medical Team, Research Institute	Business Innovators
Collect, track and share health data in order to obtain a comprehensive status of health and reduce overall health costs.	Analyze daily data flow of patient information to identify more effective collaboration, discover new insights, and improve medical service quality.	The new interaction model between doctors and patients improves participation and creates opportunity for new business models.

Facilitated by health management devices, sensors, data interoperability and integration, cheaper and scalable data storage, clinical and predictive data analysis technologies, reasonable data security and new care models.

Vision: All in one day

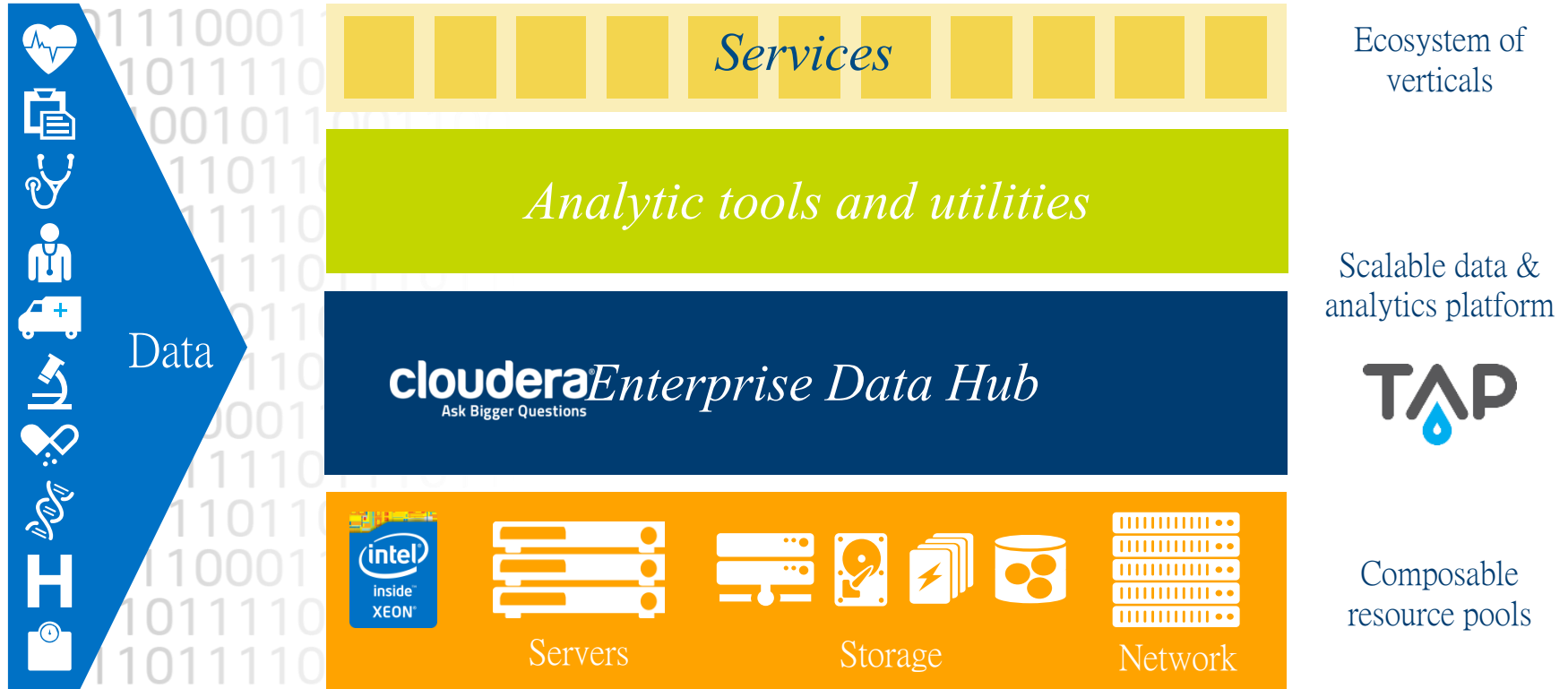| | Disease genes pathways and phenotypes identified | | ...cision ...thcare |

Precision medicine: All in one day by ... 2020

Compute and storage clusters > Accelerate genome and image analysis

Federated cloud computing > Enable secure sharing of data and results worldwide with privacy preservation

Big data analytics > Guide personalized disease management

The big data platform

Services — Ecosystem of verticals

Analytic tools and utilities

cloudera Ask Bigger Questions — *Enterprise Data Hub* — Scalable data & analytics platform

TAP

Servers   Storage   Network — Composable resource pools

Data

*Other names and brands may be claimed as the property of others.

