



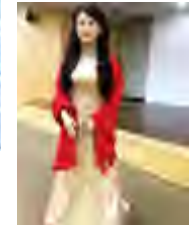
CloudMinds

Cloud Based Intelligent Robots in Healthcare

Charles Guo, MD PhD

A Large Variety of Robots are Rapidly Integrated into Human Live

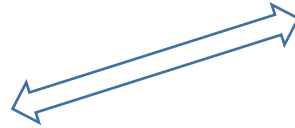
“A **robot** is a mechanical or virtual artificial agent, usually an electro-mechanical machine that is guided by a computer program or electronic circuitry.” ---Wikipedia



Cloud-based AI as “Brain” is a Preferred Solution for Intelligent Robots

Beautiful: !!!

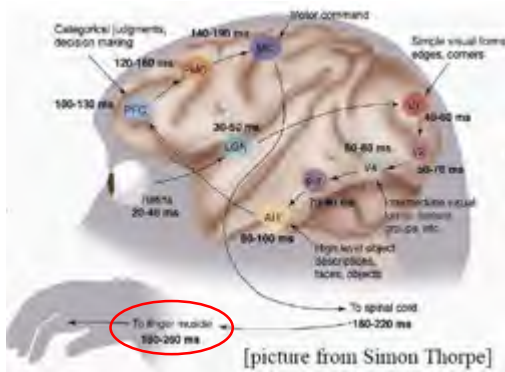
Intelligent: ???



Different in :

- Size,
- Weight
- Energy Consumption
- Calculating Speed
- ...

The Modern Communication Technologies Guarantee the Coordination of Robot-Human Interaction



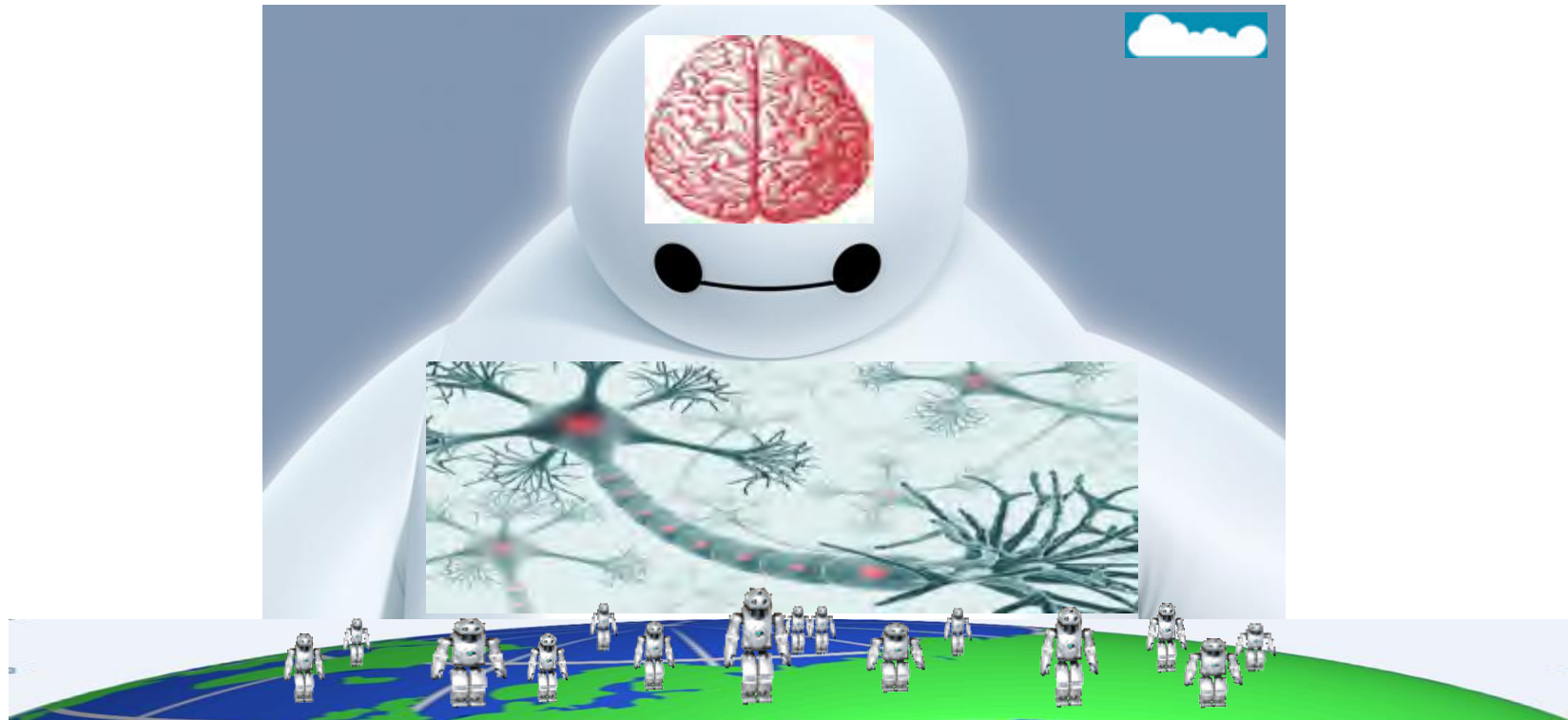
The maximal Nerve Conduction Velocity (NCV) is ~120 m/s

