晶心科技股份有限公司

ANDES TECHNOLOGY

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

01 公司簡介

02 營運成果

03 產品應用

04 新產品及生態系統

05 總結

ANDES TECHNOLOGY

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240人；80%為工程師。
- 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」。
- 向量處理器核心NX27V獲頒「新竹科學園區優良廠商創新產品獎」 (2020)
- EE Awards亞洲金選獎 -「Taiwan 產品獎」,「Asia 企業獎」(2021)

晶心任務

- 創新架構高效能/低功耗嵌入式處理器。

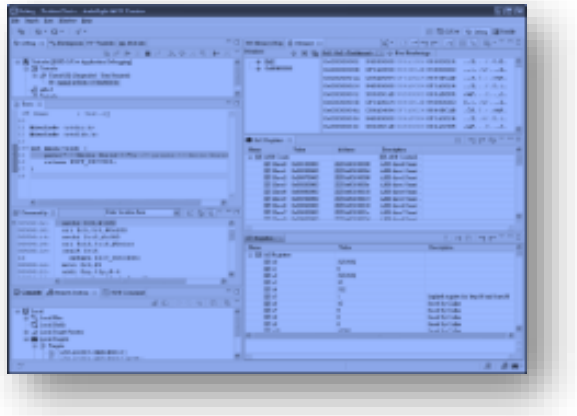
晶心利基

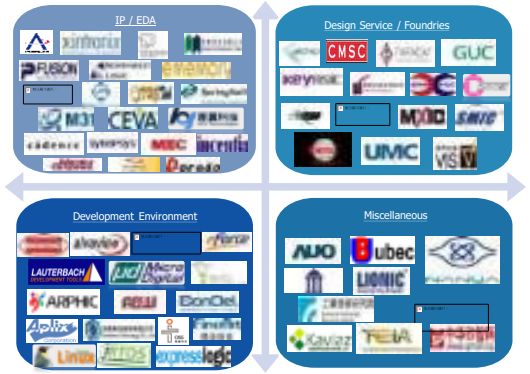
- 智能及環保之電子設備
- 雲端應用,人工智慧及物聯網

ANDES TECHNOLOGY

重要里程碑

- **200+** commercial licensees
  - Geographically distributed in Taiwan, China, Korea, Japan, Europe, and USA
  - **500+** license agreements signed
- AndeSight™ IDE:
  - **21,000+** installations
- Eco-system:
  - **500+** partners
- **9B+** Accumulative SoC Shipped

