Building All-Scenario Intelligence with Intelligent Twins

Joy Huang, VP Cloud&AI BG, Huawei
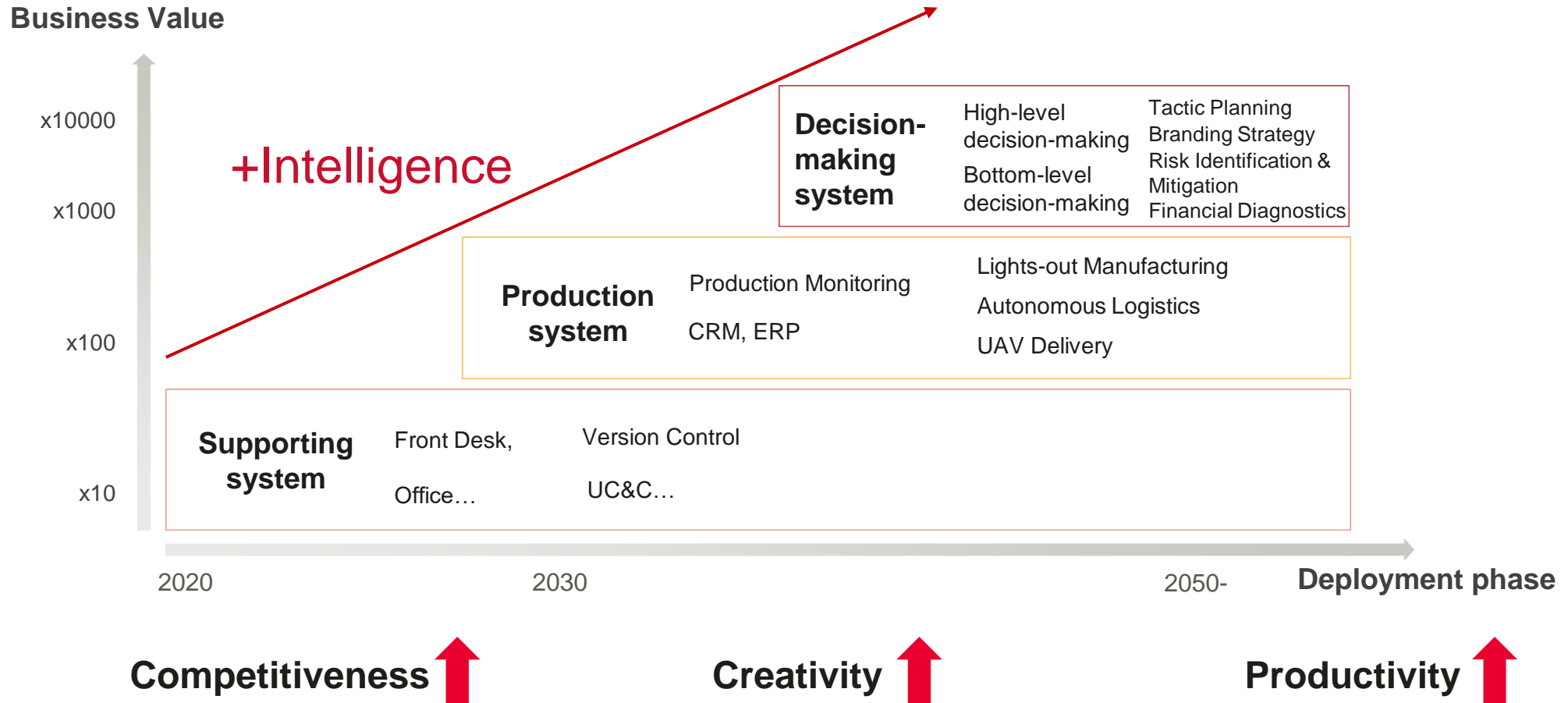
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Industry Trends
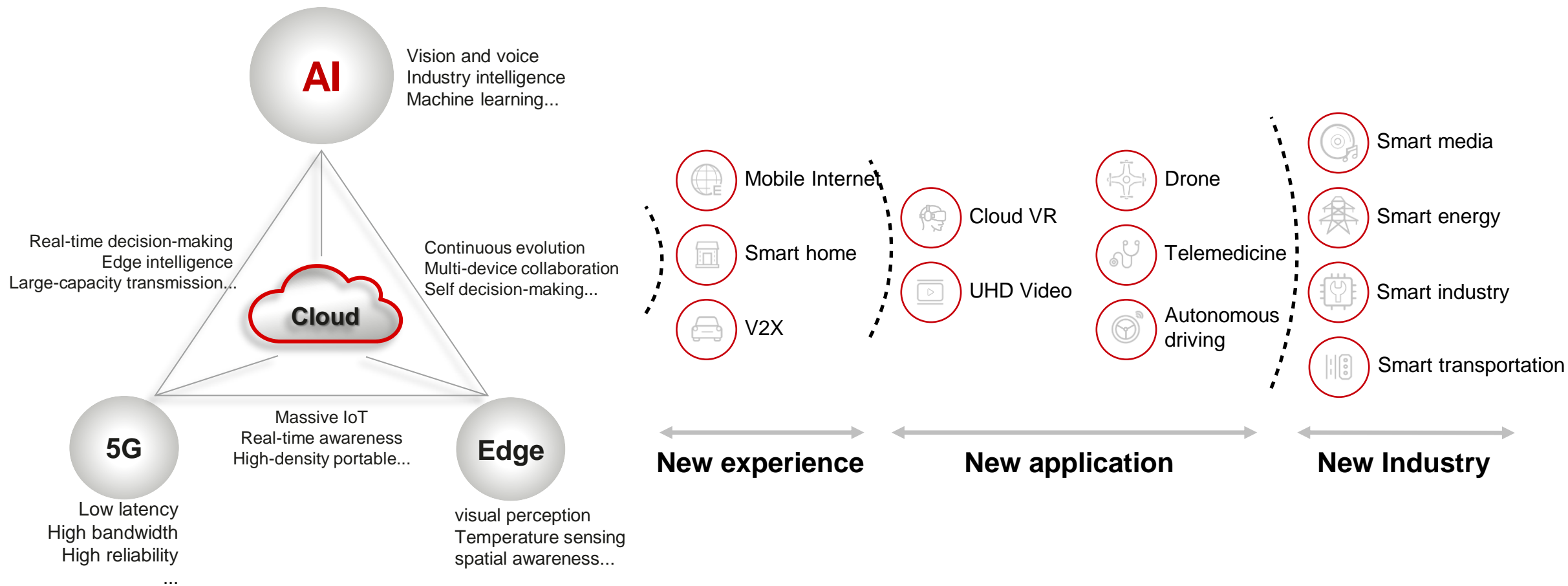
Practices of Industry Intelligent Twins