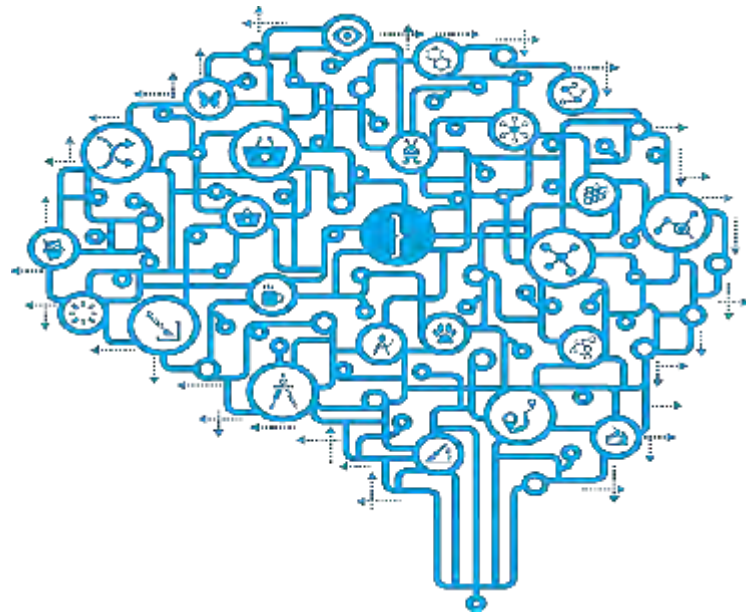


5G Capacities Expected:

- 1,000x increase in capacity
- Support for 100+ billion connections
- Up to 10 Gbit/s speeds
- Below 1ms latency

“Cloud-Network-Terminal” is a Preferred Ecosystem for Robotic Society

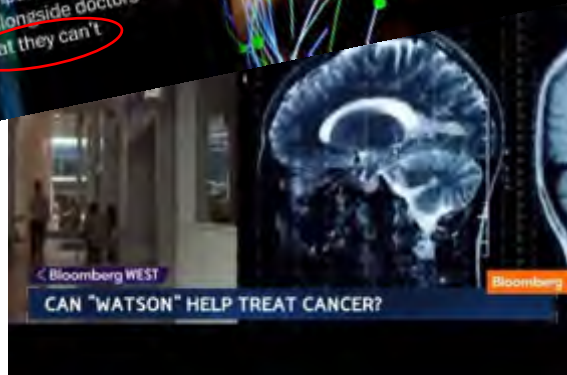




After Challenging Human Bing Successfully, Watson and AlphaGo Serve Human Health Dearly



IBM Watson Declares War against Human Cancer



Watson for Oncology

Get oncologists the assistance they need to make more informed treatment decisions. Watson for Oncology analyzes a patient's medical information against a vast array of data and expertise to provide evidence-based treatment options.

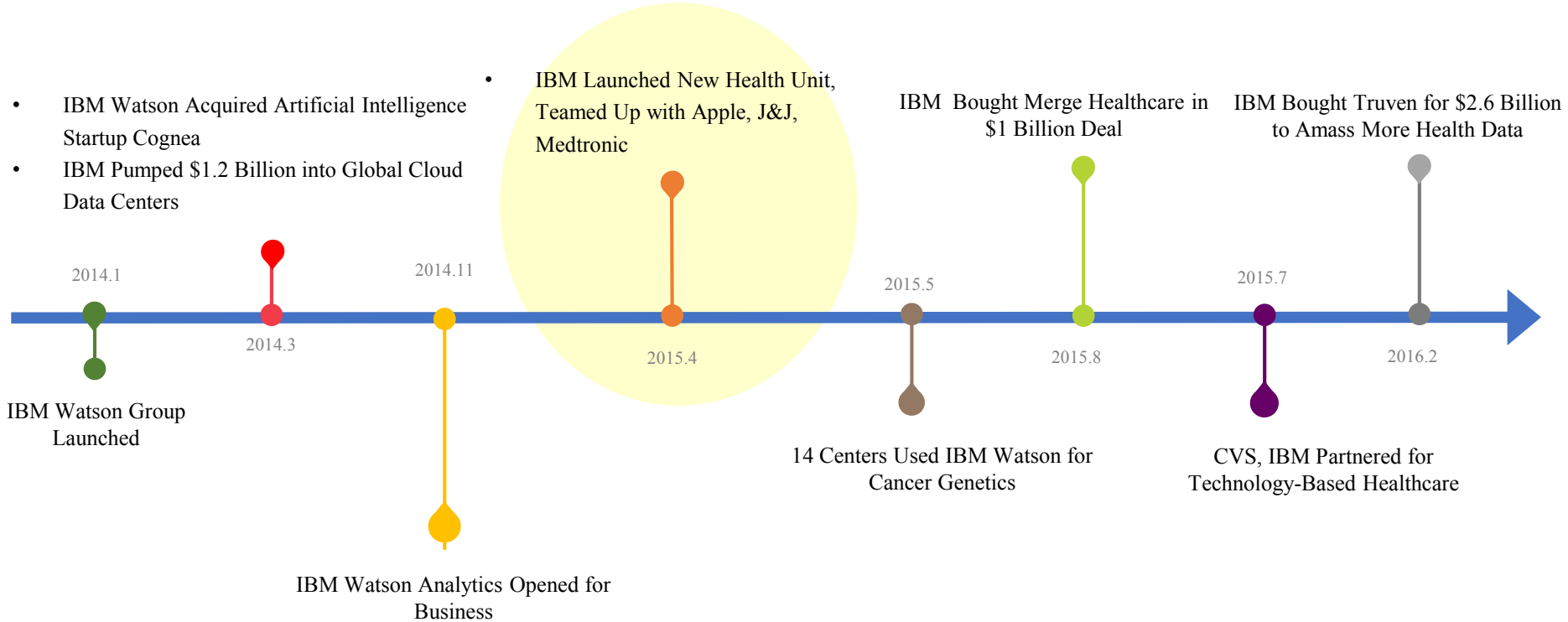
Watson for Clinical Trial Matching

Uncover promising new approaches often unavailable outside of the clinical trial setting. With Watson for Clinical Trial Matching, doctors can narrow down a wide pool of available cancer trials and quickly identify potential matches for patients.

