



# 晶心科技股份有限公司法說會 – 矽智財 Corporate Day

(主辦單位:永豐金證券)

2020/7/22

# 投資安全聲明

除簡報內所提供之歷史信息外，簡報事項係屬預測性陳述，受到風險及不確定性因素影響，可能造成實際結果與陳述內容發生不符，這些不確定性因素包括但不限於：天氣、競爭性產品及其定價的影響、產業及市場對半導體產品之供給及需求移轉、新產品大量量產之能力、技術急遽演進、半導體產業景氣以及整體經濟環境之變化。

# 簡報大綱



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## 公司簡介



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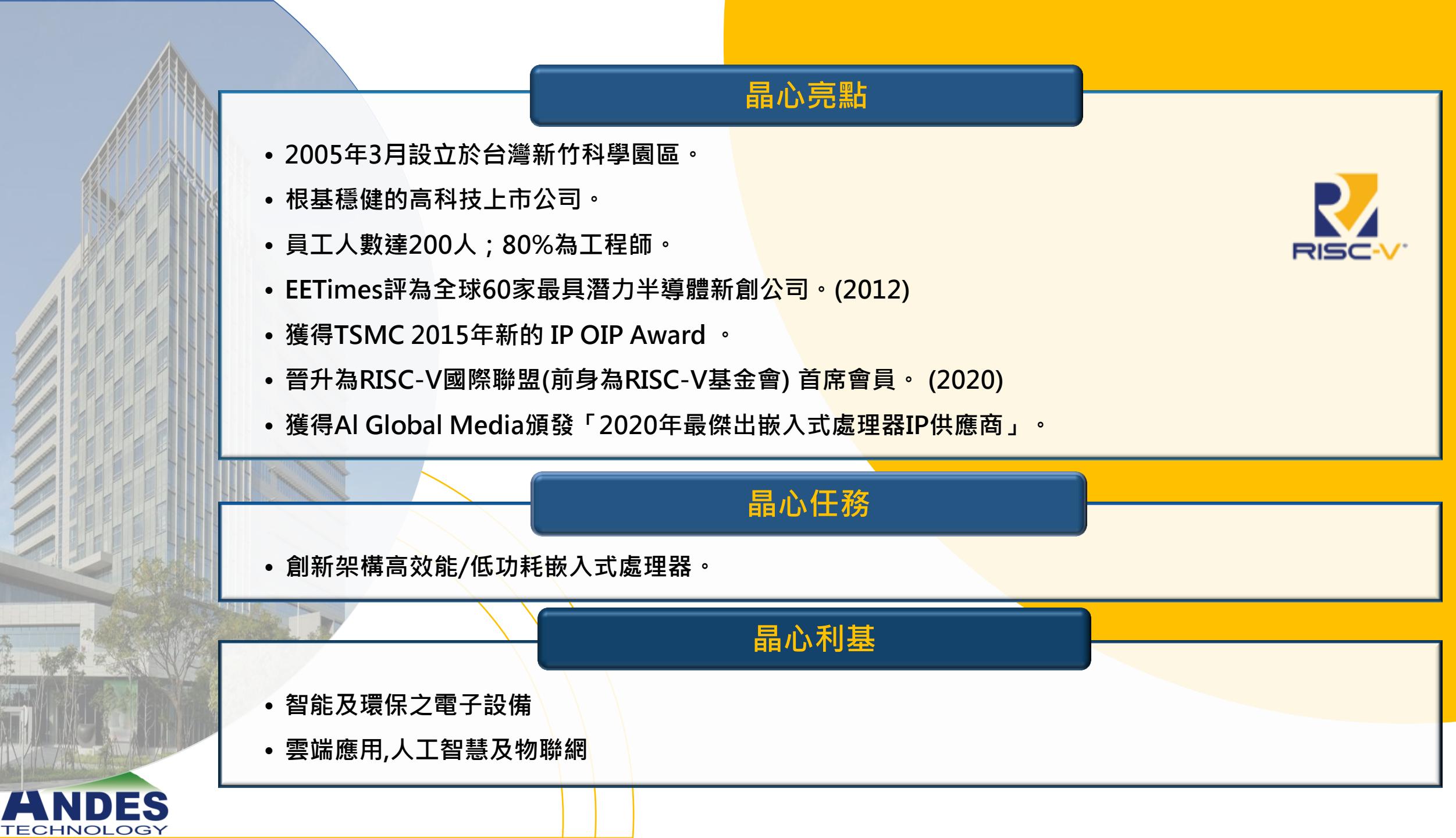
## 總結



# 公司簡介

<http://www.andestech.com>





## 晶心亮點

- 2005年3月設立於台灣新竹科學園區。
- 根基穩健的高科技上市公司。
- 員工人數達200人；80%為工程師。
- EETimes評為全球60家最具潛力半導體新創公司。(2012)
- 獲得TSMC 2015年新的 IP OIP Award 。
- 晉升為RISC-V國際聯盟(前身為RISC-V基金會) 首席會員。 (2020)
- 獲得AI Global Media頒發「2020年最傑出嵌入式處理器IP供應商」。



## 晶心任務

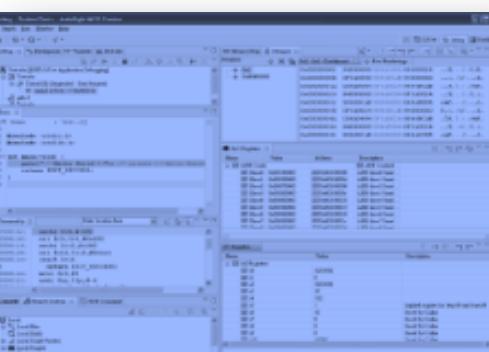
- 創新架構高效能/低功耗嵌入式處理器。

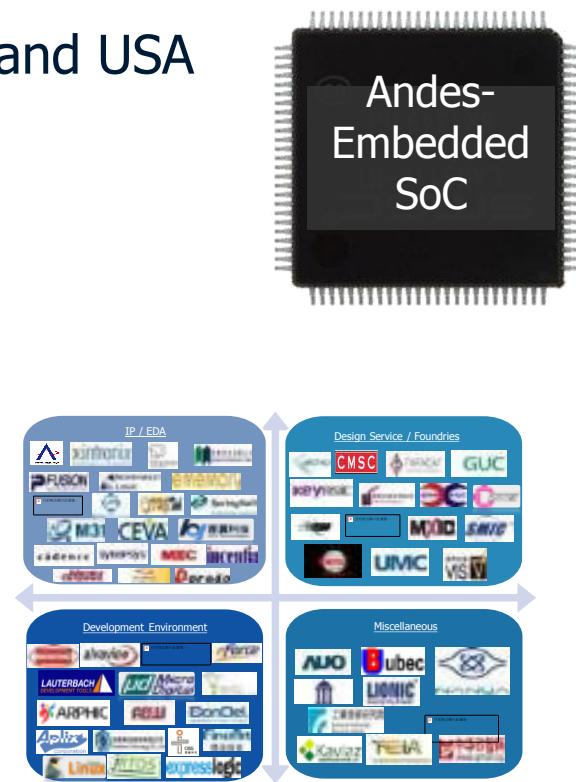
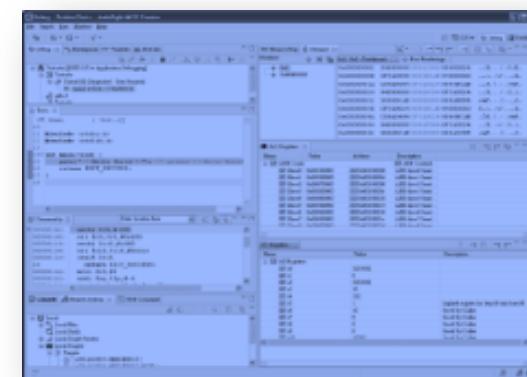
## 晶心利基

- 智能及環保之電子設備
- 雲端應用,人工智慧及物聯網



# 重要里程碑

- ❖ **200+** commercial licensees
    - Geographically distributed in Taiwan, China, Korea, Japan, Europe, and USA
    - **400+** license agreements signed
  - ❖ AndeSight™ IDE:
    - **17,000+** installations
  - ❖ Eco-system:
    - **150+** partners
  - ❖ **5B+** Accumulative SoC Shipped



