



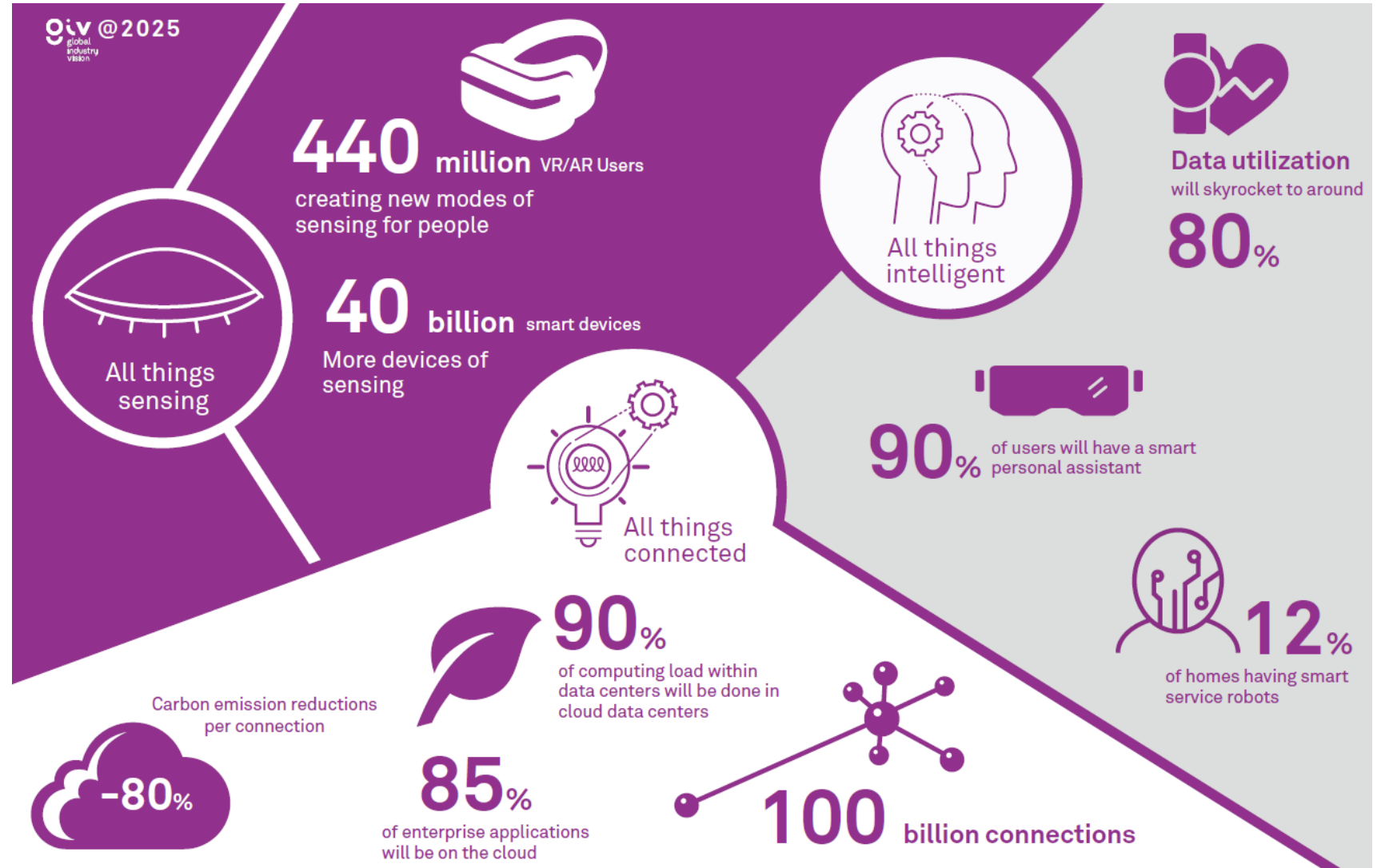
AI Workshop, ITU

Zhifeng Zhang o.zhang@huawei.com, 11:15 am – 12:00 am, 11 Oct. 2019



Outlook for 2025

- Sensing
 - All things sensing wakes up 40 billion terminal devices
- Connection
 - All things connected activates 100 billion connections
- AI
 - All things intelligent lights up 180 billion TB data