In Indonesia, For Indonesia

AI is Entering Core Production and Operation System

97% Large Enterprises will Adopt AI by 2025 *(Source: Huawei GIV)*

Business Value

+Intelligence

x10000

x1000

x100

x10

Decision-making system
- High-level decision-making
- Bottom-level decision-making
- Tactic Planning
- Branding Strategy
- Risk Identification & Mitigation
- Financial Diagnostics

Production system
- Production Monitoring
- CRM, ERP
- Lights-out Manufacturing
- Autonomous Logistics
- UAV Delivery

Supporting system
- Front Desk, Office…
- Version Control
- UC&C…

2020   2030   2050-   **Deployment phase**

Competitiveness   **Creativity**   **Productivity**

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Multi-Technology Convergence Accelerating Commercial Use of AI

AI

Vision and voice
Industry intelligence
Machine learning...

Real-time decision-making
Edge intelligence
Large-capacity transmission...

Continuous evolution
Multi-device collaboration
Self decision-making...

Cloud

Massive IoT
Real-time awareness
High-density portable...

5G

Low latency
High bandwidth
High reliability
...

Edge

visual perception
Temperature sensing
spatial awareness...

Mobile Internet

Smart home

V2X

New experience

Cloud VR

UHD Video

Drone

Telemedicine

Autonomous
driving

New application

Smart media

Smart energy

Smart industry

Smart transportation

New Industry

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Take the Lead in Adopting AI, Building Core Competitiveness

AI can be introduced in many mainstream scenarios

10+
Industries

600+
AI projects

30%
Systems will AI Applied to

18%
Average profitability increase

Public safety
- Safe City
- Intelligent transport
- Disaster prediction

Education
- Personalization
- Attention improvement
- Robotic teacher

Healthcare
- Early prevention
- Diagnosis assistance
- Precision diagnosis

Media
- Real-time translation
- Abstraction
- Inspection

Pharmacy
- Fast R&D
- Precise trial
- Targeted medicine

Logistics
- Route planning
- Monitoring
- Auto sorting

Finance
- Document processing
- Real-time fraud prevention
- Upselling

Insurance
- Auto detection
- Fraud prevention
- Innovative services

Retail
- Unmanned shops
- Real-time inventory
- Precise recommendations

Manufacturing
- Defect detection
- Industrial internet
- Predictive maintenance

Telecom
- Customer service
- Auto O&M
- Auto optimization

Oil & Gas
- Localization
- Remote maintenance
- Operation optimization

Agriculture
- Fertilization improvement
- Remote operation
- Seed development

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Intelligent Twins: Reference Architecture for Advancing Intelligence