Watson Engages in Healthcare with a Clear Mission

- IBM Watson Acquired Artificial Intelligence Startup Cognition
- IBM Pumped \$1.2 Billion into Global Cloud Data Centers

- IBM Launched New Health Unit, Teamed Up with Apple, J&J, Medtronic



Watson Integrates Different Key Technologies


Big Data & Analytics

Data Mining, Optimization, Text Analytics

A visualization of data flow, showing a central point with many lines radiating outwards, resembling a network or a fan of data paths.

Artificial Intelligence

Machine Learning, Natural Language Processing, Algorithms & Theory

A visualization of a neural network or data points, showing a cluster of blue dots with lines connecting them, suggesting interconnected data or learning processes.

Cognitive Experience

HCI, Speech, Translation, Machine Vision, Visualization

A close-up image of a person's eyes, with a blue glow around them, symbolizing human perception and interaction.


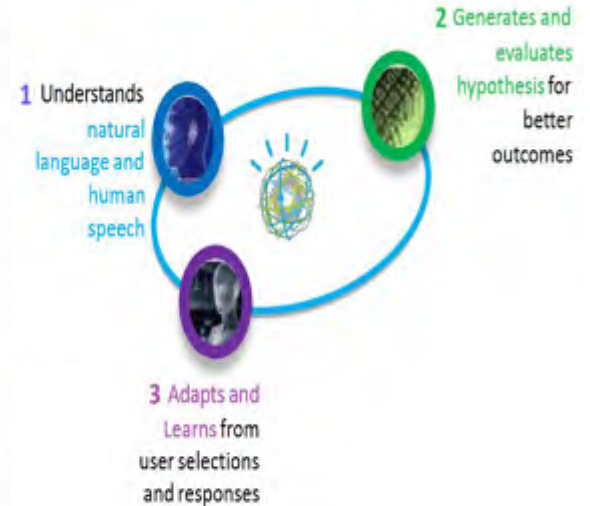
Cognitive Knowledge

Knowledge Representation, Ontologies, Semantics, Context

A visualization of a complex network or ontology, showing a dense cluster of blue dots with lines connecting them, representing interconnected knowledge.

Computing Infrastructure

High Performance Computing, Distributed Systems, Programming Models & Tools

A perspective view of a server room aisle, showing rows of server racks extending into the distance under a blue sky, representing high-performance computing infrastructure.

Watson Cooperates with Hospital and Industry Partners

<p>Ongoing Training Partner</p>  <p>Memorial Sloan Kettering Cancer Center</p> <p>Watson for Oncology, trained by Memorial Sloan Kettering available in clinical use in lung, breast, colon and rectal cancer</p>	<p> Bumrungrad International HOSPITAL</p> <p>Bumrungrad International Hospital</p> <p>5 year agreement for Watson for Oncology</p>	<p>THE UNIVERSITY OF TEXAS MD Anderson Cancer Center</p> <p>Making Cancer History</p> <p>MD Anderson introduced proprietary solution with Watson for clinical use for Leukemia and Molecular Targeted Therapies</p>	<p>MAYO CLINIC</p>  <p>Mayo Clinic</p> <p>Completed testing with Clinical Trial Matching for lung, breast, colon and rectal cancer</p>
<p> BCM</p> <p>Baylor College of Medicine</p> <p>Baylor College of Medicine Published results of use with Watson Discovery Advisor - identified 7 targets for P53 activation within weeks</p>	<p> MEMORIAL SLOAN KETTERING GENOMICS CENTER</p> <p>Watson Genomics Advisor</p> <p>Secured 13 Cancer and academic medical centers for beta testing</p>	<p> Department of Veterans Affairs</p> <p>Selected Watson to analyze EMRs in a demo project</p>	<p>MAYO CLINIC</p>  <p>Mayo Clinic</p> <p>Selected Watson to analyze EMRs for Clinical Efficiency and Effectiveness Program</p>
<p> Manipal</p> <p>Manipal Hospitals</p> <p>Selected Watson for Oncology to identify evidence-based treatment options among 200,000 patients/year.</p>			



Watson Supports Healthcare from Professionals to Patients

R&D Productivity

Discovery Advisor

to enable researchers to uncover new insights into relationships between genes, proteins, pathways, phenotypes and diseases

Clinical Trial Matching

to optimize patient selection and recruitment for clinical trials

IBM Watson Content Analytics

Core NLP solution platform for extracting and leverage medical facts from unstructured data

Improve Outcomes

Oncology

to assist in the creation of individualized treatment plans and enhance patient / physician experience

EMR Advisor

to identify critical attributes of a patient case and provide easy-to-consume summaries