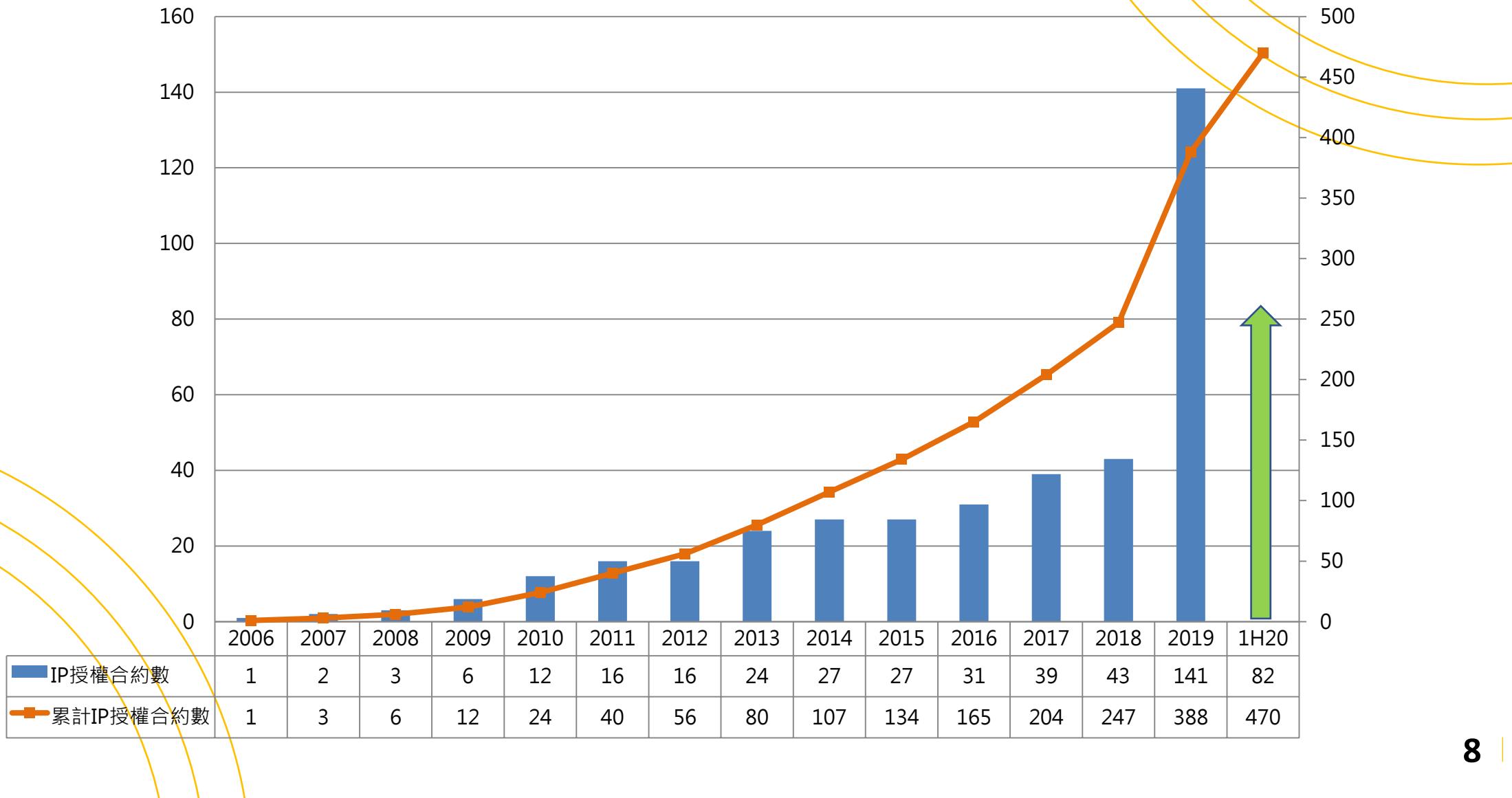


# 營運成果

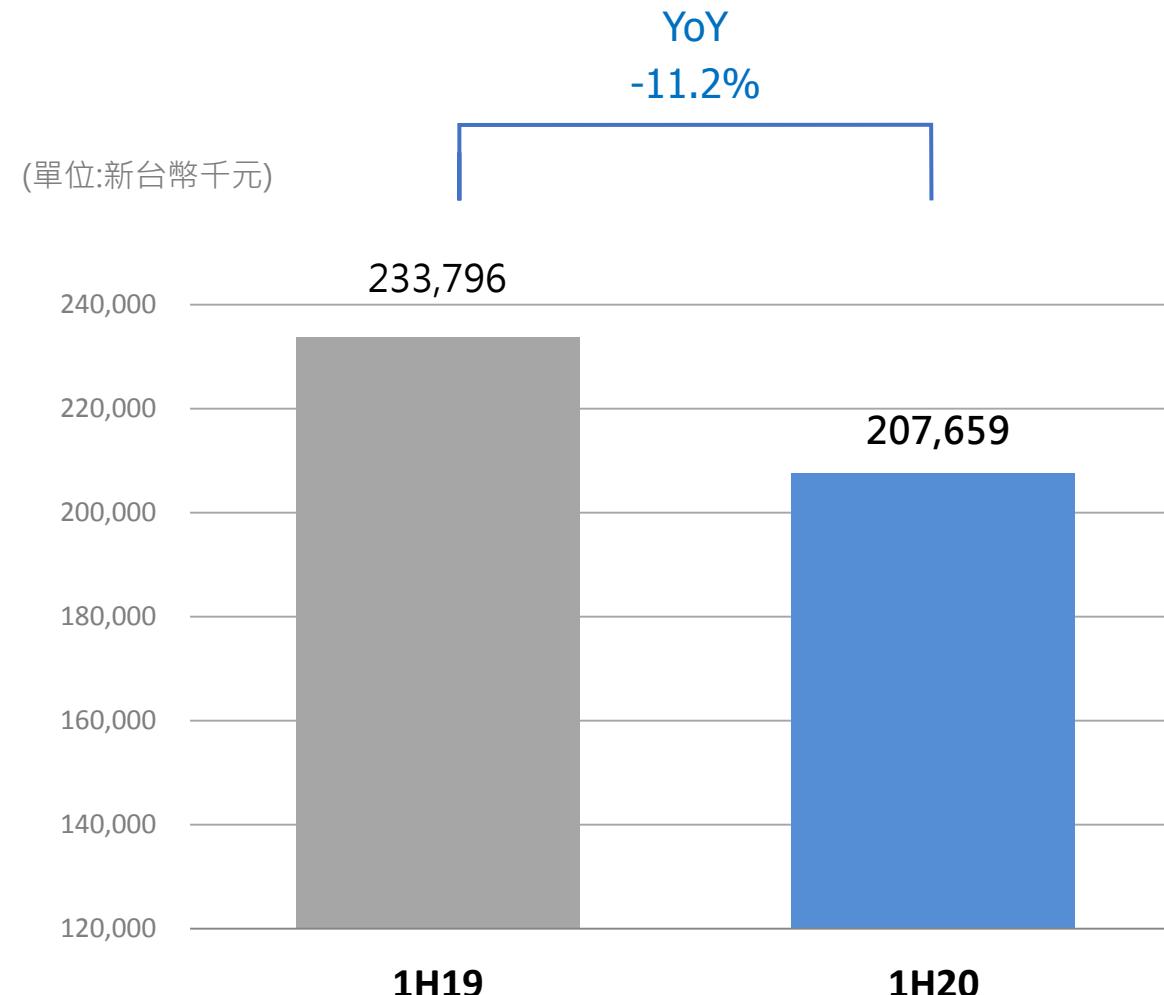
<http://www.andestech.com>



# IP 授權合約數穩健成長



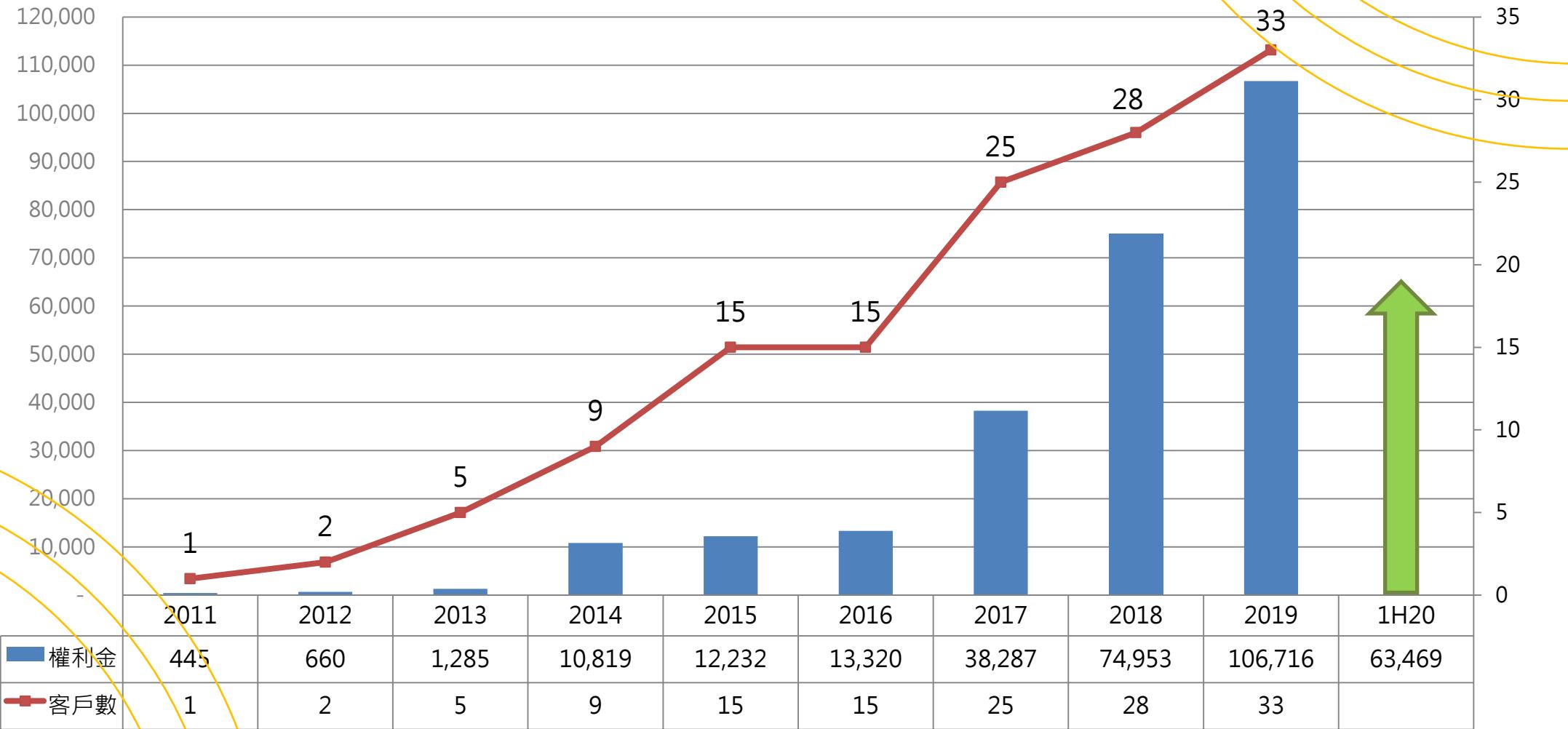
# 2020年上半年營業收入



# 2020年上半年權利金收入

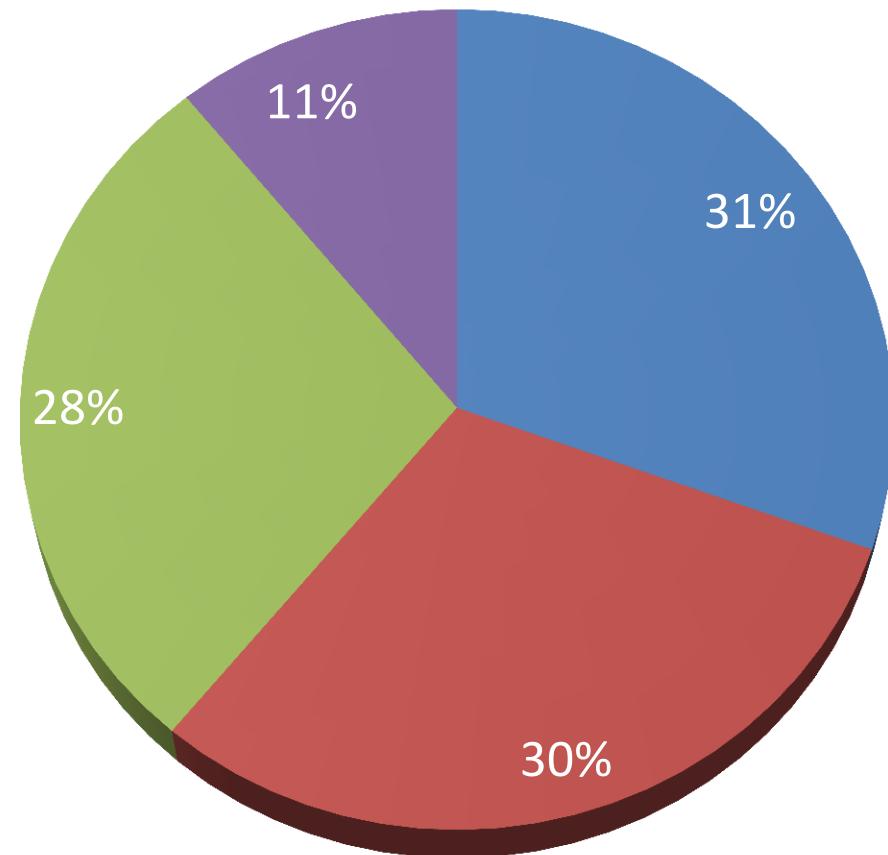
(單位:新台幣千元)

(單位:家數)