Reimagining experience | Optimizing processes | Enabling innovation

City　Transportation　Enterprise　Science　Energy　Network　Finance　Industrial

Intelligent Application

Low code/ No code　　　　　　Logical data lake
Knowledge computing

Application enablement　　**AI enablement**　　**Data enablement**

"Perceptible"

"Thinking"

"Executable"

"Evolvable"

Intelligent Hub

AI is the core of Intelligent Twins

Cloud Infrastructure

HUAWEI CLOUD Service　　　HUAWEI CLOUD Stack

Computing | Storage | Network | Security | Blockchain
CDN | WeLink | RTC

ADN　Wi-Fi 6　IP　5G　F5G　IoT

Intelligent connectivity

Intelligent Interaction

Cloud-edge-device collaboration OS

IEF
Huawei device　　Edge ecosystem　　Partner devices

An integrated intelligent system with collaboration across cloud, network, edge, and device

AI Enablement: Driven by Data and Knowledge to Catalyze Innovation across Main Business Processes

Steel ingredient prediction accuracy
80% -> **95%**

Accuracy of esophageal cancer early detection
88% -> **97%**

Reservoir Identification and evaluation time
70%+ ↑

Data - Driven **+**

Knowledge - Driven

Knowledge Acquisition **>** Knowledge modeling **>** Knowledge management **>** Knowledge application

ModelArts – AI Development platform

Fundamental E2E simplified, automated development   **Pro** Packing industry AI experience into templates

Intelligent Twins for City: Towards a Perceptive，Conscious，Evolvable, Familiar City

Digital government | Digital citizen | Digital economy

Better governance | Thriving business | Better livelihood

Government service

Education & tourism

Elderly care & healthcare

Innovation & startups

All-domain perception

Network-wide collaboration

All-service convergence

All-scenario intelligence

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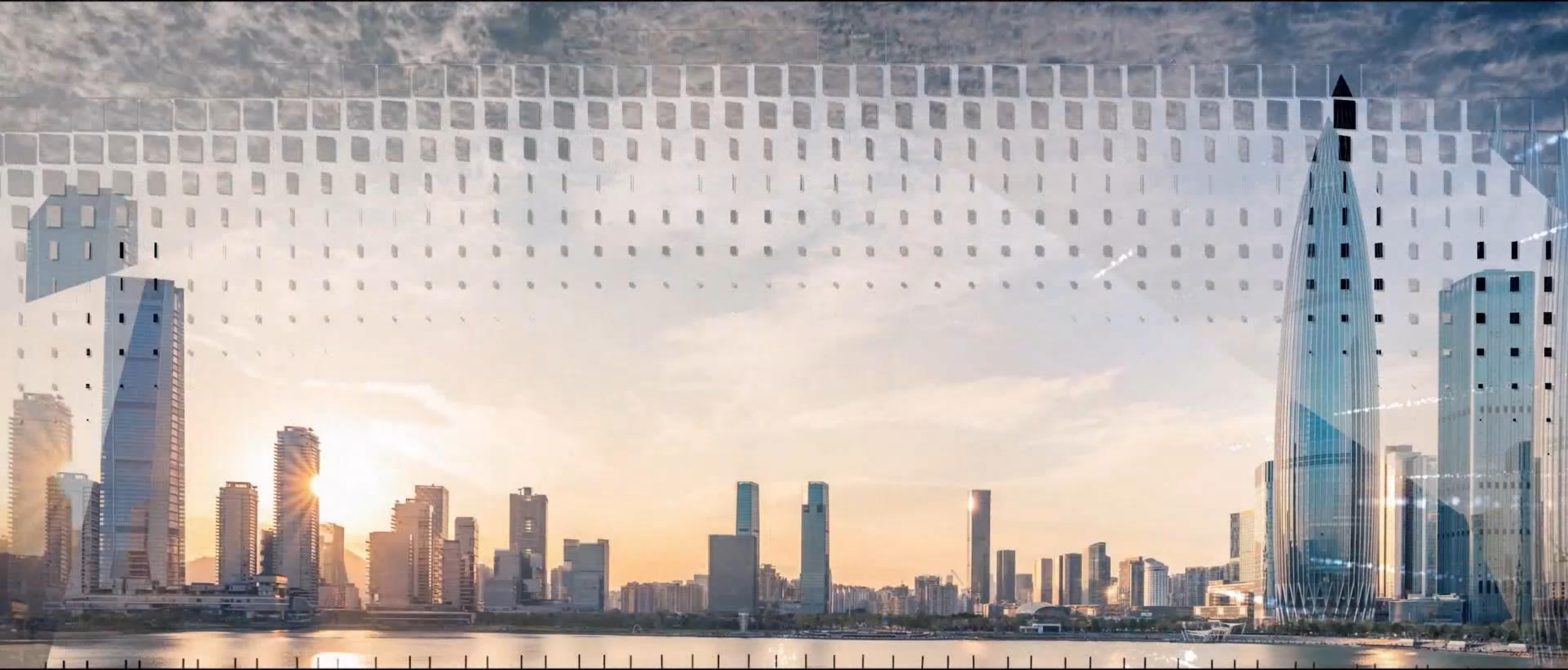
Intelligent Twins for Transportation: AI Enables Free Flow, Improving Travel Efficiency