Gartner Hype Cycle for Emerging Technologies, 2019



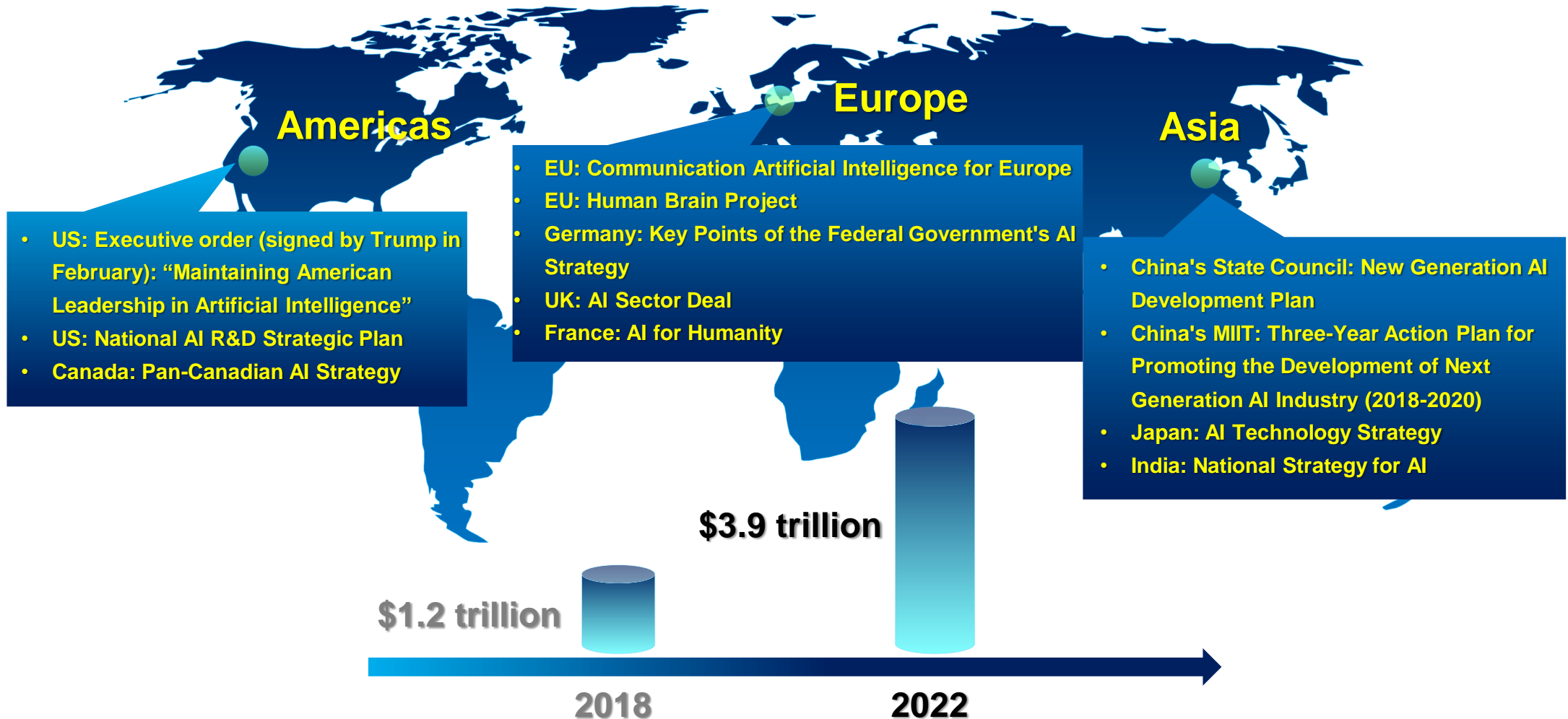
gartner.com/SmarterWithGartner

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AI has become a national strategy due to its great value to the industry