Paths

Clinical reasoning for Medical Education & top of license care delivery

Improve Engagement

Engagement Advisor

to transform interactions and experiences with patients and physicians

Utilization Management

to streamline and automate authorizations and ensure adherence to guidelines

From Data



Analytics

To Information



Cognitive Computing

To Knowledge and Wisdom



Watson Health Cloud Benefits Different Stakeholders in Healthcare Industry



Besides AlphaGo, Google DeepMind also Shows its Healthcare Ambition



Identifying Patients at Risk

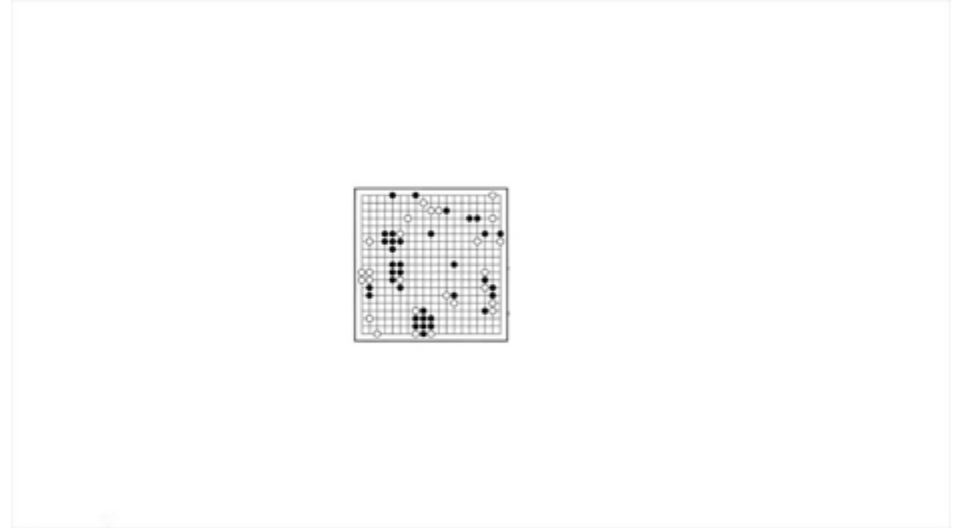
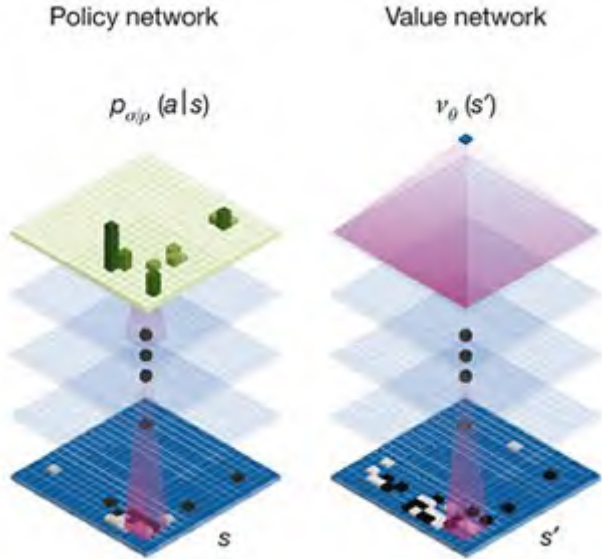
Streams presents timely information that helps nurses and doctors detect cases of acute kidney injury.



Helping Clinicians Take Action

Hark is an early stage clinical task management app.

The Algorithms Behind AlphaGo Open a New Field of Machine Learning in Healthcare



Policy Network (Supervised Deep Learning) : The Sense of Move
Value Network (Deep Reinforcement Learning) : The Sense of Win-Los
Monte Carlo Tree Search : Calculate to Verify the Sense of Move and Win-Los

Brain Projects are Expected to Largely Promote the Development of AI

1. Scientific understanding of the human brain
2. Brain Health (Parkinson's, Alzheimer's...)
3. Acceleration of development of **artificial intelligence**



the United States (2013)
Brain Initiative



Europe (2013)
Human Brain Project



Japan (2014)
Brain/Minds



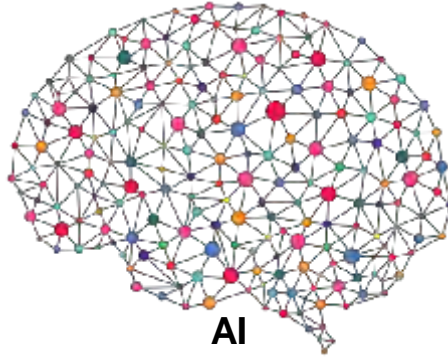
China (coming soon)

Smart Medical Outputs Come from Healthcare Big Data and AI



Healthcare Big Data

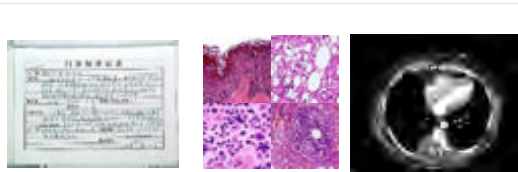
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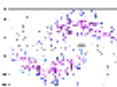