Faster:

Identification & free circulation

Efficiency:

coordination & recognition

Reduction:

avoid congestion & consumption

Plate recognition
Automatic toll collection

Edge-cloud synergy
Fare evasion detection

Traffic monitoring
Driver assistance

Intelligent Twins for Airport: Smart Aircraft Stand Allocation

SMART AIRPORT

25°
Thunderstorm
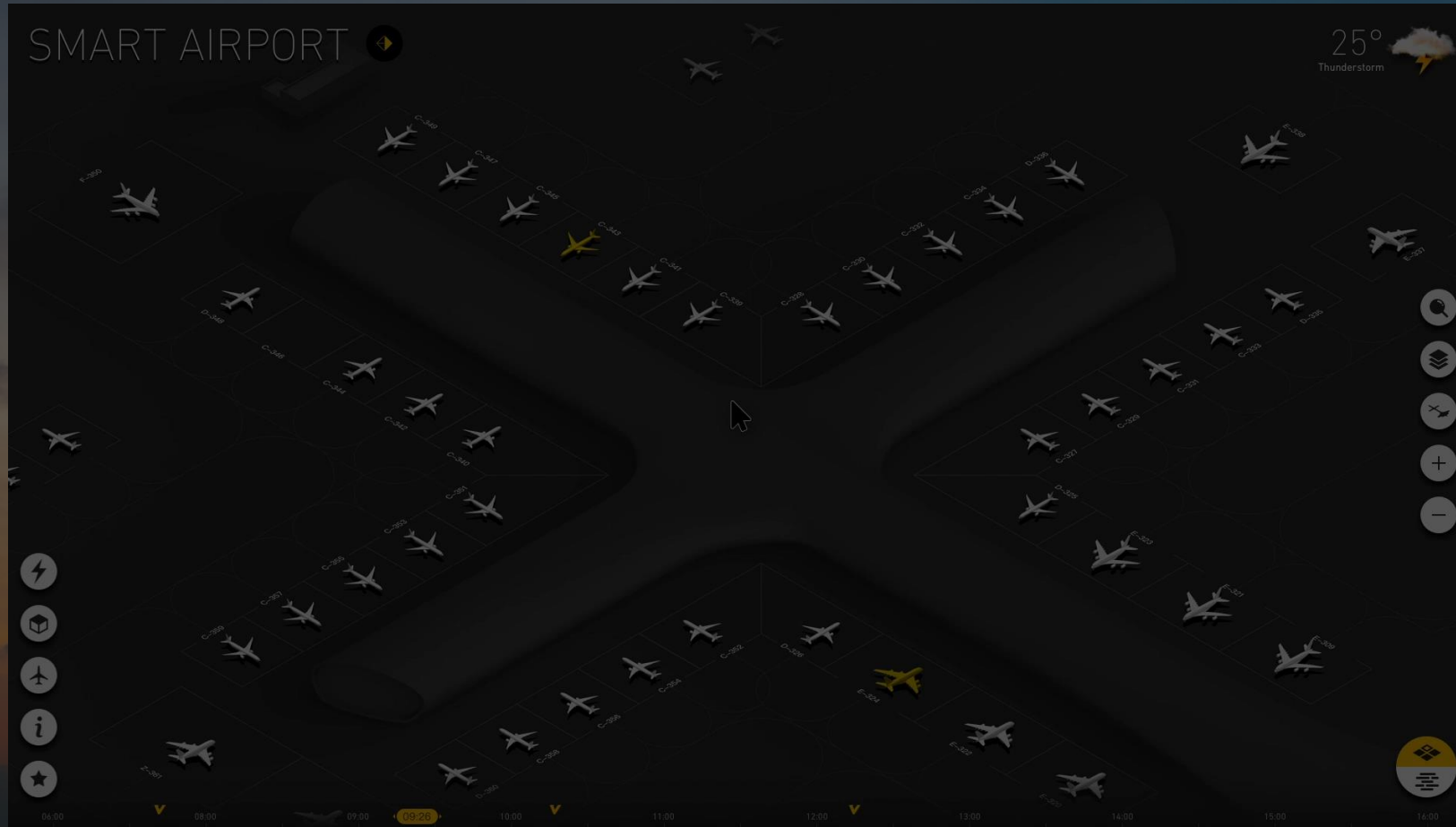
Airport scheduling optimization