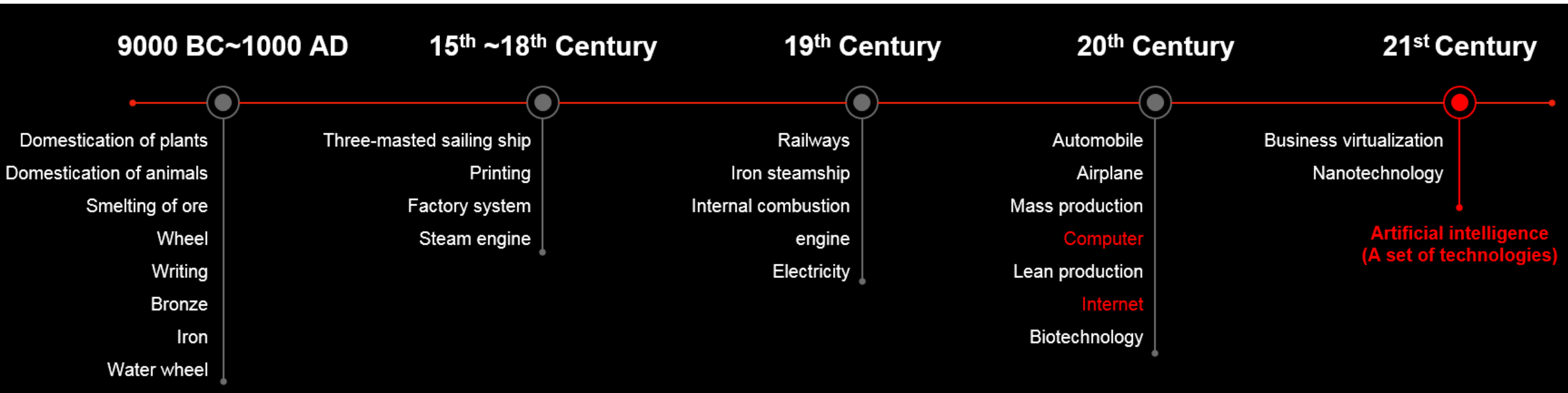
AI: Simulating and expanding man's intelligence

Artificial intelligence (AI) : Theories, methods, technologies, and application systems that can stimulate, extend, and expand human intelligence. The purpose of AI is to propel intelligent machines to listen, see, speak, think, learn, and act

Capability	Technology
Listen	Speech recognition, machine translation, etc.
See	Image recognition, text recognition, etc.
Speak	Speech synthesis, man-machine dialogue, etc.
Think	Man-machine game, theorem proving, etc.
Learn/Predict	Machine learning, deep learning, knowledge representation, etc.
Act	Robots, self-driving cars, etc.



AI is a new general purpose technology (GPT)



Multiple uses across the economy














Many technological complementarities and spillovers

https://en.wikipedia.org/wiki/General_purpose_technology

Richard G. Lipsey, etc., Economic Transformations: General Purpose Technologies and Long-Term Economic Growth