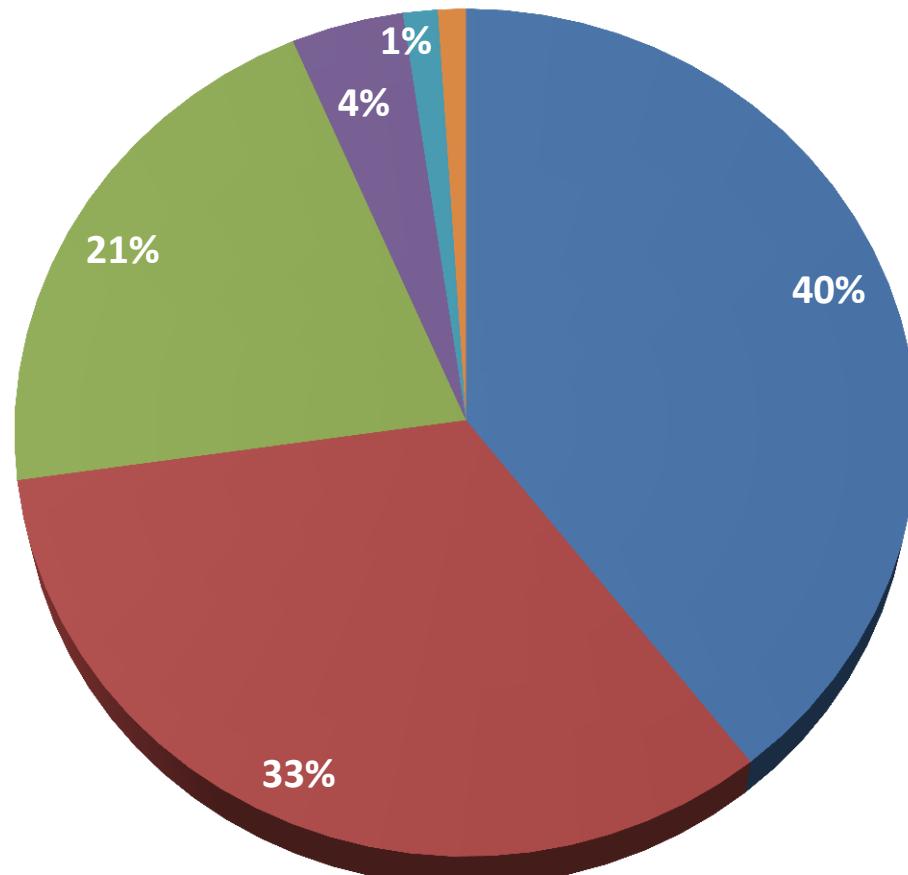
# 2020年上半年銷售分析-收入模式

■ 權利金收入 ■ 矽智財授權收入 ■ 技術服務收入 ■ 維護服務收入及其他

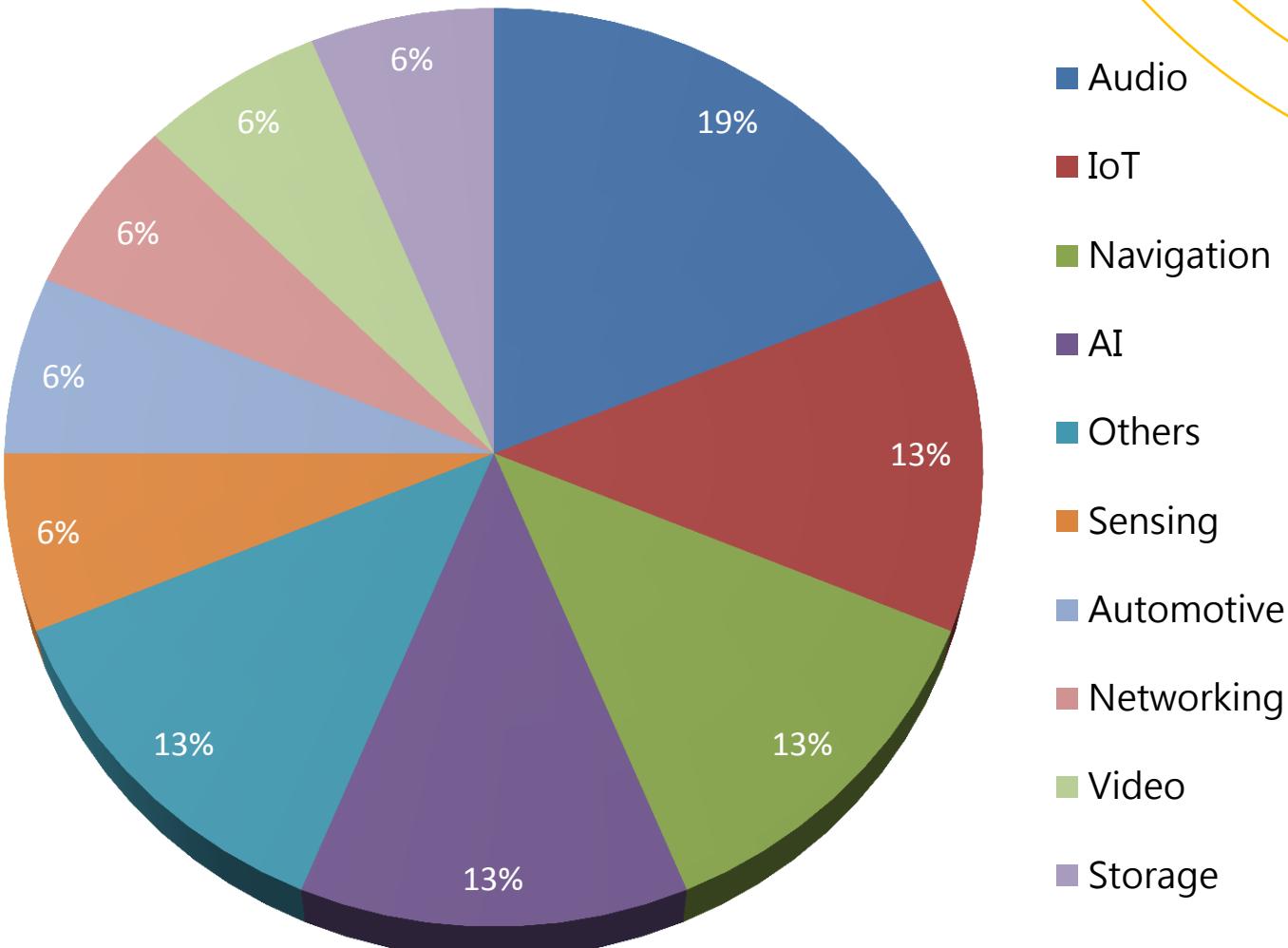


# 2020年上半年銷售分析-地區別

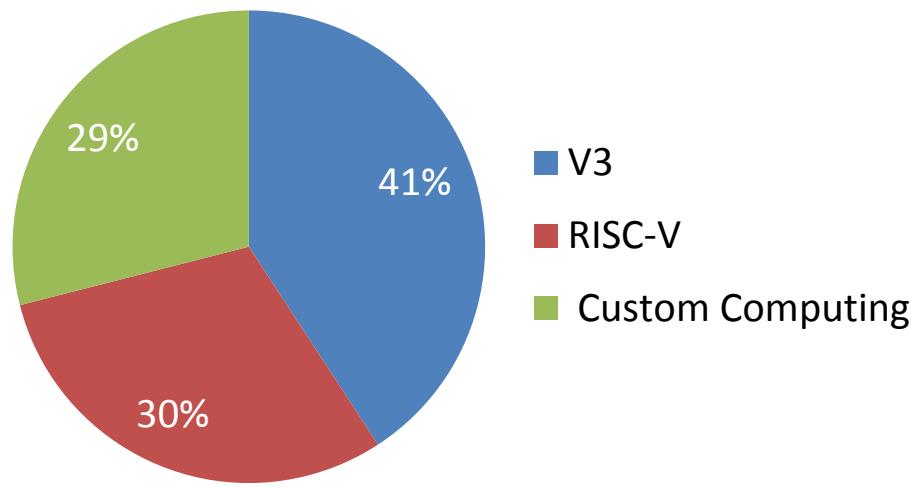
■ 台灣 ■ 美國 ■ 中國 ■ 韓國 ■ 歐洲 ■ 日本



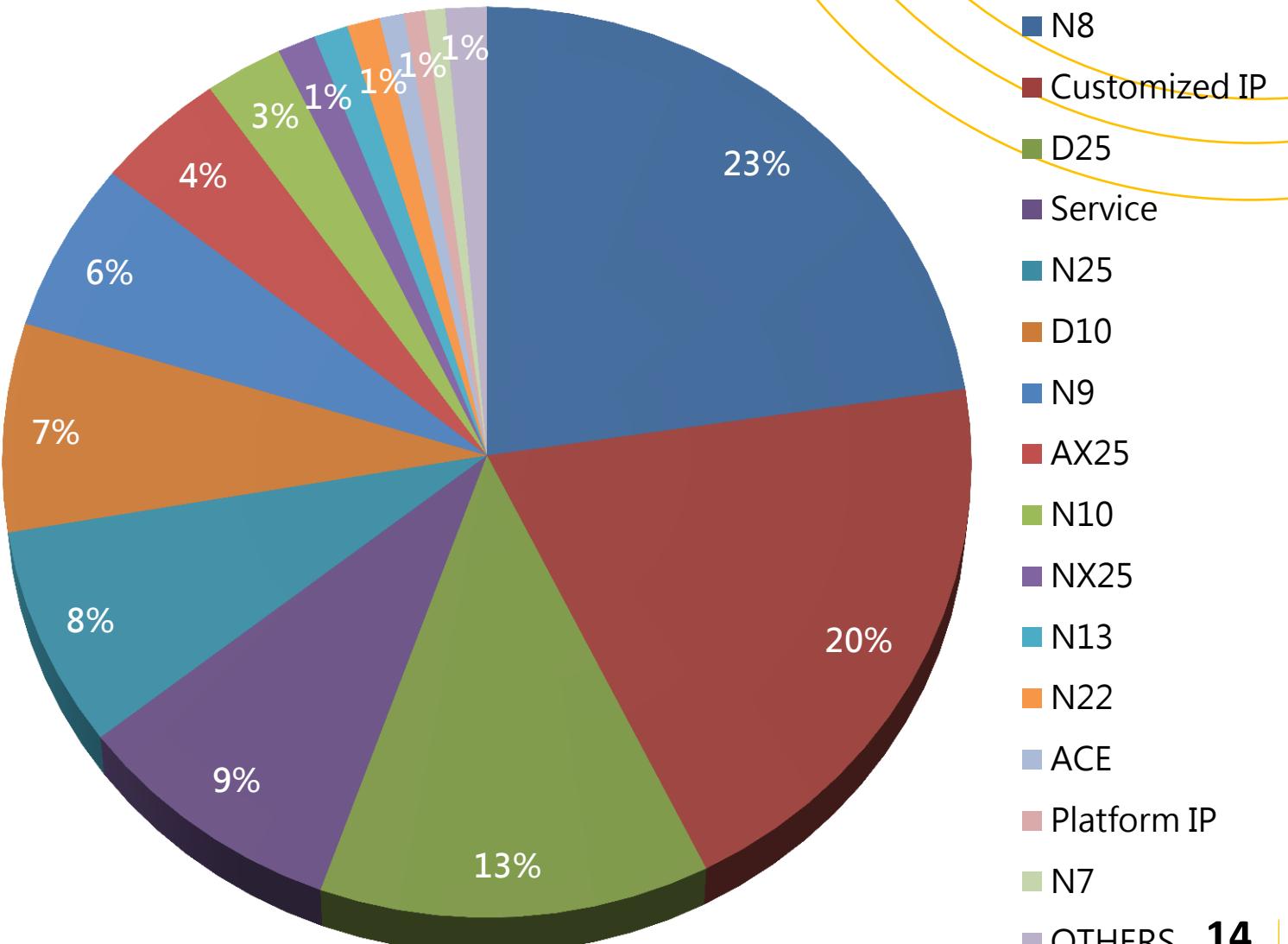