AI



Smart Medical Outcomes

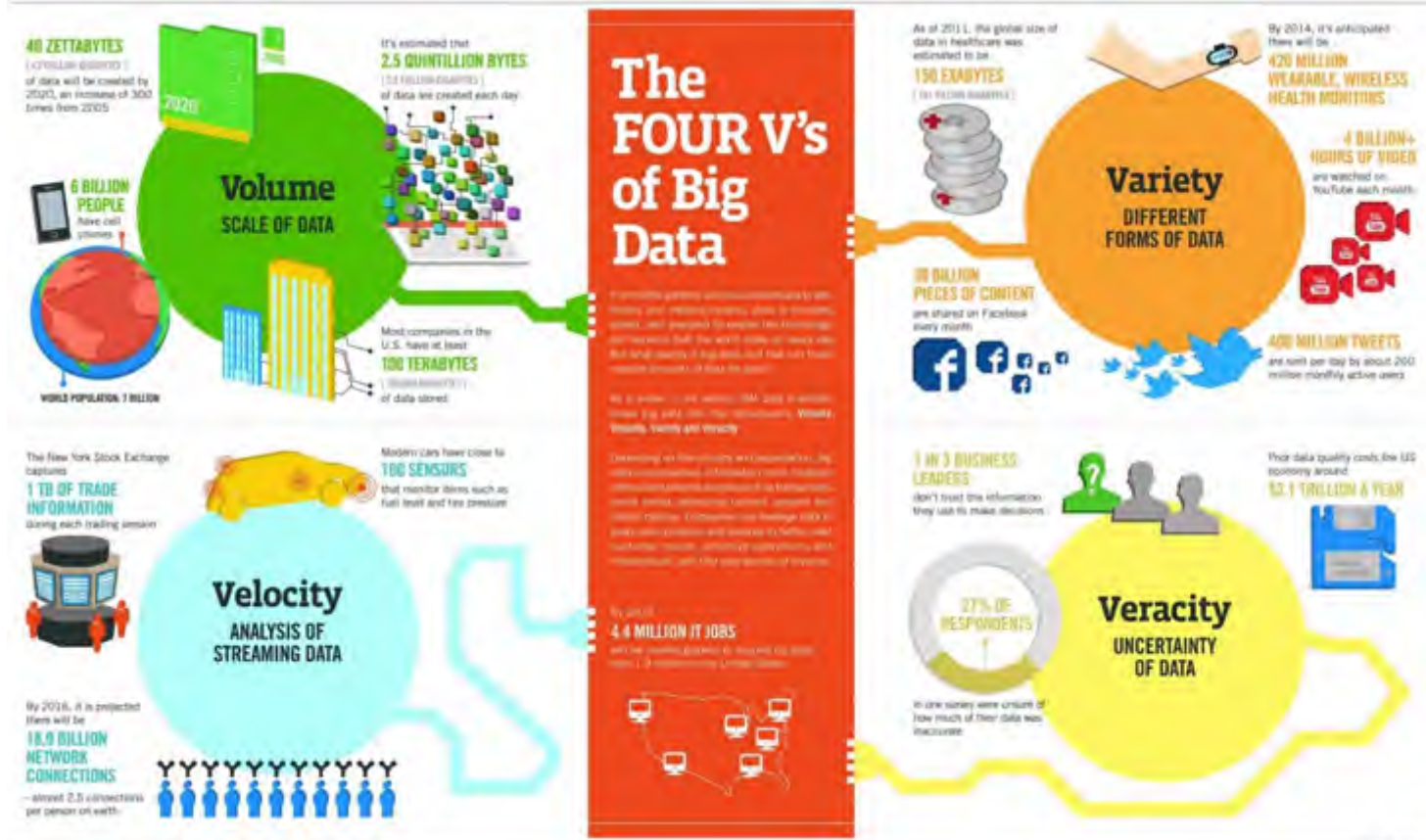


(Unstructured Data)

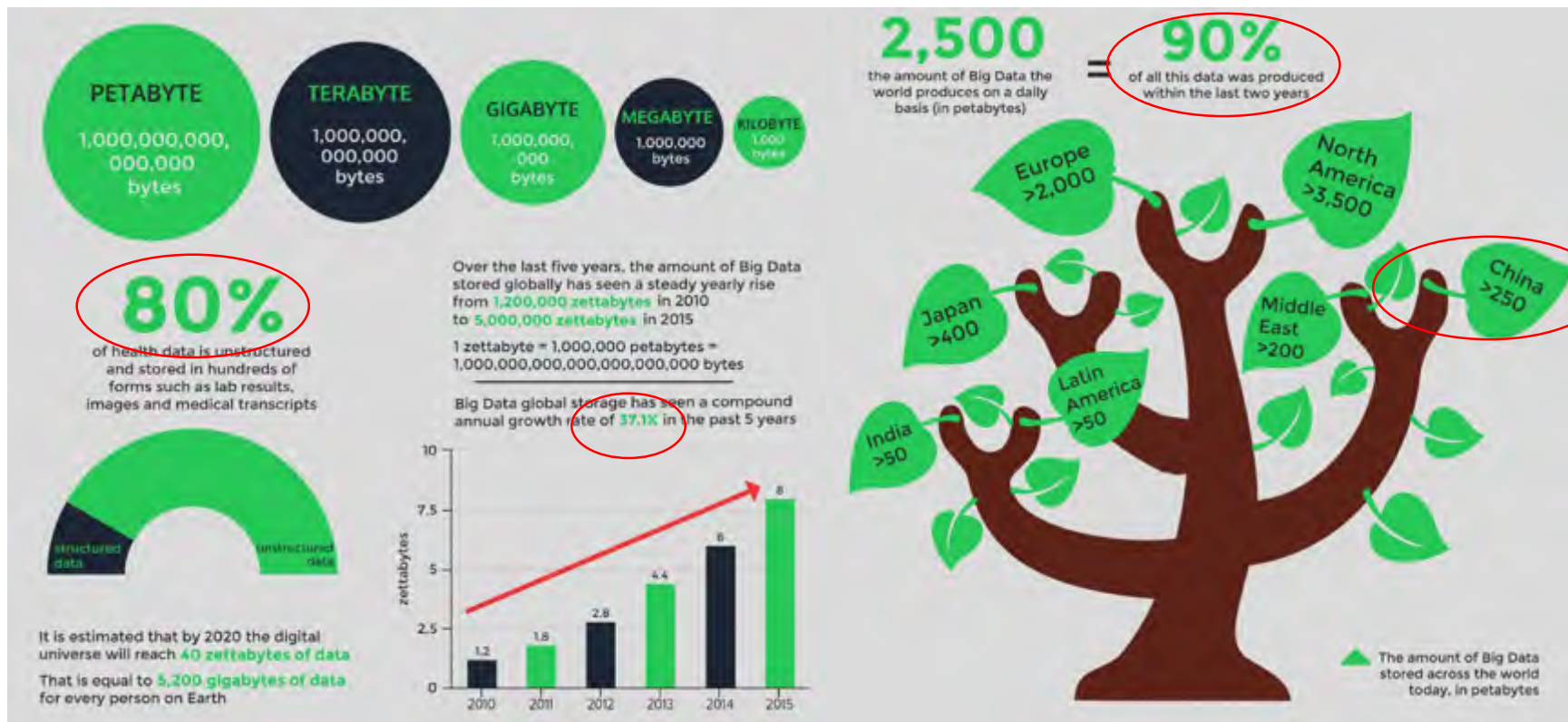
			
Bayesian Method	Supervised Learning	Reinforcement learning	
			
Artificial Neural Network	Semi supervised learning	Unsupervised Learning	
			
			