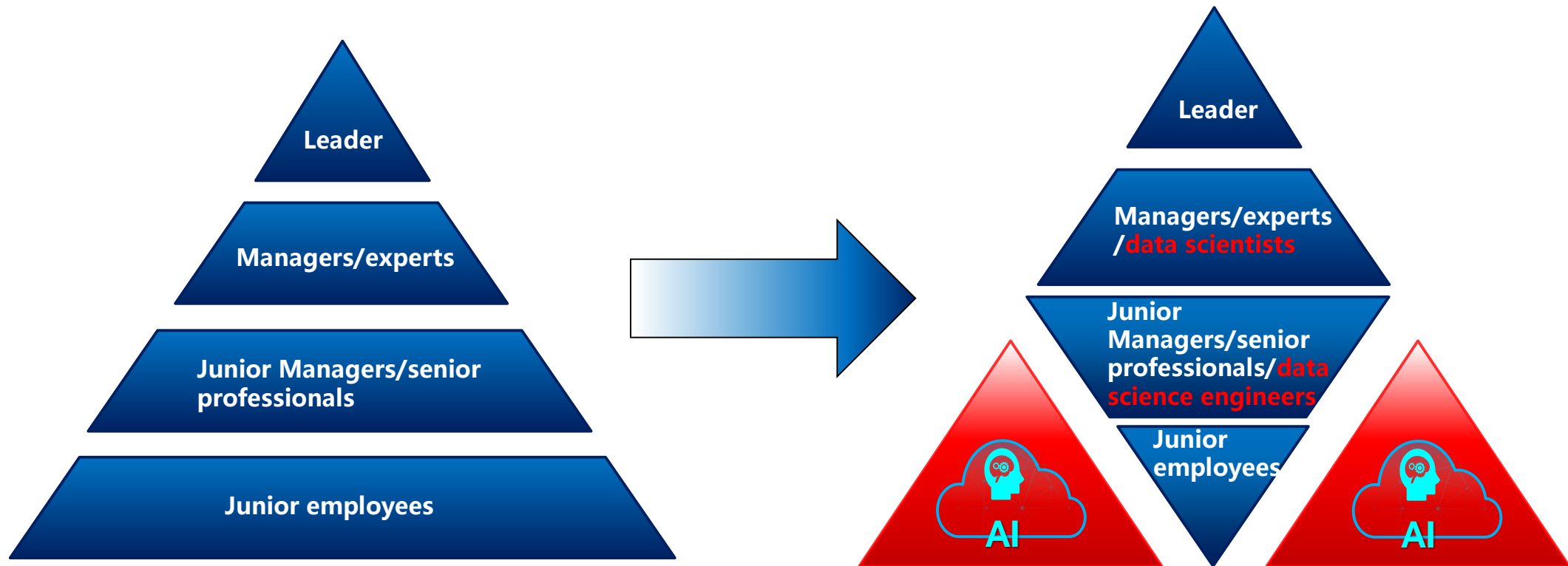


AI, a GPT, is changing all industries

 Public <ul style="list-style-type: none">• Safe city• Smart transportation• Disaster warning	 Education <ul style="list-style-type: none">• Personalized content• Attention improvement• Machine TA	 Health <ul style="list-style-type: none">• Early prevention• Assisted diagnosis• Precision treatment	 Media <ul style="list-style-type: none">• Real-time translation• Abstract• Content review	 Logistics <ul style="list-style-type: none">• Path planning• Goods monitoring• Automatic sorting	 Pharmaceuticals <ul style="list-style-type: none">• Shortened period• Precise test• Precision medicine	 Finance <ul style="list-style-type: none">• Doc processing• Real-time anti-fraud• Precise recommendation
 Insurance <ul style="list-style-type: none">• Efficient authentication• Counter-Measure of Service Fraud• Product innovation	 Retail <ul style="list-style-type: none">• Self-service supermarkets• Real-time inventory• Precise recommendation	 Manufacturing <ul style="list-style-type: none">• Quality check• Industrial IoT• Predictive maintenance	 Oil and gas <ul style="list-style-type: none">• Precise drilling• Remote maintenance• Operation optimization	 Telecommunication <ul style="list-style-type: none">• Customer service• Network maintenance• Network optimization	 Agriculture <ul style="list-style-type: none">• Fertilization optimization• Remote work• Efficient breeding	