# 2020年上半年銷售分析-客戶應用



# 2020年上半年銷售分析-產品別

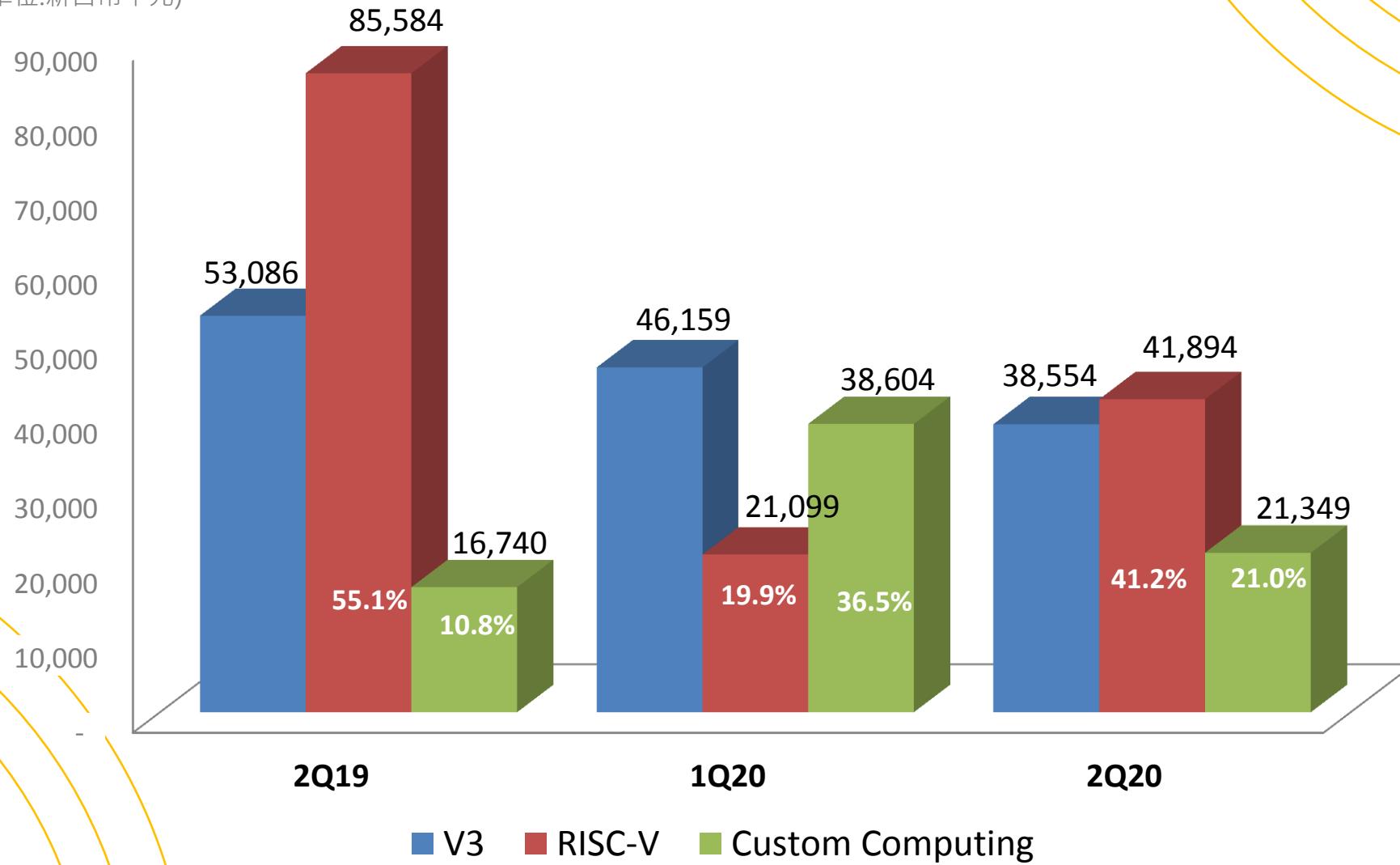


■ V3  
■ RISC-V  
■ Custom Computing



# 2020年上半年銷售分析- RISC-V

(單位:新台幣千元)





# 產品應用

<http://www.andestech.com>



# 晶心概况

- ❖ A 15-year-old public CPU IP company
- ❖ 1.5B+ Andes-Embedded SoC annually in 2019