Air bridge match improved

5%

Conflict reduced

10%

Solution refresh interval down to

10s

Annual shuttle bus passenger reduced

2,500,000

Intelligent Twins for Scientific Research :Providing Powerful Computing Power by AI Cluster

Atlas 900: World's fastest AI training cluster

World's #1: **28s**

79.8s

70.2s

Atlas 900
59.8s

45.6s

Atlas 900
28s

2019.09

2020.09

• Test benchmark: ResNet-50 V1.5 model, ImageNet-1k dataset

256 PFLOPS FP16:

16 Atlas racks / **208** GPU racks / **6195** x86 racks

736 kW

1,352 kW

40,268 kW

HUAWEI CLOUD and Peng Cheng Laboratory have deployed Atlas 900

Autonomous driving | Intelligent transportation | Astronomical exploration | Weather forecast ...

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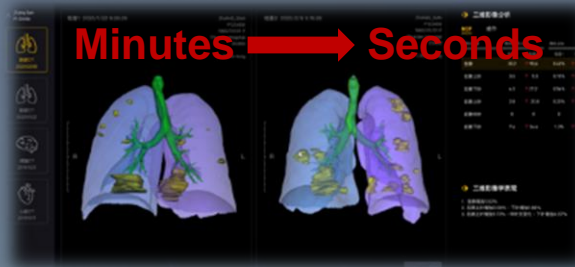**HUAWEI CLOUD EI cluster service**
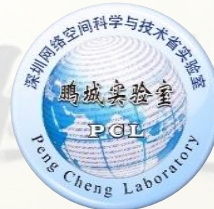
Peng Cheng CloudBrain Phase II

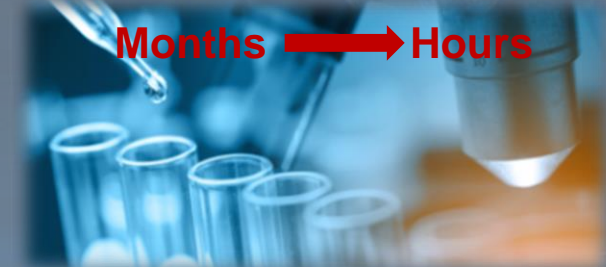# Intelligent Twins for Health Care：AI Help People Fights against COVID-19
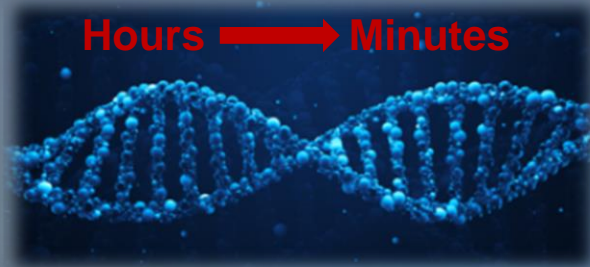
Hours ➡ Minutes

Genomic Analysis

Minutes ➡ Seconds

Medical Imaging

Months ➡ Hours

Drug Discovery

Public Information Office - City of Baguio
22 March at 18:05 · 🌐

COVID-19 CONTROL ADVISORY ‼️

AI COVID-19 scan analyzer operational soon

23 March 2020 -- Mayor Benjie Magalong announced that the Artificial Intelligence COVID19 CT Scan Analyzer, a new technology of Huawei company that helps doctors detect Coronavirus Disease, will be operational soon at the Baguio General Hospital.

"For the past two days, our city through our Management Information and Technical Division (MITD) under Executive Asst. V Philip Puzon has been working together with the technical team of Huawei and Baguio doctors to set up the system in BGH. It will be the first of its kind in the country," the mayor said.

The mayor said the AI analyzer is a diagnostic system that would help our doctors identify highly suspicious COVID19 cases.

"Unlike the current screening test kits which would take 4-5 days, the AI system only takes 2 min. Hopefully it will be up and running by Monday or Tuesday. Test runs ongoing," he added

Puzon thanked the Huawei-EVI support team and the MITD team which has been attending to all information and communication technology and closed circuit television requirements of the city in the COVID operations. - Aileen P. Refuerzo

https://www.gadgetmatch.com/huawei-cloud-covid-19-coronavi.../

"The screening program can greatly improve the hospital's diagnostic efficiency, enhance the confidence of the Ecuadorian people to fight the epidemic."