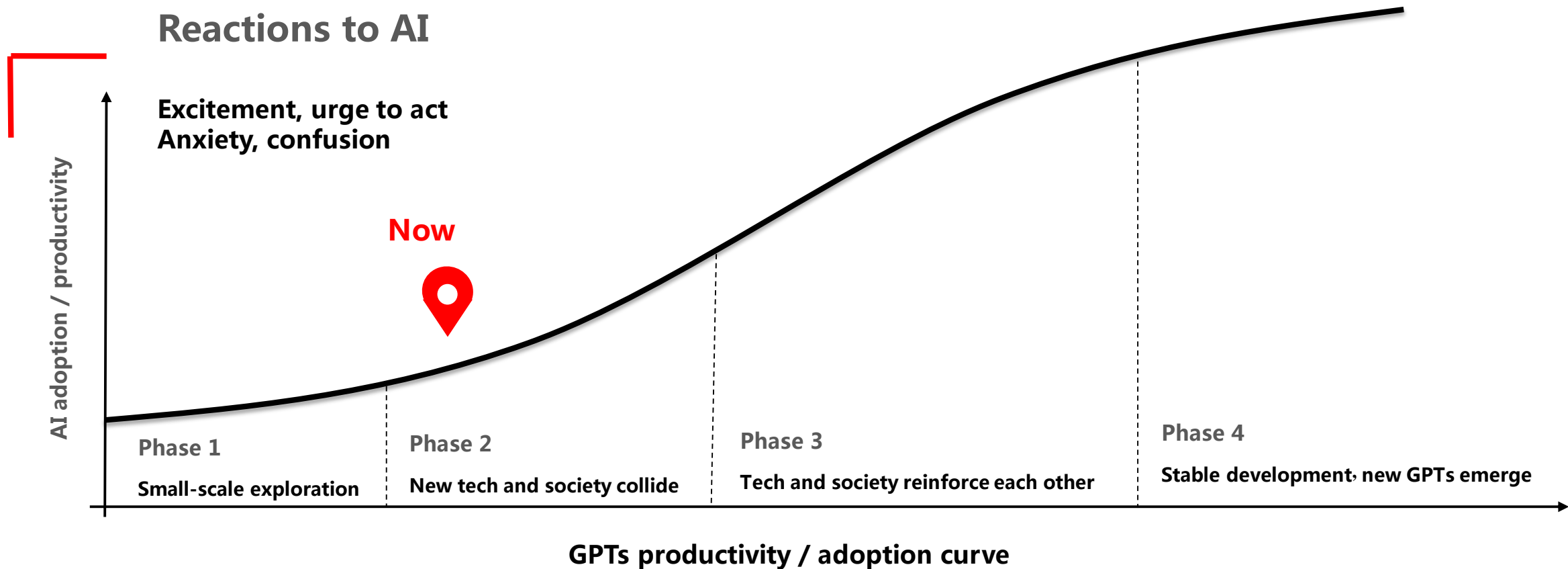


AI will change every organization





AI-triggered change has just begun





Inspiring gaps we see today

20k machine learning papers in 2017

of AI papers keeping up with **Moore's law** in past 8 years

Object detection: Outperforming **humans**

Speech recognition: On par with **humans**

Translation: Approaching **humans**

22+ countries with national AI plans

253+ business and academic events in 2018

1,100+ new AI startups in 2017

US\$24 bn AI-related M&As in 2017

US\$14 bn AI-related VC investments in 2017

4% of enterprises have invested in or deployed AI

~2% of retailers have invested in and deployed AI

5% of higher education institutions use AI to augment experience

10% of B2B companies employ AI to augment sales processes

~5% of smart city implementations are using AI

4% of consulting and SI service projects were AI-related in 2017

2% of customer service operations integrated virtual assistants in 2017

~10% of smartphones with AI capabilities in 2017

~10% of B2C/B2B2C apps in China include AI in 2018

1% – Available AI talent vs. Global demand



10 changes that will shape the future with AI

Training in days or even months	Training in minutes or even seconds
Scarce & costly computing power	Abundant & affordable computing power
AI: Mostly in cloud, some at the edge	Pervasive AI for all scenarios. Respects and protects user privacy
Today's basic algorithms invented before the 1980s	Data and energy-efficient, secure, and explainable algorithms
No labor, no intelligence	Automated / semi-automated data labeling
Models perform better in tests	Industrial-grade AI, perform excellently in execution
Updates not in real time	Real-time, closed-loop system
Inadequate integration with other technologies	Synergy between AI and cloud, IoT, edge computing, blockchain, big data, databases, etc.
Only highly-skilled experts can work with AI	AI as a basic skill, supported by one-stop platforms
Scarcity of data scientists	Data scientists + Subject matter experts + Data science engineers

As Is

To Be



Future society will be shaped by AI+5G+IoT...

g.i.v@2025

10 Trends for 2025:

Touching the Intelligent World

The intelligent world is arriving - the fusion of 5G, AI, IoT and other emerging technologies promises new possibilities, opportunities, and experiences for everyone, everywhere. Huawei's Global Industry Vision 2025 describes 10 exciting trends that are shaping the future and inspiring a new age of digital inclusion. Together, we can bring the benefits of digital technologies to every person, home and organization.