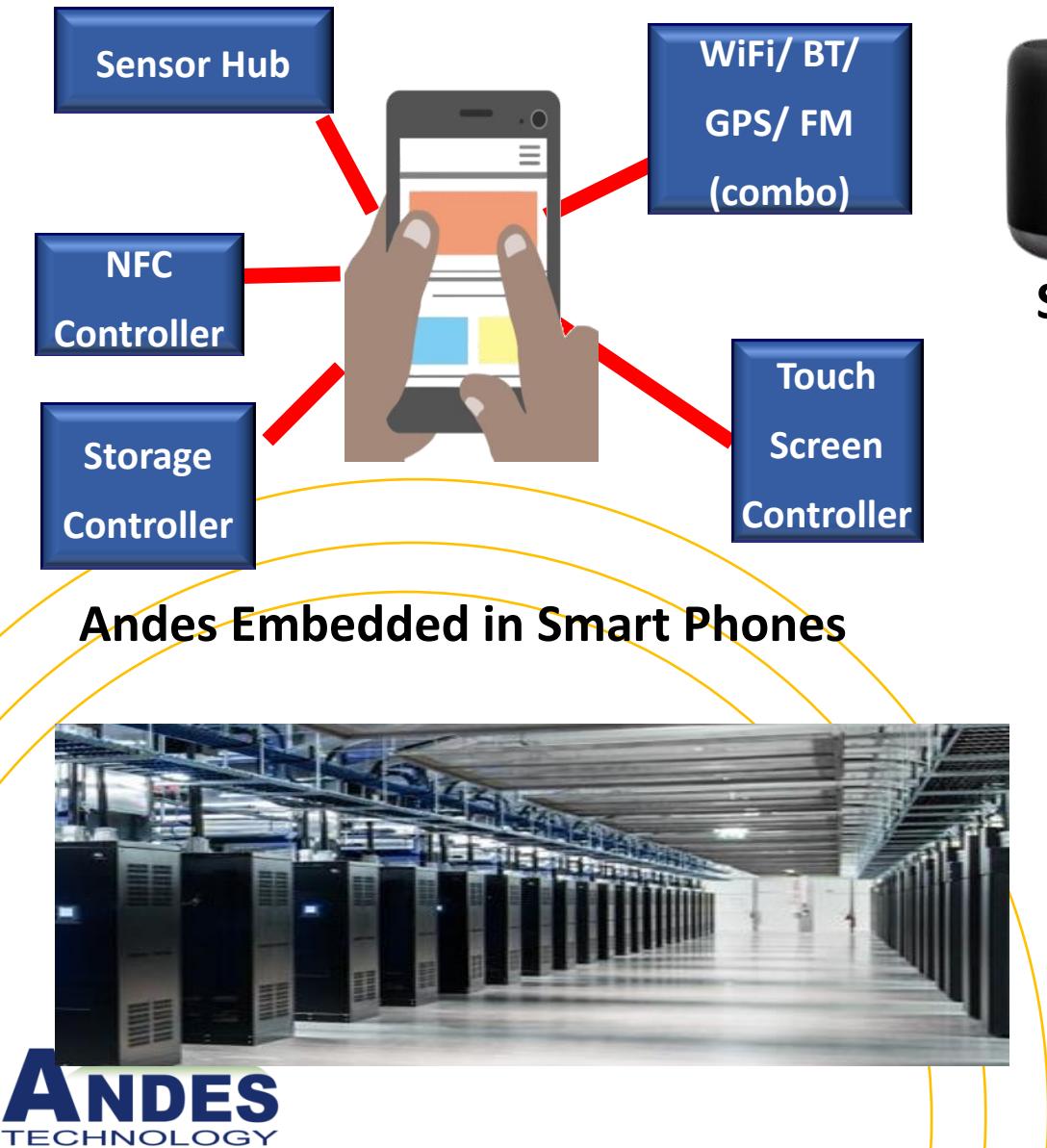
- ❖ A **founding premier** member of the RISC-V International
- ❖ An active role in RISC-V International & its extension task groups
  - RISC-V Board Director
  - Vice Chair of Technical Steering Committee
  - RISC-V Ambassador
  - Chair of P-extension (Packed DSP/SIMD) Task Group
  - Co-chair of Fast Interrupt Task Group
- ❖ A major open source maintainer/contributor

The slide is divided into three main sections:

- GNU-Based Toolchains**:
  - binutils, GCC: May, 2017
  - glibc: February, 2018
    - only supports rv64i-based ISAs
  - newlib: August, 2017
  - "Probably not a compiler bug"
- GNU Toolchains**
- RISC-V LLVM Porting Effort**:
  - Alex Bradbury is in charge of RISC-V LLVM/EM
    - Talk yesterday afternoon
    - Poster on Tuesday night
  - RV32IM(A)FI support upstream
    - Missing hard-float calling convention
    - Missing 64-bit support
    - Missing compressed support
  - Clang, Go, and OpenJDK have run code
    - Built port in progress
    - Poster on Tuesday
- LLVM**
- RISC-V Linux Kernel Port**:
  - Linux: January, 2018
    - Only RV64i-based systems
    - Drivers are trickling in now
- Linux**

Logos for SiFive, bluespec, redhat, ANDES TECHNOLOGY, lowRISC, Berkeley, and Intel are displayed along the right side.

# 晶心嵌入各式各樣新的應用



Smart Speakers:  
WiFi IoT



Bike Sharing:  
GPS Ctrl



X-Trail:  
ADAS Ctrl



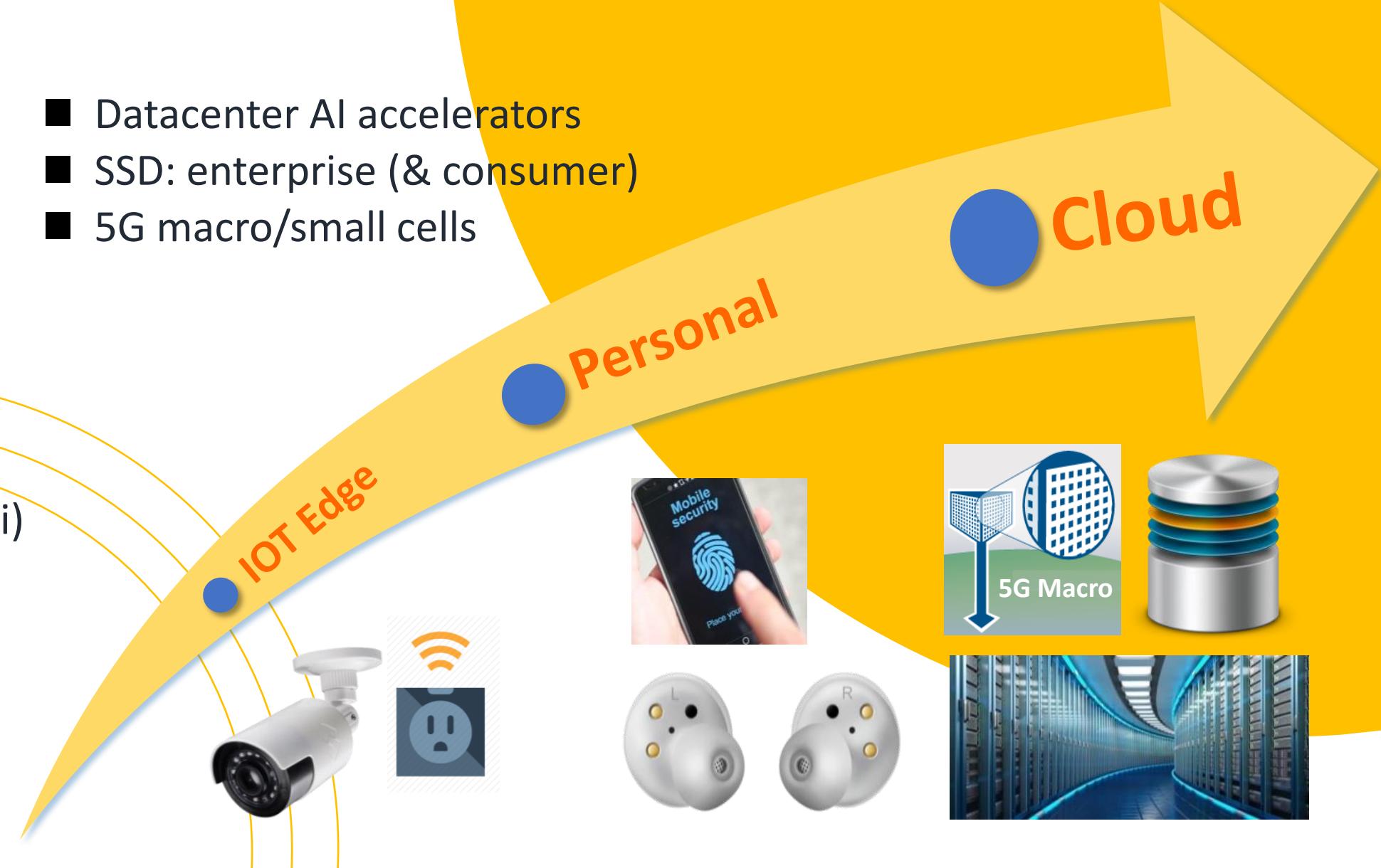
Switch:  
Game Flash Ctrl

- ❖ In leading machine learning computers for datacenter
- ❖ In tier-one switch routers for datacenter
- ❖ Recent applications: 5G networking, 802.11ax, AI processors (using Andes Custom Extension, ACE)

# 晶心RISC-V已應用在邊緣到雲端運算的SoC

## ❖ Edge to Cloud

- ADAS
  - AIoT
  - Blockchain
  - FPGA
  - MCU
  - Multimedia
  - Security
  - Wireless (BT/WiFi)
- ❖ 40nm to 7nm
- ❖ Many in AI
- Datacenter AI accelerators
  - SSD: enterprise (& consumer)
  - 5G macro/small cells