--The clinician of Quito Southern General Hospital, Ecuador

Intelligent Twins for Food(1): AI Makes Supermarkets Work Smarter

Fruit recognition - Apple variety identification
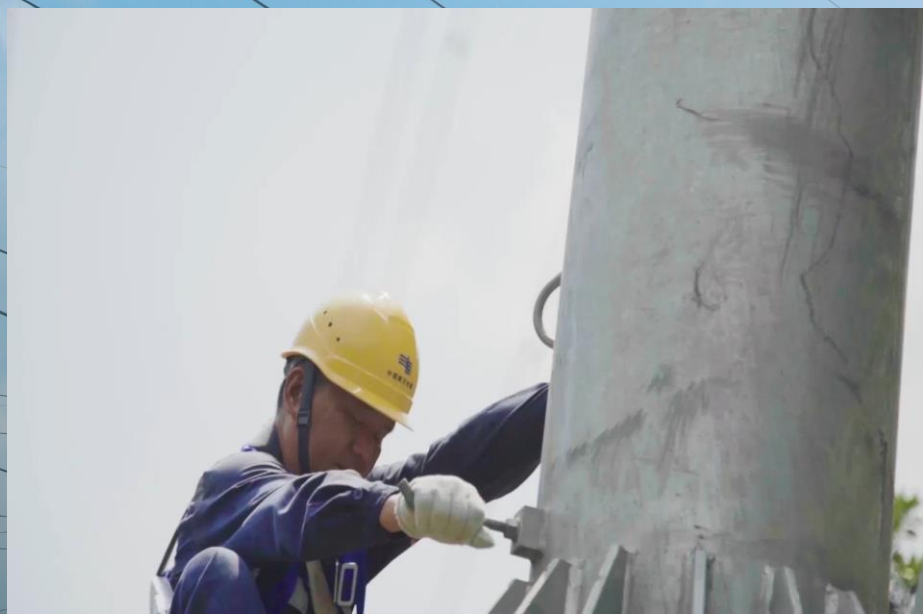
Intelligent Twins for Food(2): AI Makes Food Quality Better

Food quality sorting - Chili sorting efficiency **50%↑**

Intelligent Twins for Power： AI Inspection Enabling Smart Grid

AI

Efficiency: 20x ↑

Manual inspection

Heavy workload | Personnel risk | Time required: 20 days

AI inspection

Remote monitoring, no personnel risk | Real-time analysis Time required: 2 hours

Clear

HD camera with a resolution of 1080P or higher

Straightforward

AI algorithm, accurately identifying insulator damage and missing pins

Secure

3D geo-fence, making drones 5 to 10 meters away from high-voltage lines

Flexible

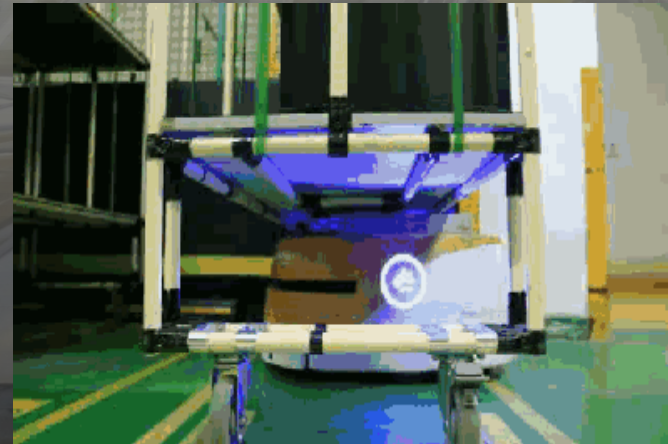Algorithm and hardware decoupling; algorithm choice according to scenario

Intelligent Twins for Manufacturing：AI Boosts Production Efficiency

Collaboration:

data sharing & collaborative

Agile:

flexible scheduling & manufacturing

Efficiency:

intelligent & smooth production
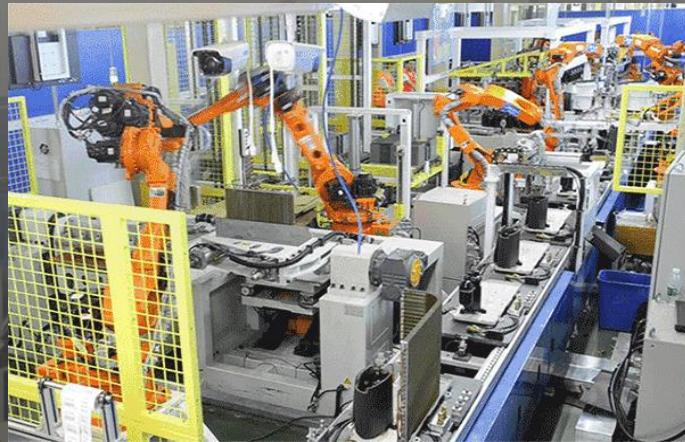
Real-time interconnection, collaborative work

Intelligent quality testing to improve yield

Efficient control and precise scheduling

Intelligent Twins for Society: AI For Good (Video)

Osa Peninsula, *Costa Rica*

Industry Trends

Practices of
Industry
Intelligent Twins

In Indonesia,
For Indonesia

AI Has Been Officially Announced as National Strategy for 2020-2045

Vision of Indonesia's Government--Becoming a Developed Country by 2045

Per capita income: 320M IDR /Year   GDP: $ 7 Trillion   Top 5 Biggest Economy in the World

| **Human Resource**	Infrastructure Deployment Continuity	Simplify Regulation	Simplify Bureaucracy	**Economy Transformation**