Whatever the re-architect is doctors and patients Remain AT THE CORE

PRC Health & Life Science Case in 2015

Backup Slides

China Health All-in-one medical tablet

220ku in 200k rural clinic by 2016

Base Intel platform & optimization

Farmer can do blood/Urine/ECG analysis through rural GP doctor

Affordable medical service in China

Key China National Policy, all 700k rural clinic in 2018
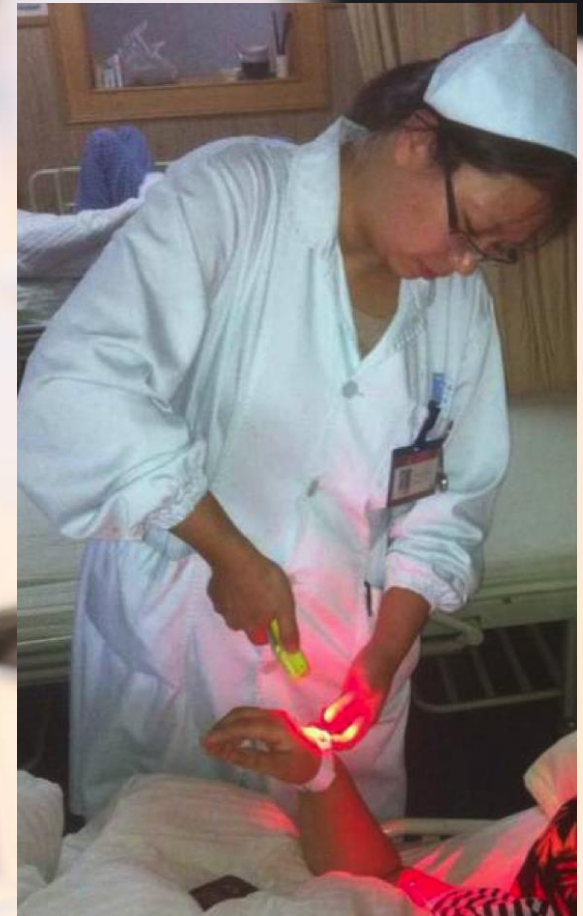
Innovative Nurse Phablet