# 晶心RISC-V核心在SoC中被採用的數目

o single core

0 0 0 0 0  
    0 0 0

> 30 cores

> 1000 cores

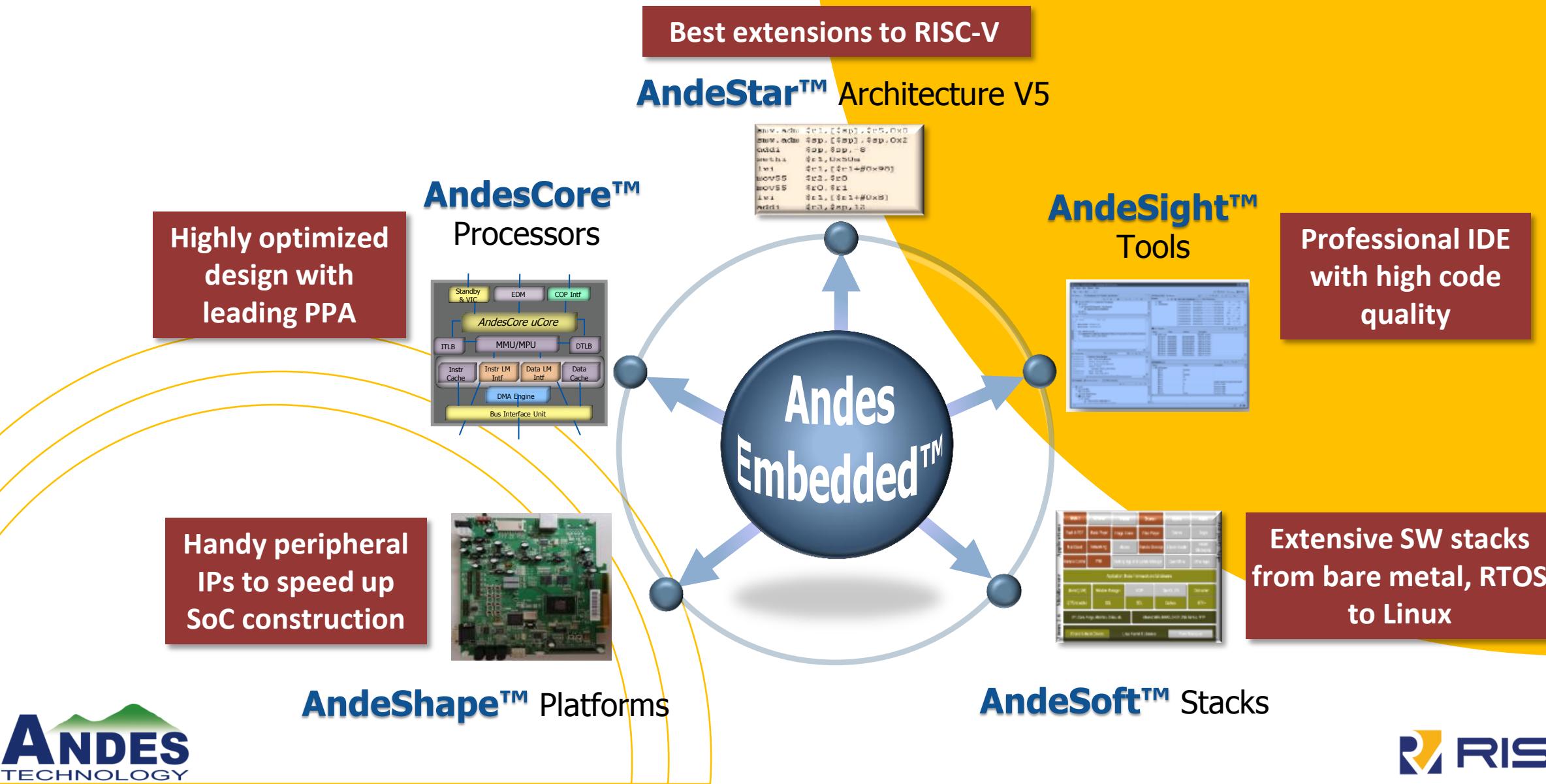


# 新產品及生態系統

<http://www.andestech.com>



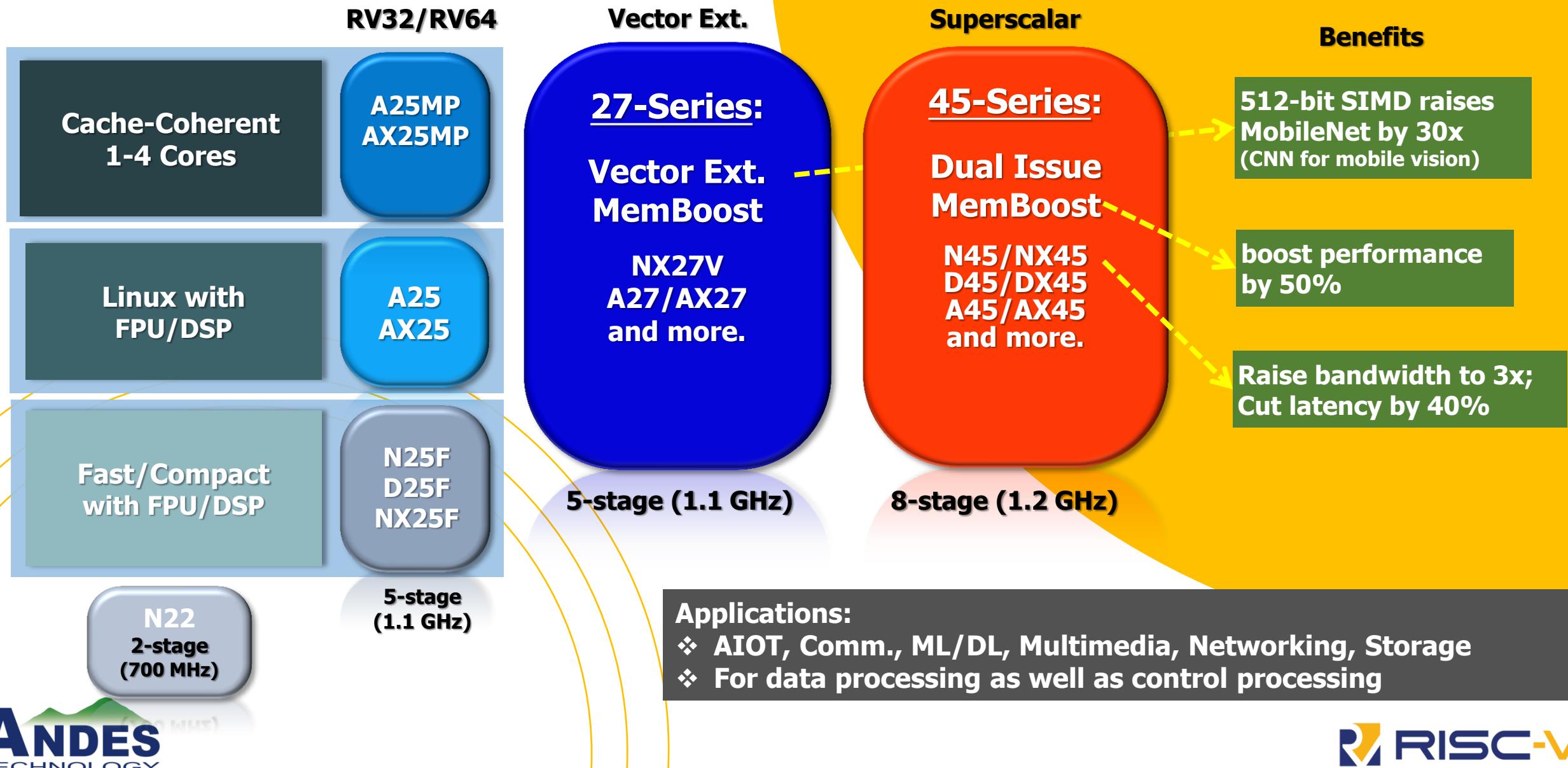
# 晶心RISC-V產品概述



# 完整產品線



# 晶心RISC-V產品路線圖



# Andes V5 適用於廣泛的運算架構

## AndeStar™ V5 CPUs



RV32/64



Andes Extension

### N/D-series

N22 N(X)25 D25...

## General Computing Architecture

### Leading PPA Embedded Processor

IoT, Sensing, Storage, Audio, GPS

## Domain Specific Architecture (DSA)



Define custom instruction to handle time critical codes

### Andes Custom Extension

Better approach for accelerator /co-processor to do particular jobs

### A-series

A(X)25 A(X)27 A(X)45  
Multicore...

### High Performance and Power Efficient AP

5G, AI, Datacenter, Video Surveillance, Networking

### Vector

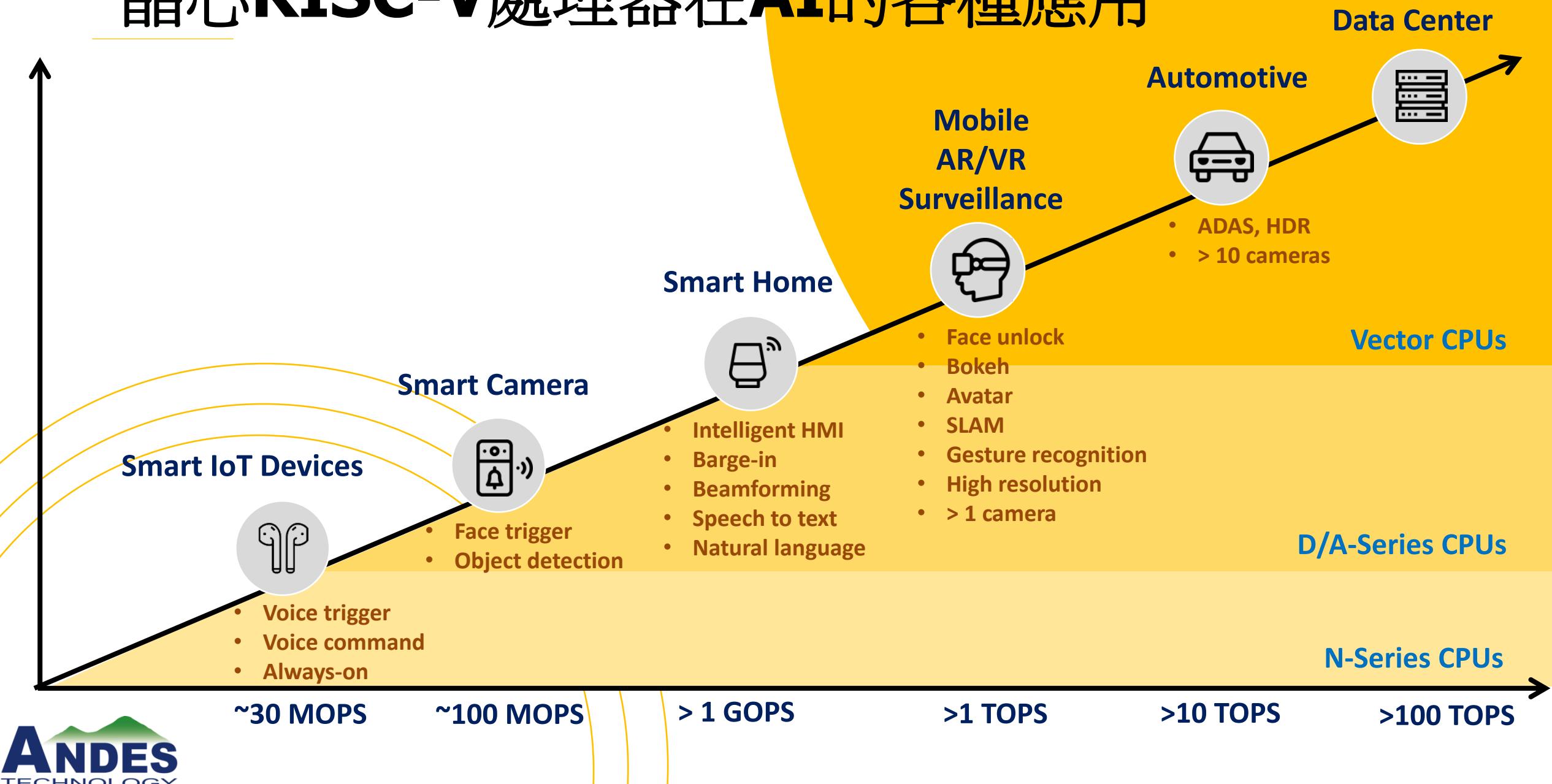
NX27V, NX45V...