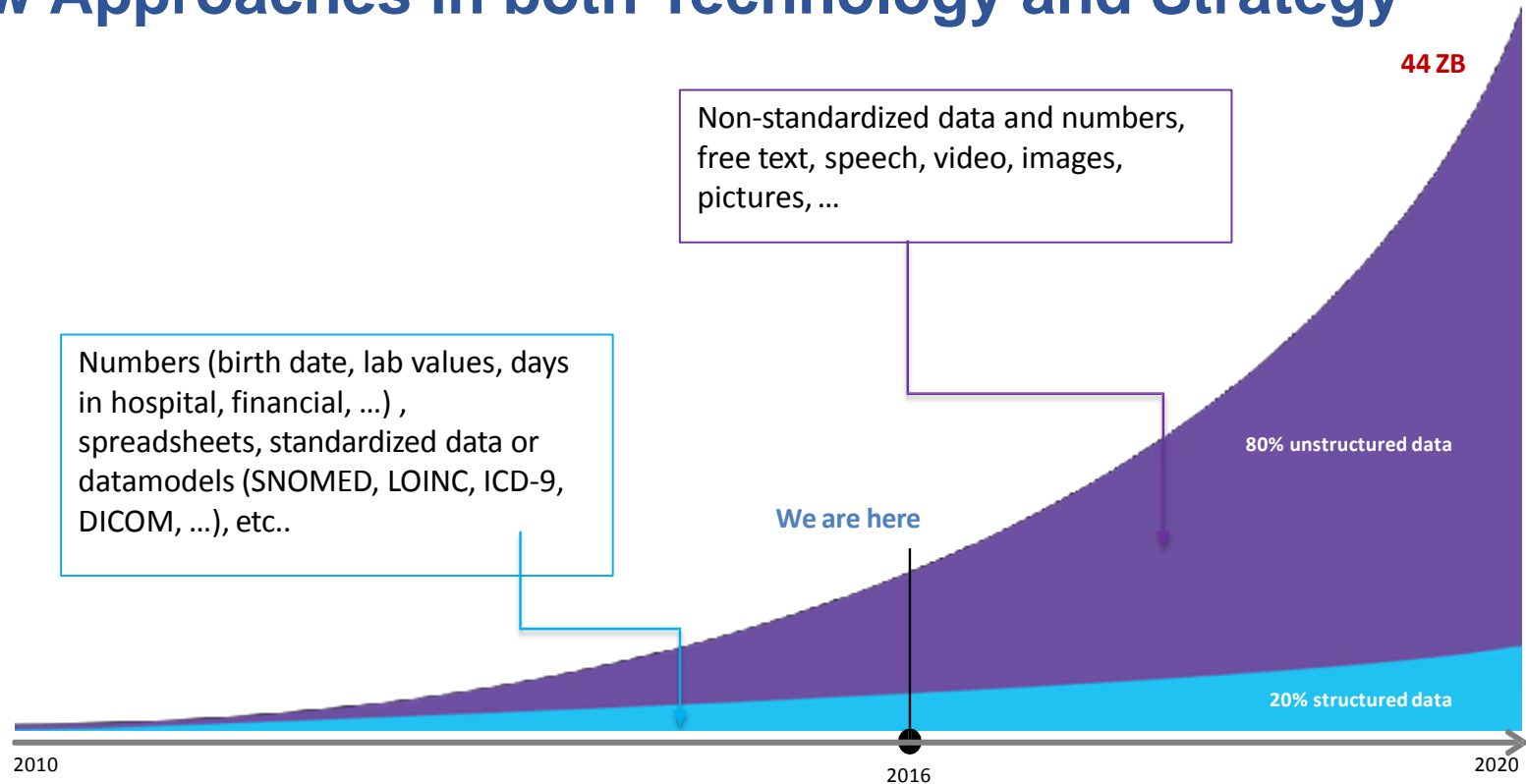
Big Data (4V) is Reshaping the Future of Healthcare



Healthcare Data is Huge in Amount with 80% Unstructured



Medical Data is Growing Exponentially and Demands New Approaches in both Technology and Strategy



Personal Data is a Major Data Source of Healthcare

Personal Data is Exploding

Impact on a person's health status

Exogenous Factors

60%

Environment & Social Context, Behavior

Genomic Factors

30%

Clinical Factors

10%



In their lifetime, the data an average person will generate

1,100 TB

Volume, Variety, Velocity, Veracity
Educational records, Employment Status, Social Security Accounts, Mental Health Records, Caseworker Files, Fitbits, Home Monitoring Systems, and more...

6 TB

Volume

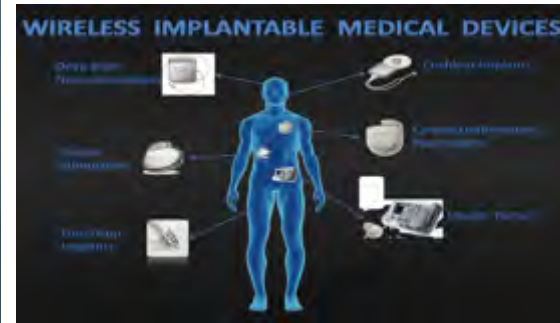
0.4 TB

Variety
Electronic Medical / Health Records, Physician Management Systems, Claims Systems and more...