Priority Sectors of Indonesia National AI Strategy

Health Care
Government Public Services
Education and Research
Food Security
Mobility and Smart City

" The use of artificial intelligence （AI） technology aims to increase productivity in government，business, and priority sectors， from investment to public services，from health care to food security and to encourage education and innovation"

——*Hammam Riza*

Digital Infrastructure

Digital Ecosystem
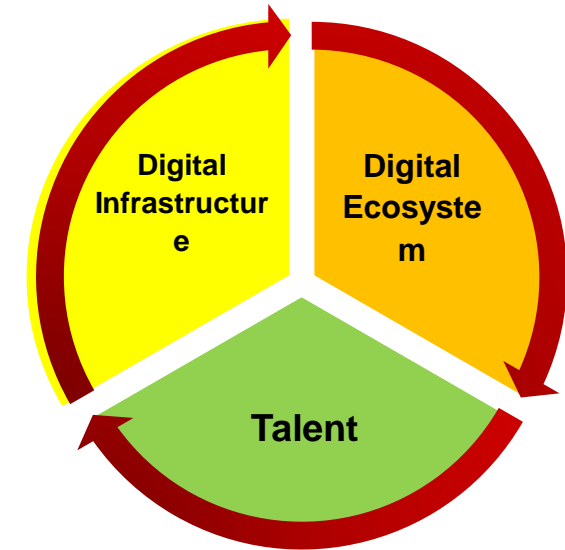
Talent

Build digital infrastructure and digital industry ecosystem by excellent ICT Talent

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Collaborate with BPPT to Develop National Digital Infrastructure

MOU Signing Between Huawei Indonesia with Assessment and Application of Technology Agency (BPPT)

October 12th , 2020 via Online Video Conference

BPPT, Huawei team up to develop AI, cloud and 5G

The Jakarta Post

Jakarta / Tue, October 13, 2020 / 05:42 pm

The Agency for the Assessment and Application of Technology (BPPT) on Monday signed a memorandum of understanding with Chinese telecommunications giant Huawei to **develop Indonesia's digital ecosystem** and **develop talent through the transfer of knowledge and technologies.** The agency and Huawei will focus on the development of **artificial intelligence (AI), cloud and 5G technology.**

Source: The Jakarta Post, Oct13.2020

Cooperate and Contribute via Digital Infrastructure during COVID-19

Connectivity

Provide Microwave High capacity – up to 1 GBps at Sebaru Island

Provide WIFI6 Access Point to enhance broadband experience at RSPAD
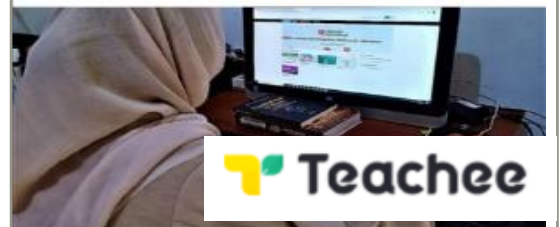
Cloud AI CT Scan

Cloud AI CT Scan at RSPAD and Pertamedika Hospitals
Accurate : up to 98%
Reading result < 2 minutes

Telemedicine Video Conference

Video Conference Supporting Telemedicine between Patient with Doctors

E-learning (Cloud Online)

E-learning platform Serving online education for universities study

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Facilitate ICT Knowledge Transfer for Talent Development

100,000 Indonesia ICT Talent Program

SmartGen

Initiated since 2017, Supported by 4 Ministries this program aims to cultivate more bright young talent with ICT capabilities in Indonesia

ICT Vocational Training
1000+ Students from **30+** vocational school

1,500+ ICT Training

Worked with over **33** universities in the past 3 years

700+ students got Huawei international certificate

National ICT Competition
1000+ Students from **Top 9** Universities join Huawei ICT Competition since 2019

5G is ON

Seeds for Future
100+ Students went to **Huawei HQ** to learn latest ICT technology

Benefited nearly **12,000** engineers and **7,000** students in ICT sector until now.

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To Build One AI Computing Center and Four Platforms to Enable Industry Intelligence

Provide inclusive public computing services for local enterprises through government policies.

Build an independent and controllable computing service platform to meet the computing power requirements of urban AI development.

Based on the characteristics of the local city industry, building AI application benchmarks.

Smart city, smart manufacturing, smart transportation, smart healthcare, and smart networking

Build an ecosystem innovation center. Drive the centralized and intensive development of the AI industry.

Aggregate advantages of AI technologies and enterprise resources;

Start-up support, technical enablement, and application promotion.