The 1st 5'' Phablet

Specific for medical

Barcode/RFID/WiFi

OEM: Lenovo + Neusoft

EMR Integration

Upgrading to 4G/LET

Intel Primary Clinic Cloud Image Solution

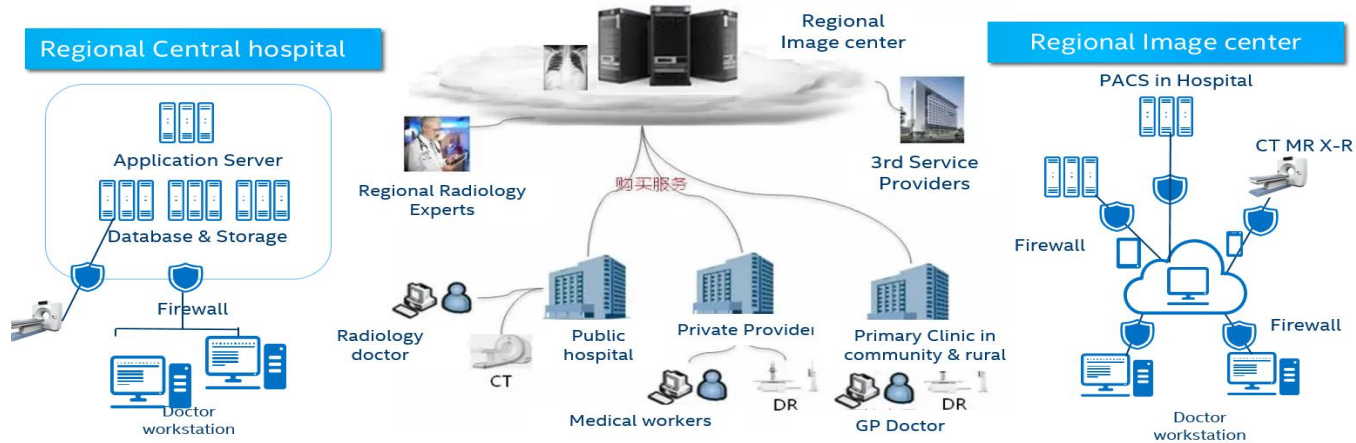| Government	Clinics	Citizens
- Provincial cloud platform serve all clinics, centralized data aggregation; - Easy, secure and quick scale out business development and management; - Reduce the cost on deployment and maintenance >30% - Strengthen government supervision and coordination functions	- Open-stack and cloud management by Intel, clinicians easy to access and customize - Through data exchange through cloud, easy to get support from hospitals; - No need data center on each clinic, improve incomes to all	- Explore personal medical record even through different clinics; - Diagnosis in primary clinics but support by hospital through cloud - Decrease long period to visit hospital and satisfy for Clinic doctor proactive knowing historical data

Open Stack Cloud Architect

Green hospital Solution

- Reducing the energy consumption is a long term national policy

- MOH policy required and support the green hospital projects

  1. The MOH have provided 5M for the 44 subsidiary hospitals to build up system

  2. In Nov. 2015, the center of statistics and health information is publishing the bidding for their own energy consumption platform system to monitor all the sub hospitals

- In May 2015, China Hospitals Energy Conservation Industry Union Ceremony was established.

- National and local standards are built and developed to cooperate green hospitals projects promotion

Green hospital power manage system

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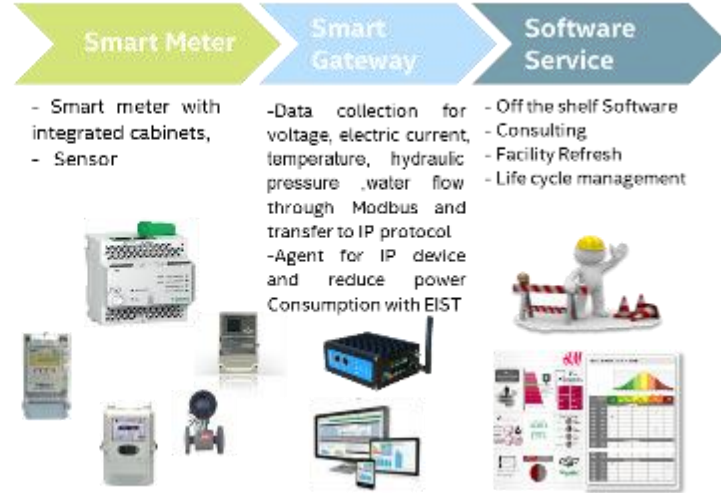Smart Metering+

Smart Gateway+

Software Service

Smart Meter
- Smart meter with integrated cabinets,
- Sensor

Smart Gateway
-Data collection for voltage, electric current, temperature, hydraulic pressure ,water flow through Modbus and transfer to IP protocol
-Agent for IP device and reduce power Consumption with EIST