Healthcare Data in Network Requires High Speed and High Security



Attack
- Proof



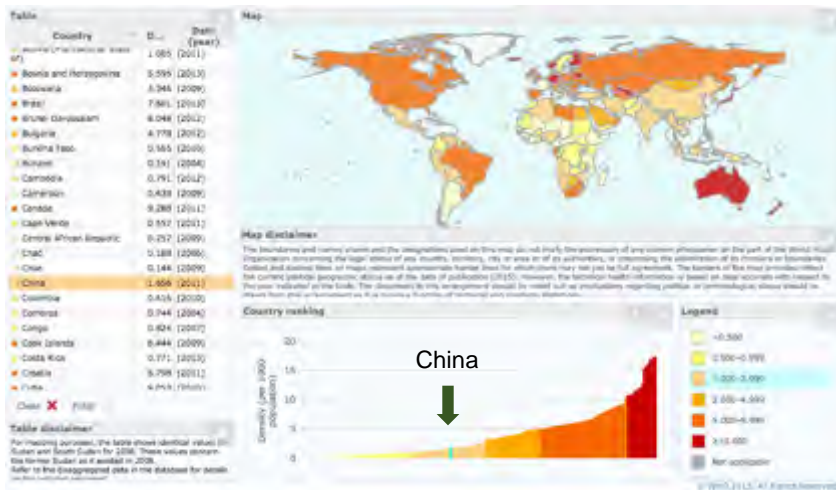
Leakage
- Proof



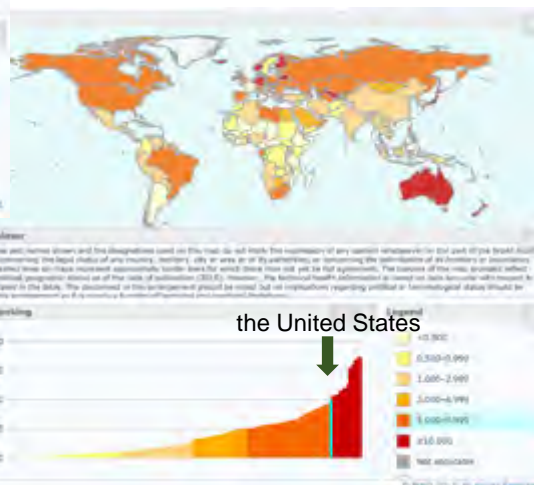
The Aging Society is a Serious Problem We are Facing



Nurses and Midwives are in Short Supply Worldwide



Density of Nurses and Midwives (Total Number per 1000 Population)



	China	the United States
Number of Nurses Per Thousand Population	1.656	9.815

Humanoid Robots as Nurse or Nanny will be Highly Demanded by the Elderly in Hospital or Home



CloudMinds is the World First Cloud Robot Operator Company

Value Proposition: We are “the Google in Cloud Robots”.

Investment Status: Seed Fund Valuation 100M USD /**Investors:** Softbank, Foxconn, Walden, Keytone Ventures

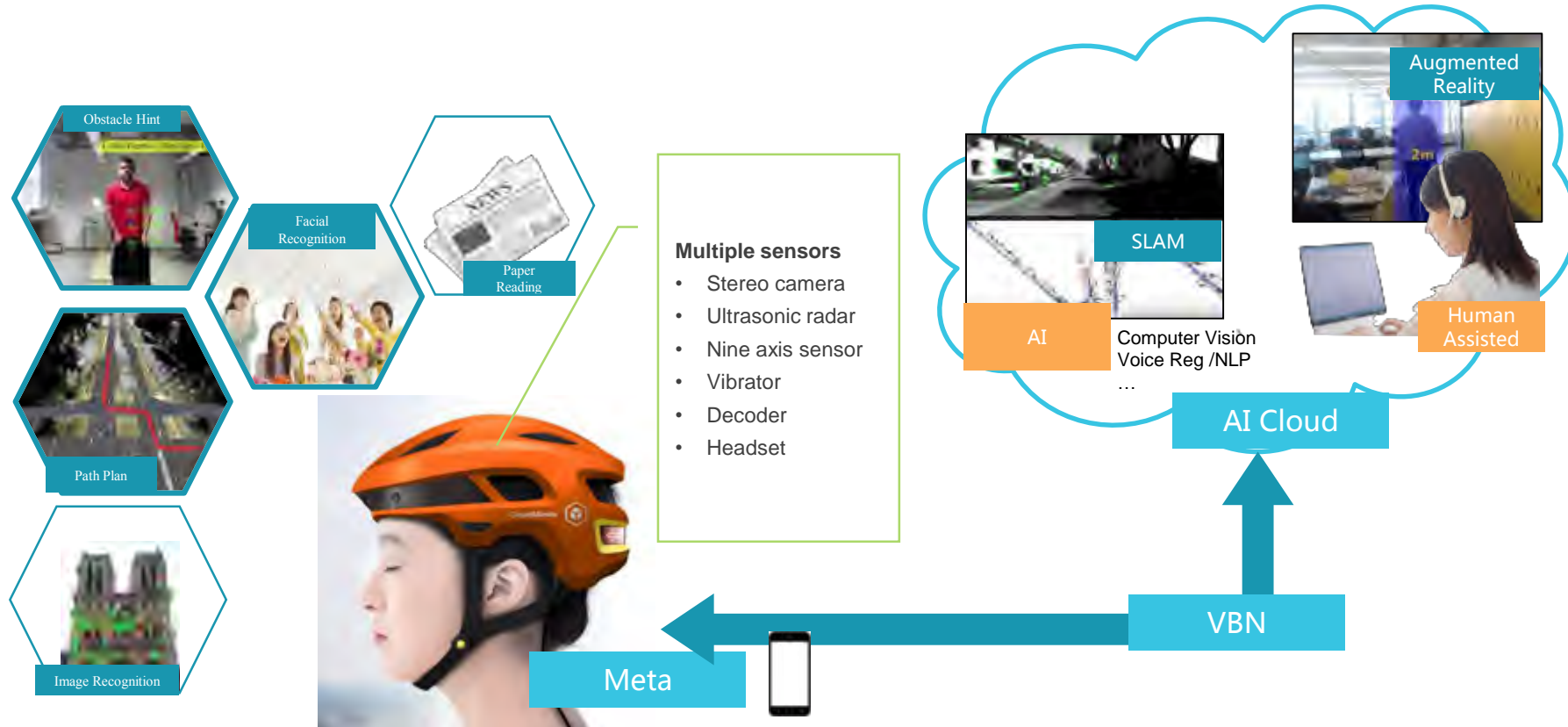
Major Locations: Santa Clara, CA; Beijing, China/**Founded:** April 2015

FTE: 150+, experienced top talents from Google, Samsung, Huawei, Cisco, China Mobile, IBM, Sony, Xiaomi, etc.