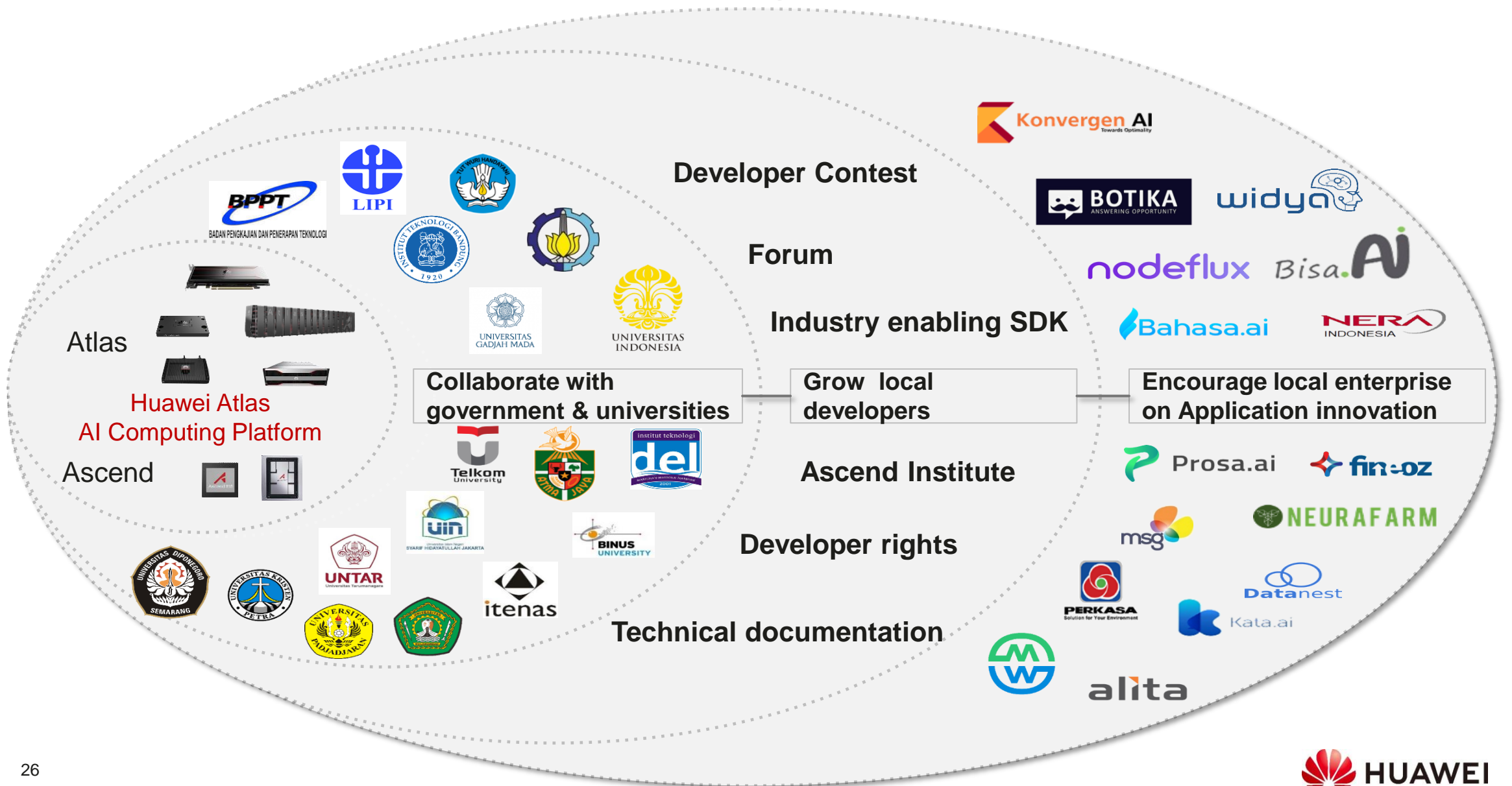**Support scientific research innovation and AI talent cultivation. Achieve breakthroughs in common AI technologies.**

Research innovation and talent cultivation centered on computing centers by leveraging city talent concentration advantages.

Public computing service platform

Application innovation and incubation platform

Industry aggregation development platform

Scientific research innovation & talent development platform

Four platforms ---- covering government, industry, education and research, and enable industry intelligence with AI computing power clusters.

One Fundamental platform ---- AI Computing Center

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Cultivate the Fertile Soil of the New Digital World in Indonesia

Atlas

Huawei Atlas
AI Computing Platform

Ascend

Developer Contest

Forum

Industry enabling SDK

| Collaborate with government & universities | Grow local developers | Encourage local enterprise on Application innovation |

Ascend Institute

Developer rights

Technical documentation

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Building All-Scenario Intelligence

with Intelligent Twins!