Software Service
- Off the shelf Software
- Consulting
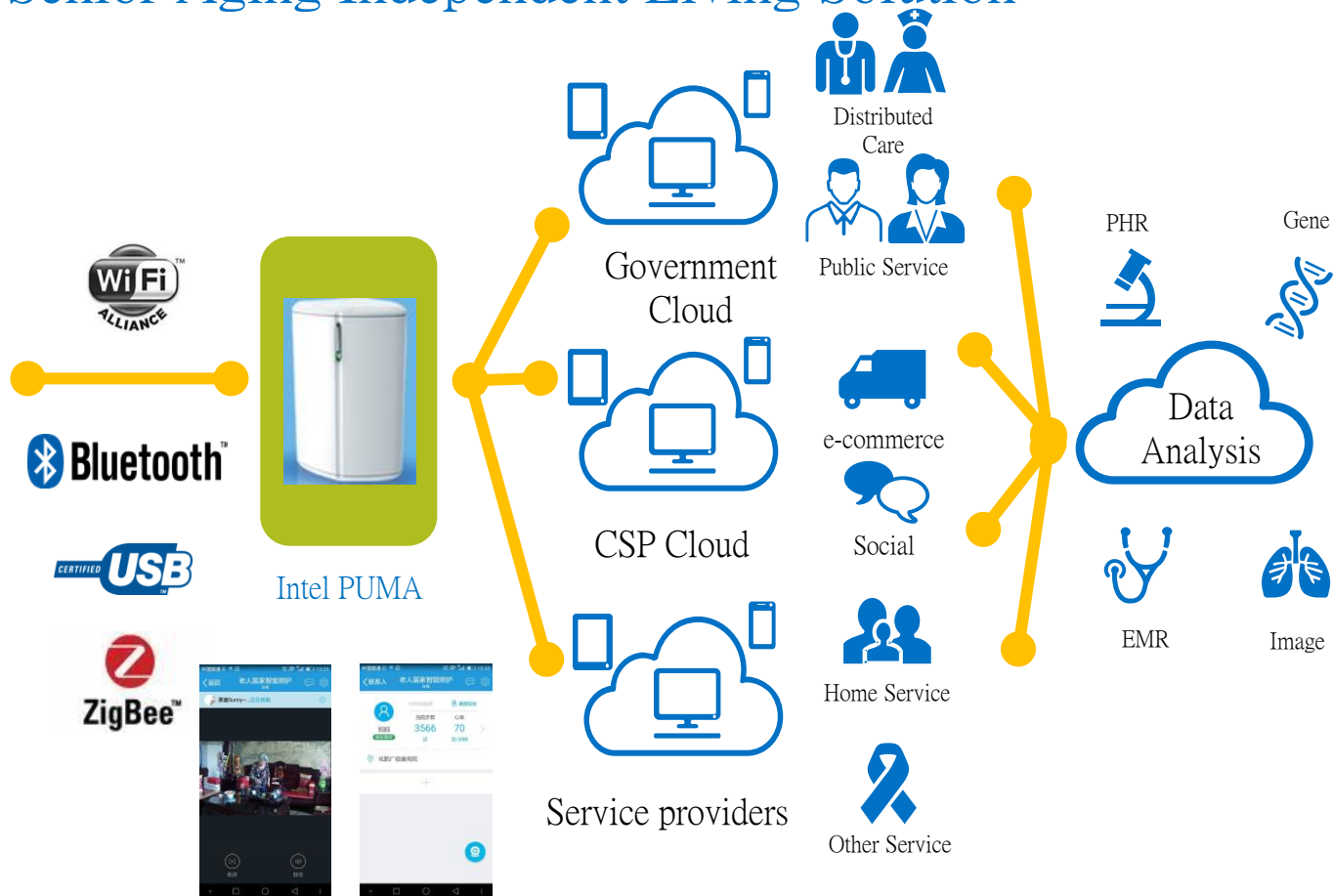- Facility Refresh
- Life cycle management

- Monitor the reality of power consumption through the integration Intel smart gateway

- Reduce power consumption through IT technology (EIST)

- Client refresh with low power consumption solution

Intel Senior Aging Independent Living Solution

Thermometer

Pulse Oximeter

Pulse / Blood Pressure

Weight Scale

Glucose Meter

Cardio / Strength

Independent Living Activity

Peak Flow

Watch

Physical Activity

WiFi ALLIANCE™

Bluetooth™

CERTIFIED USB™

ZigBee™

Intel PUMA

Government Cloud

CSP Cloud

Service providers

Distributed Care

Public Service

e-commerce

Social

Home Service

Other Service

PHR

Gene

Data Analysis

EMR

Image

Intel.com/healthcare