Living with Bots

The adoption rate of intelligent domestic robots will reach **14%**.



Super Sight

The percentage of companies using AR/VR will increase to **10%**.



Augmented Creativity

97% of large companies will be using AI in their services or operations.

Frictionless Communication

Enterprises will be making efficient use of **86%** of the data that they produce.



Future society will be shaped by AI+5G+IoT...

Zero Search

The adoption rate of intelligent personal digital assistants will reach **90%**.



Tailored Streets

C-V2X (Cellular Vehicle-to-Everything) technology will be installed in **15%** of the world's vehicles.



Working with Bots

Industrial robots will work side by side with people in manufacturing, with **103** robots for every 10,000 employees.



Symbiotic Economy

85% of business applications will be cloud-based.



5G's Fast Arrival

5G networks will cover **58%** of the world's population.



Global Digital Governance

The amount of global data produced annually will reach **180 ZB**.



AI ethics is a hot topic

(Independent) High-Level Expert Group on Artificial Intelligence

Published: 8 April 2019

- ❖ Fairness
- ❖ Respect for human autonomy
- ❖ Explicability
- ❖ Prevention of harm



<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



Ethical guidelines: example EU



- ❖ Human agency and oversight
- ❖ Technical robustness and safety
- ❖ Privacy and data governance
- ❖ Transparency
- ❖ Diversity, non-discrimination and fairness
- ❖ Societal and environmental wellbeing
- ❖ Accountability



Mariya Gabriel
@GabrielMariya

Follow

Excellent & encouraging meeting w/ #AI HLG Chair Pekka Ala-Pietilä & the 52 experts that will deliver concrete and targeted recommendations on both the #competitiveness & #ethical aspects of #AI. Human-centric and value-based approach - It's time to deliver!



5:41 AM - 9 Oct 2018

<https://ec.europa.eu/digital-single-market/en/news/ethics-guidelines-trustworthy-ai>



AI professional training is a basis in the future

AI Certification Courses



The Huawei Certified Enterprise AI Development Expert program aims to cultivate talents who have deep understanding of theoretical knowledge and are able to use the Ascend 310 solution and TensorFlow to perform expert-level programming.

EI Developer

To be released (estimated time: 2019.12)

The Huawei Certified Device AI Development Expert program aims to cultivate experts who have deep understanding of theoretical knowledge and are able to use HiAI, a three-layer open mobile platform that integrates device, chip, and cloud, to develop and innovate.

HiAI Developer

To be released (estimated time: 2020)



The Huawei Enterprise Certified Advanced AI Development Engineer program is an intermediate-level AI certification for enterprise engineers. It aims to cultivate professionals who possess basic theoretical knowledge in image processing, speech processing, and NLP and are able to use Huawei AI solutions like Huawei Cloud EI, general open source AI framework, and ModelArts (a one-stop AI development platform) to develop and innovate.

EI Developer V1.0 has been released and V1.5 will be released in May.

The Huawei Device Certified Advanced AI Development Engineer program is an intermediate-level AI certification for Huawei mobile device engineers. It aims to cultivate professionals who possess basic theoretical knowledge in computer vision, ASR, and NLU and are able to use HiAI, a three-layer open mobile platform that integrates device, chip, and cloud, to develop and innovate.

HiAI Developer V1.0 has been released.



HCIA-AI aims to cultivate entrepreneurial talents who master the basic theories of AI and are able to use the universal AI framework in the industry to develop and innovate.

V1.0 has been released and V2.0 will be released in June.