### Cray Style, Scalable Vector Processor

Datacenter, Server, Deep Learning

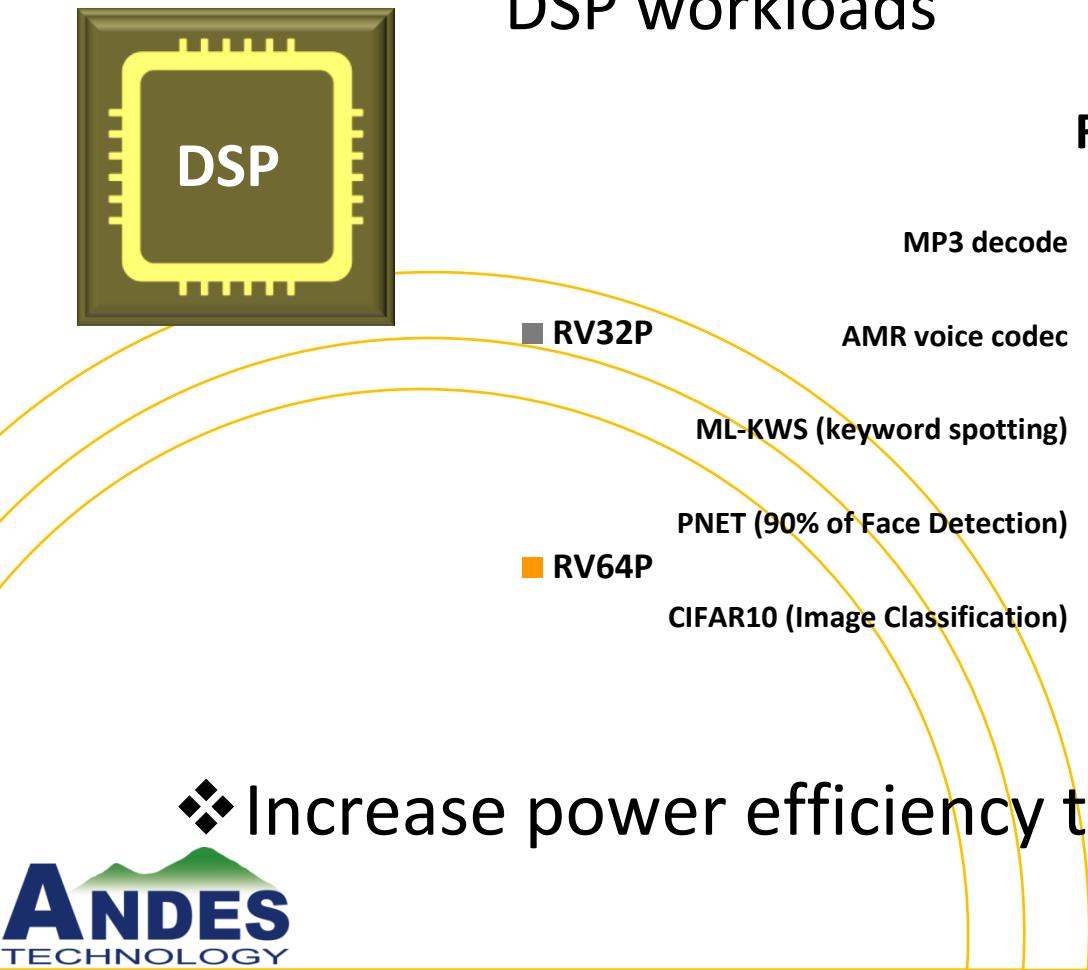
Automation Tool for the generation of toolchain, ISS, partial RTL and verification

# 晶心RISC-V處理器在AI的各種應用

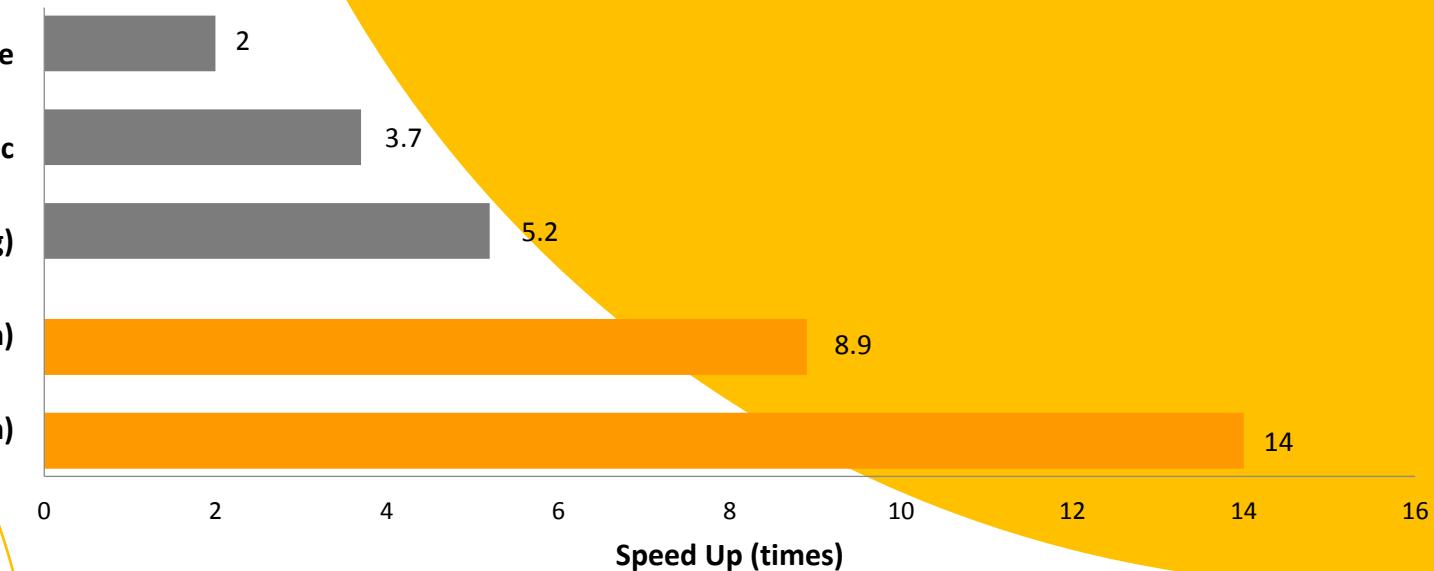


# Andes RISC-V DSP 指令集延伸

- Andes contributed market-proven DSP(SIMD) as P-Extension
- Designed to accelerate slow video, audio/voice and low data rate DSP workloads