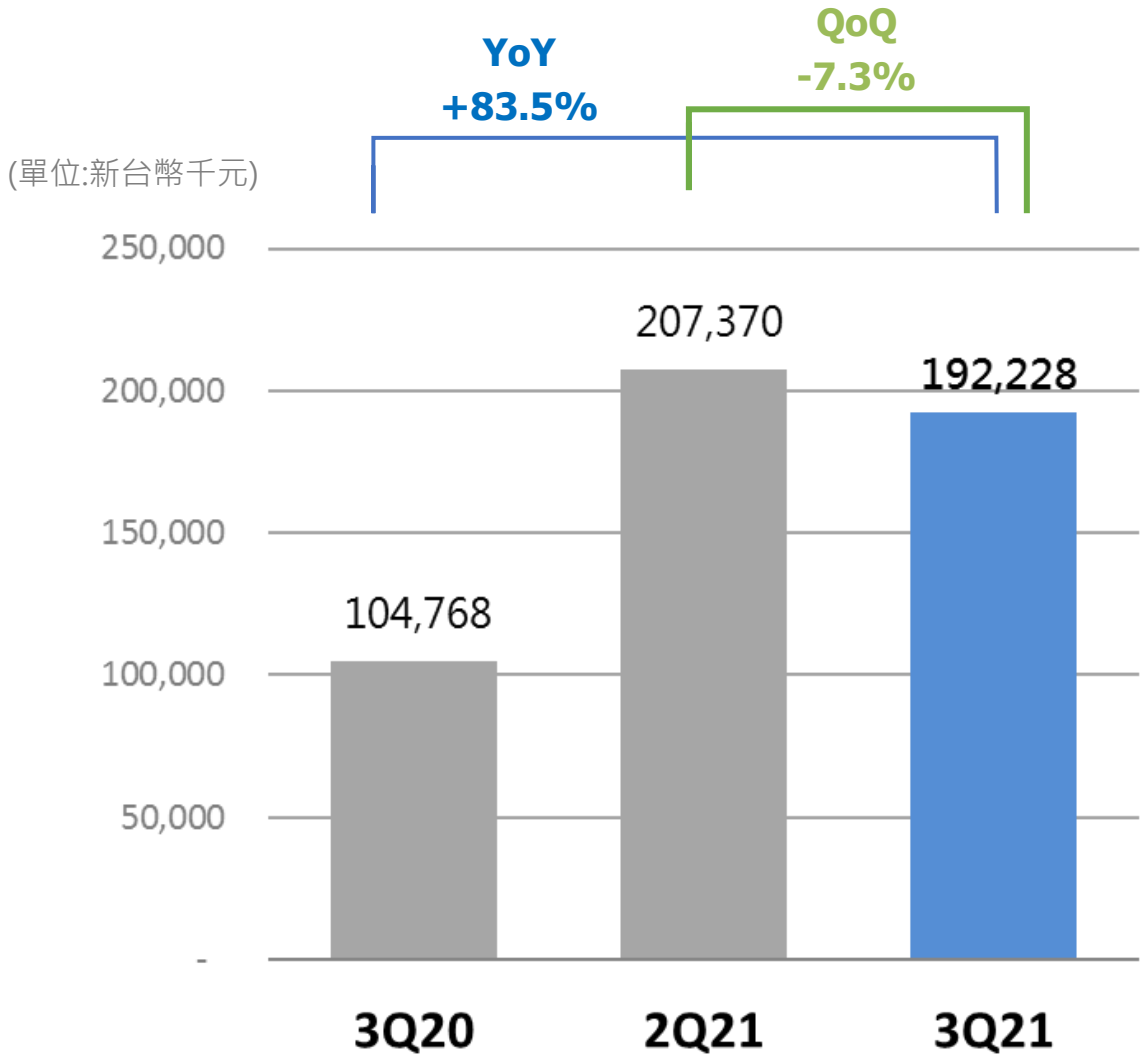




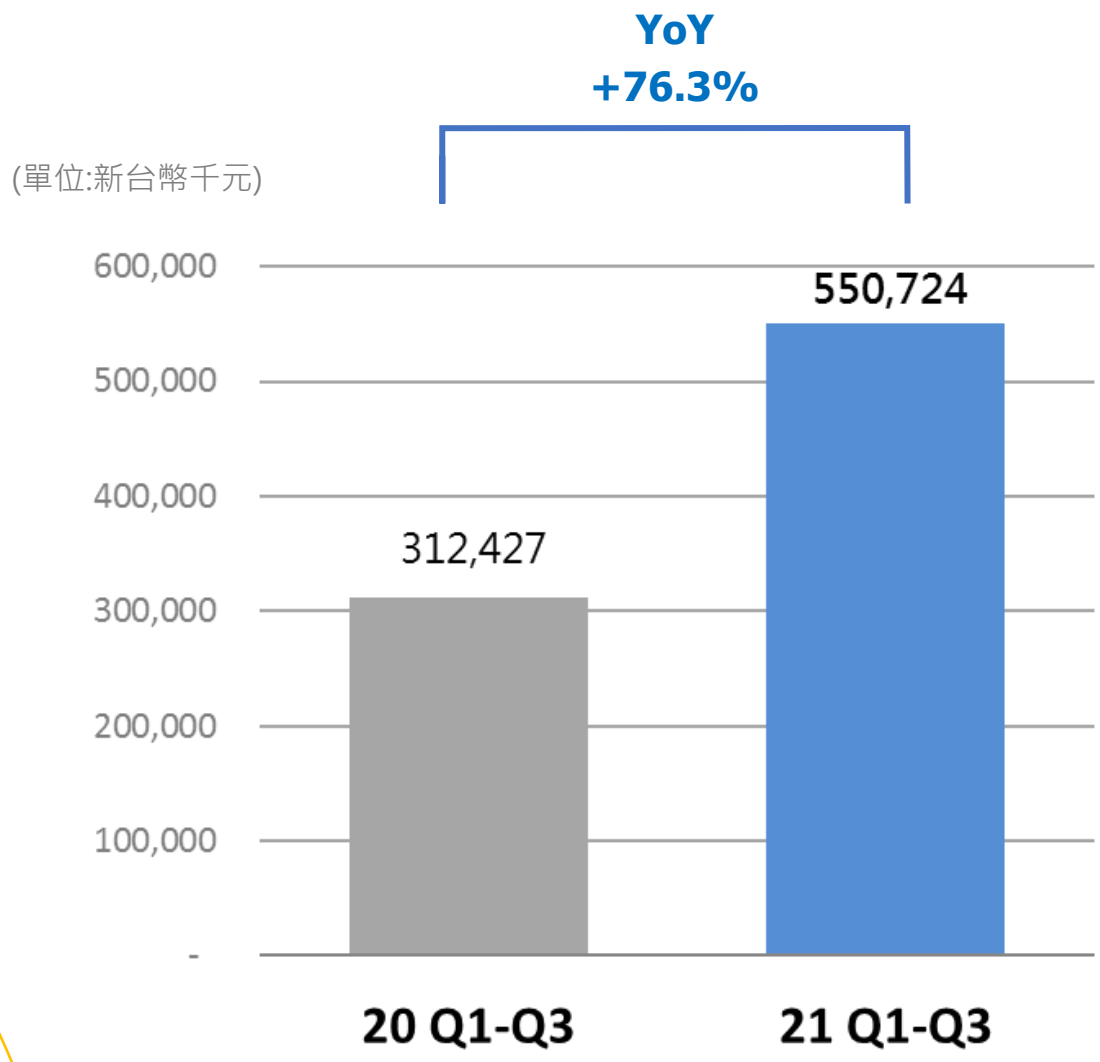
營運成果