University AI Professional Courses

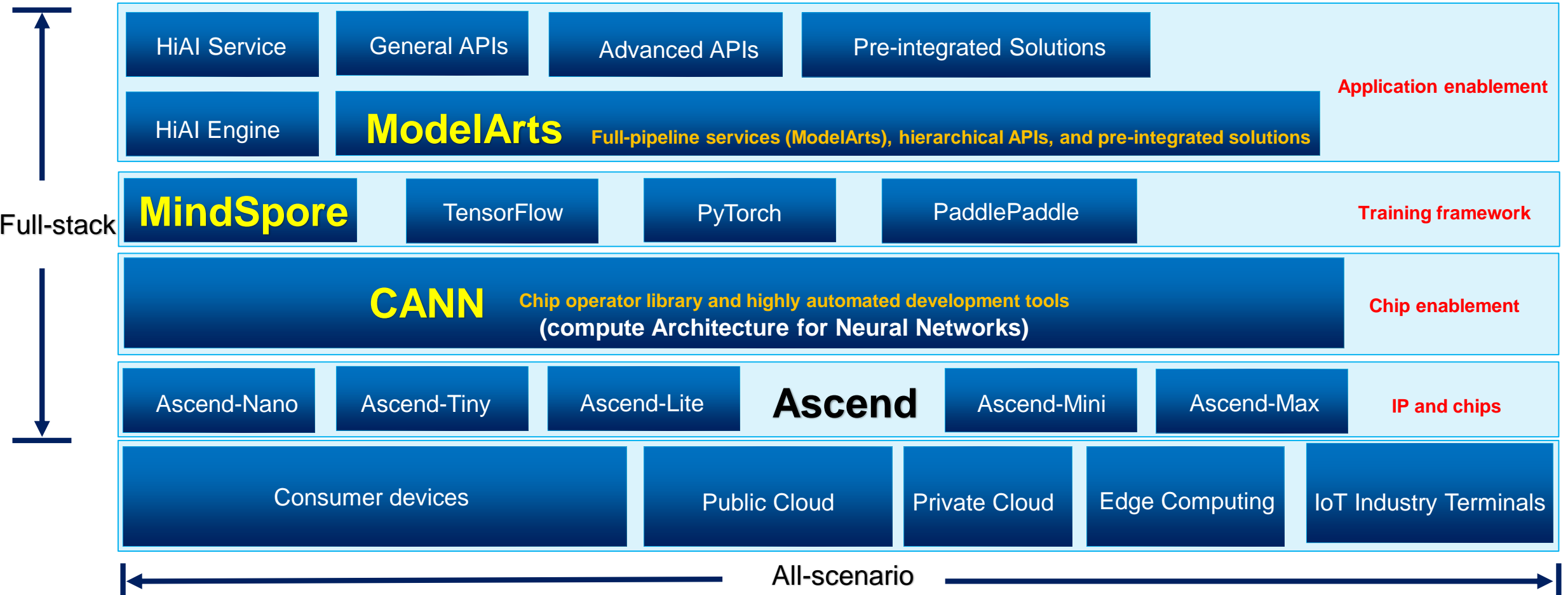
Course Type	Course Name	Type	Hours
Generic	AI Introduction	Lecture	4
	Professional Competence	Lecture	4
	ICT Frontiers – AI	Lecture	4
	ICT Frontiers – Big Data	Lecture	4
	ICT Frontiers – Cloud Computing	Lecture	4
	ICT Frontiers – IoT	Lecture	4
	ICT Frontiers – Block Chain	Lecture	4
	ICT Frontiers – Quantum Computing	Lecture	4
	AI Basics	HCIA Certification Course	64
	Big Data Basics	HCIA Certification Course	64
Specialized – Basics	Cloud Computing Basics	HCIA Certification Course	64
	IoT Technology Basics	HCIA Certification Course	64

Course Type	Course Name	Type	Hours
Specialized - Core	Machine Learning Basics	Practical training	32
	Computer Vision	Practical training	32
	NLP	Practical training	32
	Speech Processing	Practical training	32
	Deep Learning	Practical training	32
Comprehensive Training Course	Mobile Phone AI App Development	Practical training	32
AI+Industry	AI in Medicine & Machine Learning	Lecture + Practical training	32



Full-stack, all-scenario AI solution is necessary

- All-scenario: Intelligence is pervasive, including the deployment scenarios for public clouds, private clouds, edge computing in all forms, industrial IoT devices, and consumer devices.
- Full-stack: Provides powerful computing power and application development platforms for AI developers, including chips, chip enablement, a training and inference framework, and application enablement.