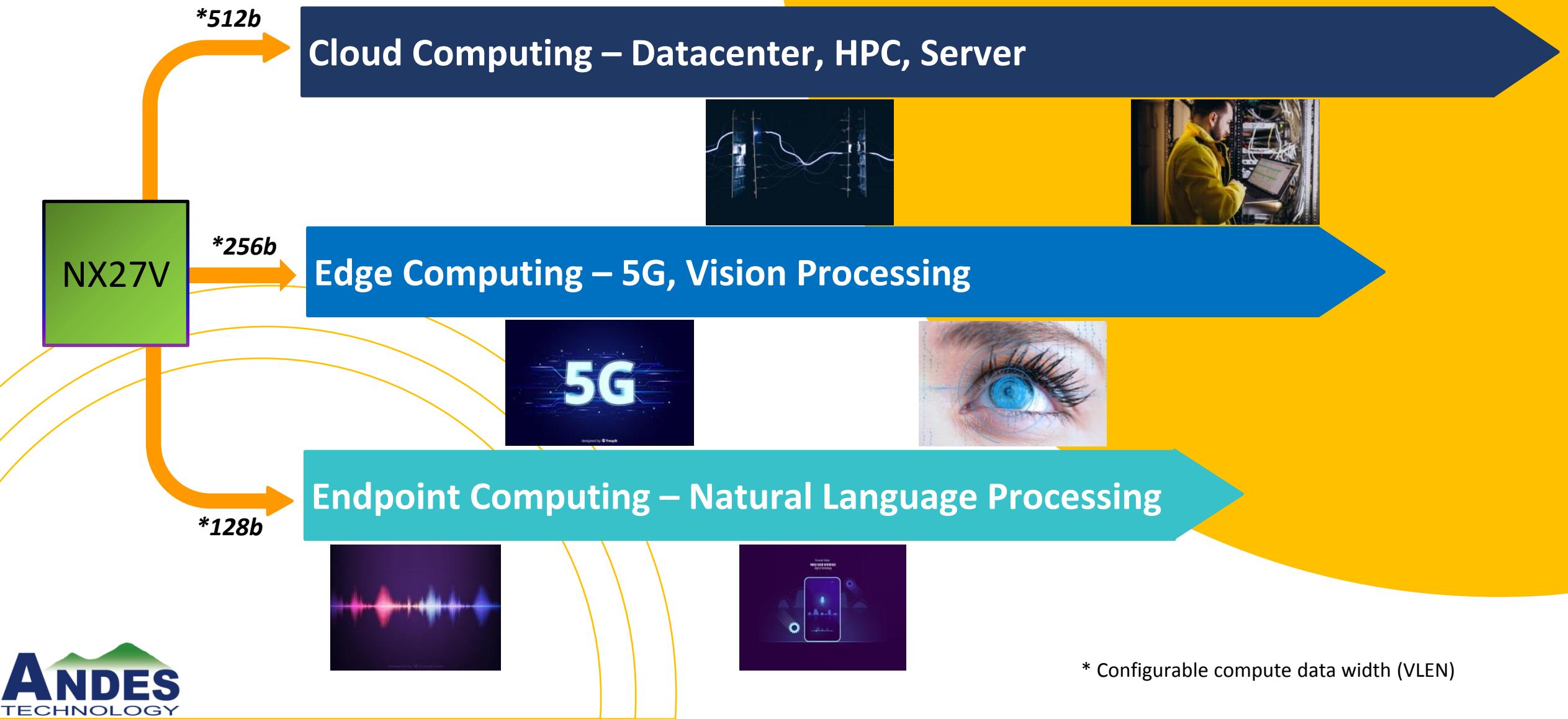


Real world speedup using P-Extension



❖ Increase power efficiency to your DSP applications

# 晶心向量處理器(NX27V) - One for All Implementations



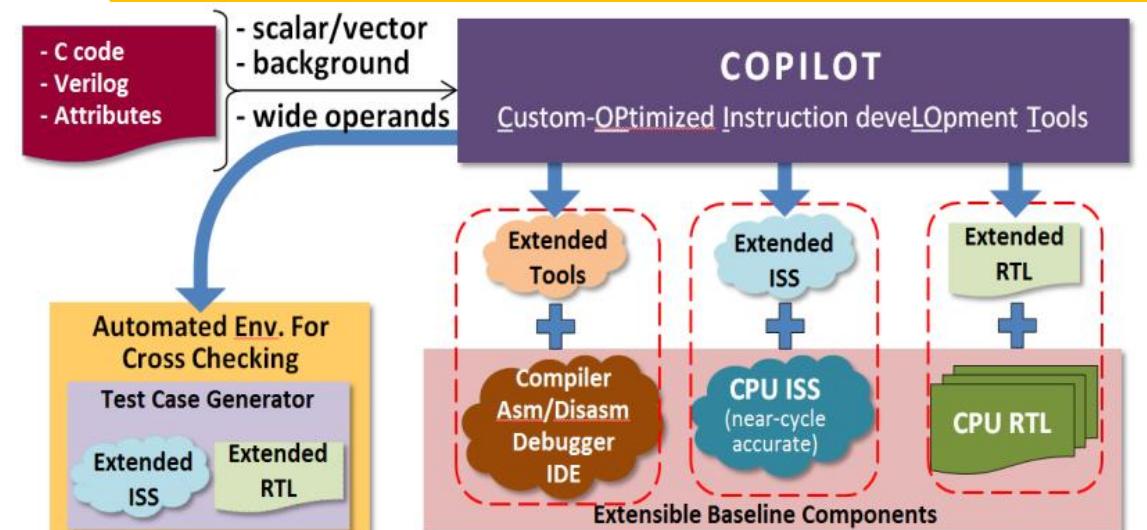
\* Configurable compute data width (VLEN)

# Andes 客製化指令集延伸



- ❖ ACE unlocks RISC-V's Potential of DSA
  - Define ACE instruction to handle time critical codes
  - Another approach to co-processor or accelerators

- ❖ All-in-one **COPilot** development environment
  - Automation tool and ease of use
  - Extensions are easy to re-use, can be used as a library



# Taking RISC-V Cores to Next Level

❖ Andes is the leading supplier shipping the commercial RISC-V cores to market with

P-Extension

- D25F, A(X)25(MP), A(X)27, A(X)45

V-Extension

- NX27V, NX45V

Custom-Extension

(w/ ACE\* support)

- Entire 25, 27, 45 series

# 晶心RISC-V產品的優勢

## Performance & Extensibility

- Leading PPA and code size
- Rich data processing in P, V, and ACE

## Configurability

- Flexible configurations for rich features

## Maturity

- Compiler optimizations, and SW stacks
- Comprehensive features in AndeSight IDE

# 積極參與RISC-V社群活動

## Foundation Task Groups (partial list)



- ❖ Contributing hardware architecture extensions
  - Chair of the P-extension (Packed SIMD/DSP) Task Group
  - Co-chair of Fast Interrupts Task Group
- ❖ Closely reviewing activities of other Task Groups

# 晶心協助強化RISC-V生態系統

- ❖ More choices for customers are good
- ❖ Andes works closely with partners to grow RISC-V ecosystem



# 晶心在 RISC-V 上的定位



Complete product portfolio

Reliable RISC-V core IP vendor

Extreme low power consumption, high computing efficiency

World's leading P-, V- and Custom-Ext. Capable RISC-V cores

Professional custom computing service

# 生態系統: Andes 與 Knect.me



knectme™



# Knect.me 生態系統

## ❖ Built up the community to help developing IoT products

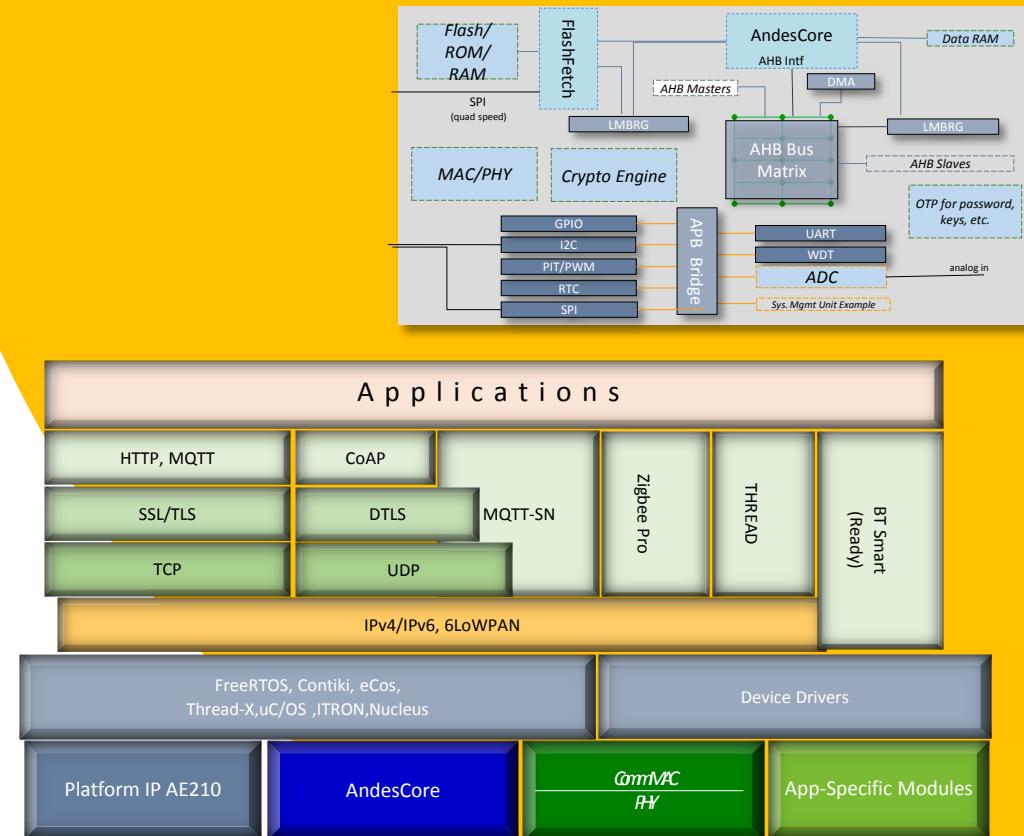
- To knect solutions for silicon IP's, SW stacks, tools, applications, systems and products

### ■ Including

- SoC IP Platforms
- Software Stack
- Development Boards
- Development Tools

## ❖ Forms a IoT League

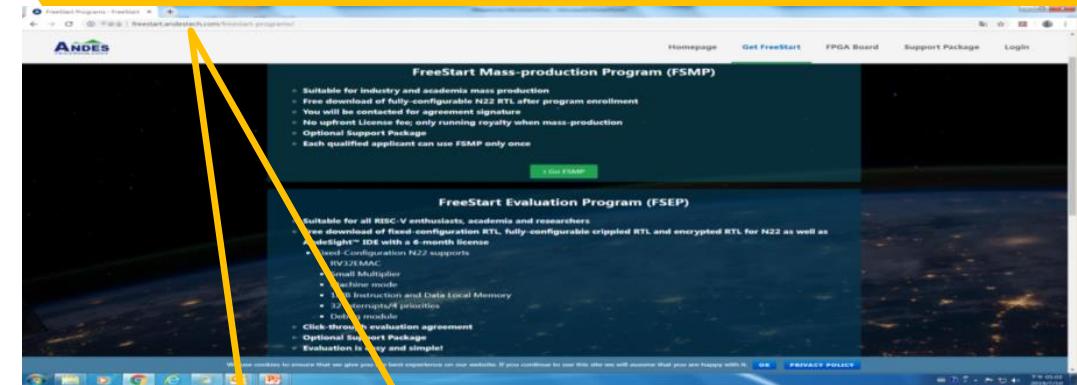
- To knect chip vendors, partners, application developers, system vendors



# FreeStart Program

- ❖ **FreeStart Evaluation Program (FSEP)**
  - For all RISC-V enthusiasms and educator/researcher
  - Fixed-Configuration N22 RTL
  - Sign simple evaluation agreement directly on website
  
- ❖ **FreeStart Mass-production Program (FSMP)**
  - For industrial and academy mass production
  - Full-configuration N22 RTL
  - License fee: \$0; only running royalty is required when mass production

- ❖ **Support Package (FSSP)**
  - For all
  - \$20K for 1<sup>st</sup> year, including
    - 1 year e-service
    - FreeStart AE250 RTL
    - Corvette F1 FPGA board



For more info., please visit  
[www.andestech.com](http://www.andestech.com)

# Event Promotion



RISC-V Summit in San Jose  
2020: Diamond Sponsor



# 總結

<http://www.andestech.com>



# A Trusted Computing Expert



# Thank You

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