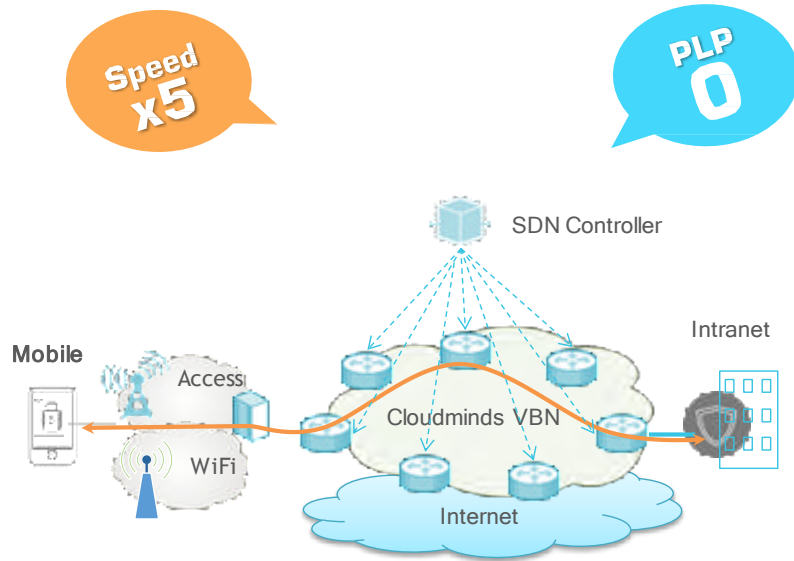


CloudMinds Mission: Provide a Home Robot to Each Family by Year 2025

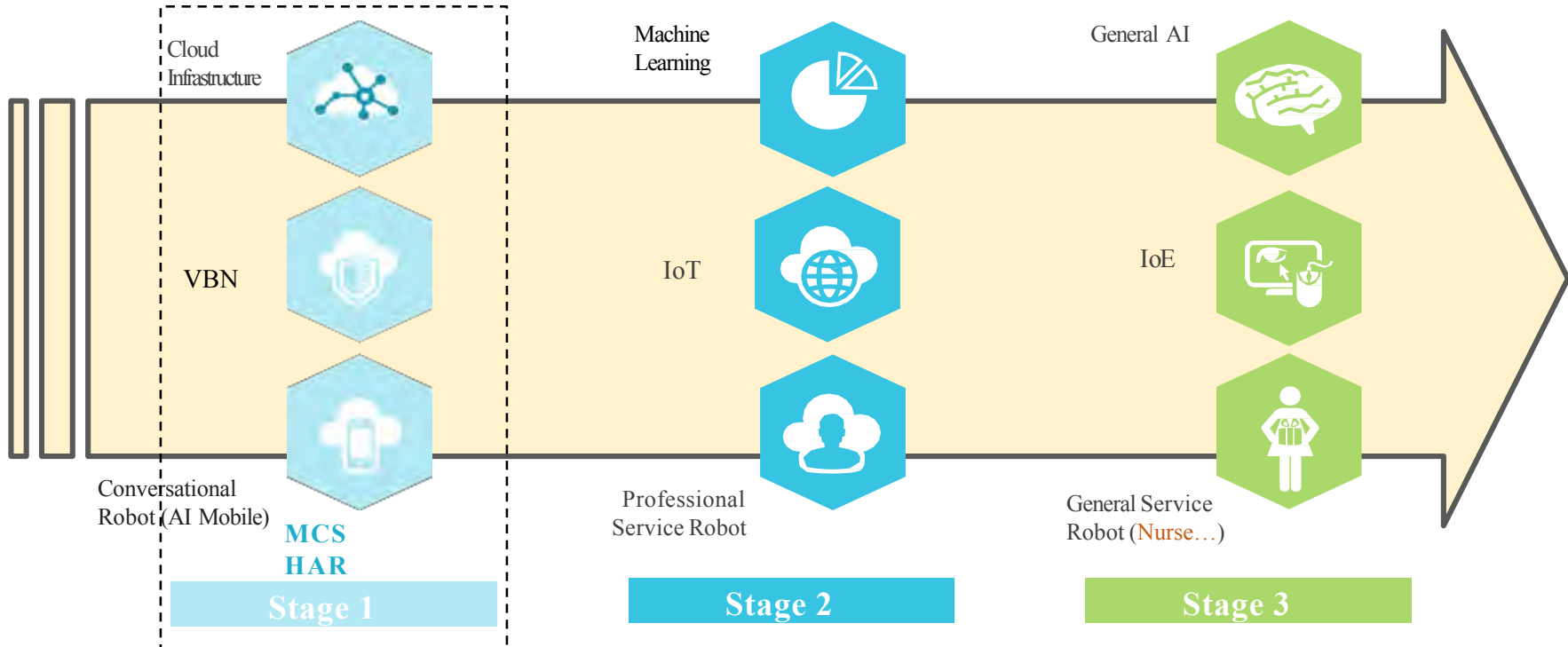
CloudMinds Meta Supports the Blind through the “Cloud-Network-Terminal” System



CloudMinds VBN has High Speed and Security with Large Coverage in China then the World



Cloud-based Intelligent Service Robots including Nurses will be the Future Products of CloudMinds



“Cloud-Network-Terminal” is a Proper Platform for Future Healthcare Conducted by Human and Robots



thank you!