Strategy for AI development advice

Invest in basic research

In fields such as computer vision, natural language processing (NLP), decision-making, and inference, build secure, trusted, and autonomous basic machine learning capability with high data efficiency (less data requirements) and energy efficiency (lower computing power and energy consumption).



Build a full-stack AI solution

Build an efficient and easy-to-use AI platform with full-pipeline services, which is adaptive to all scenarios, both standalone and collaborative scenarios between cloud, edge, and device, and can deliver abundant and affordable computing power.



Invest in open ecosystem and talent cultivation

Continue to cooperate with the academia, industry, and industry partners around the globe



Enhance existing solutions

Bring an AI mindset and techniques into existing products and solutions to create greater value and enhance competitive strengths.



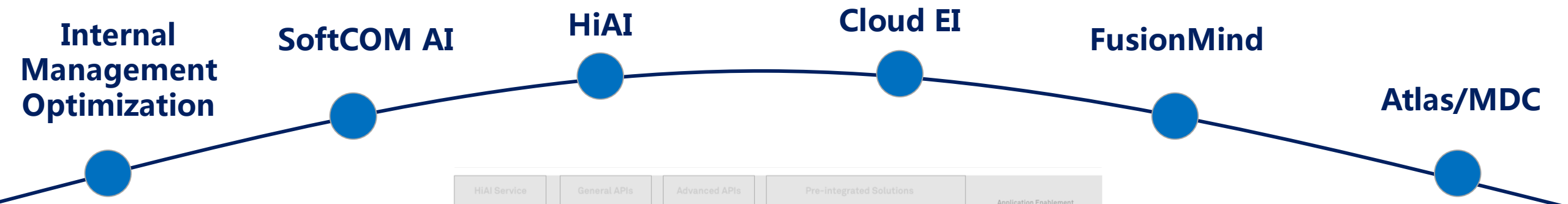
Improve internal efficiency

Apply AI to massive volumes of routine operational activities for better efficiency and quality.

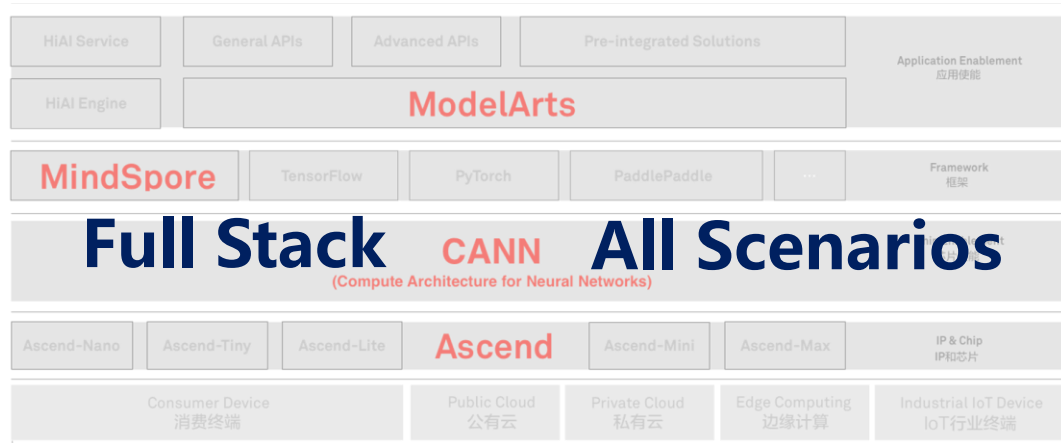




Huawei's AI update



Research



Open Global Ecosystem



Talent Development



Thank You
www.huawei.com