http://www.andestech.com

2021年第三季營業收入

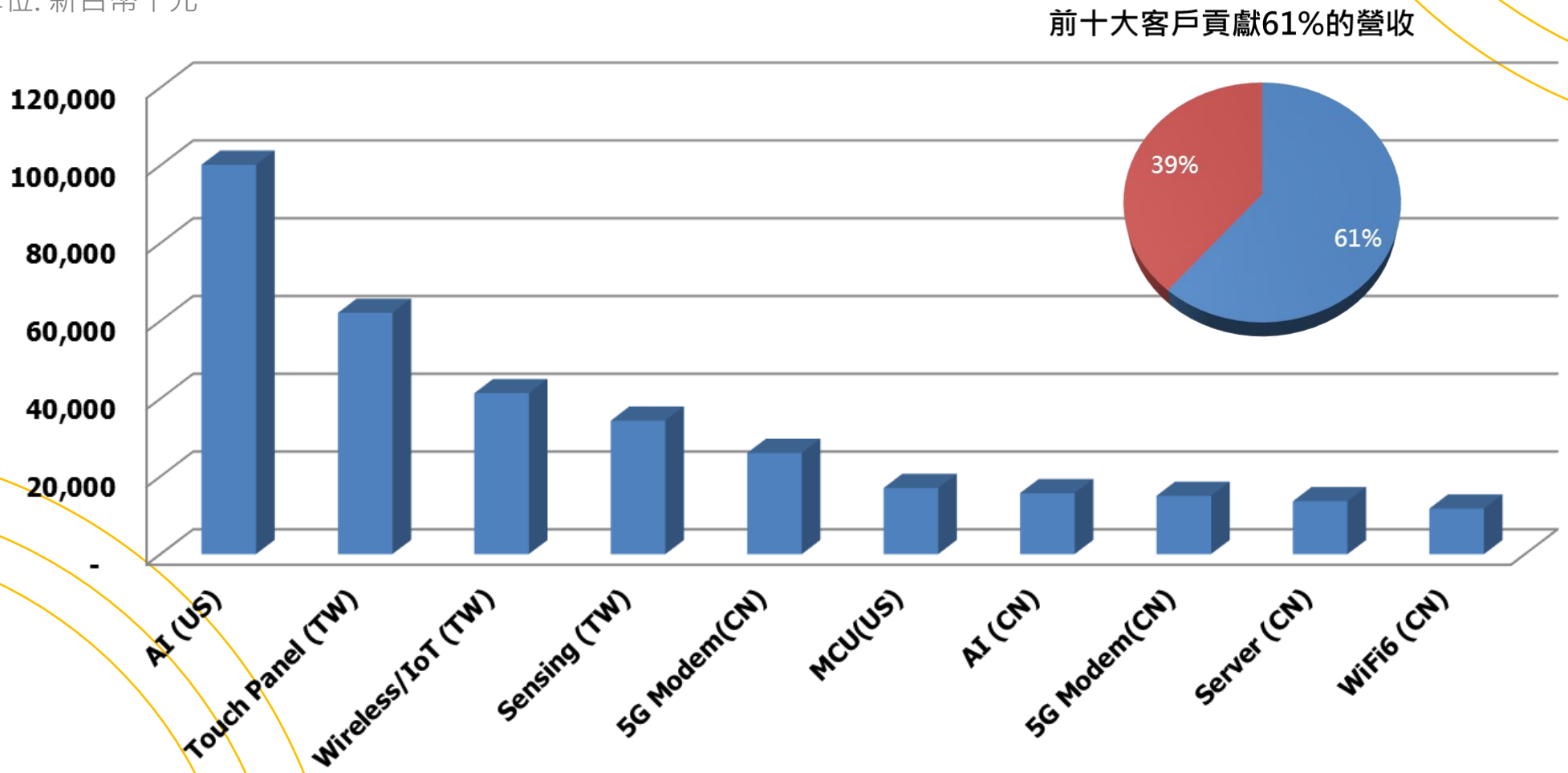


2021年前三季營業收入

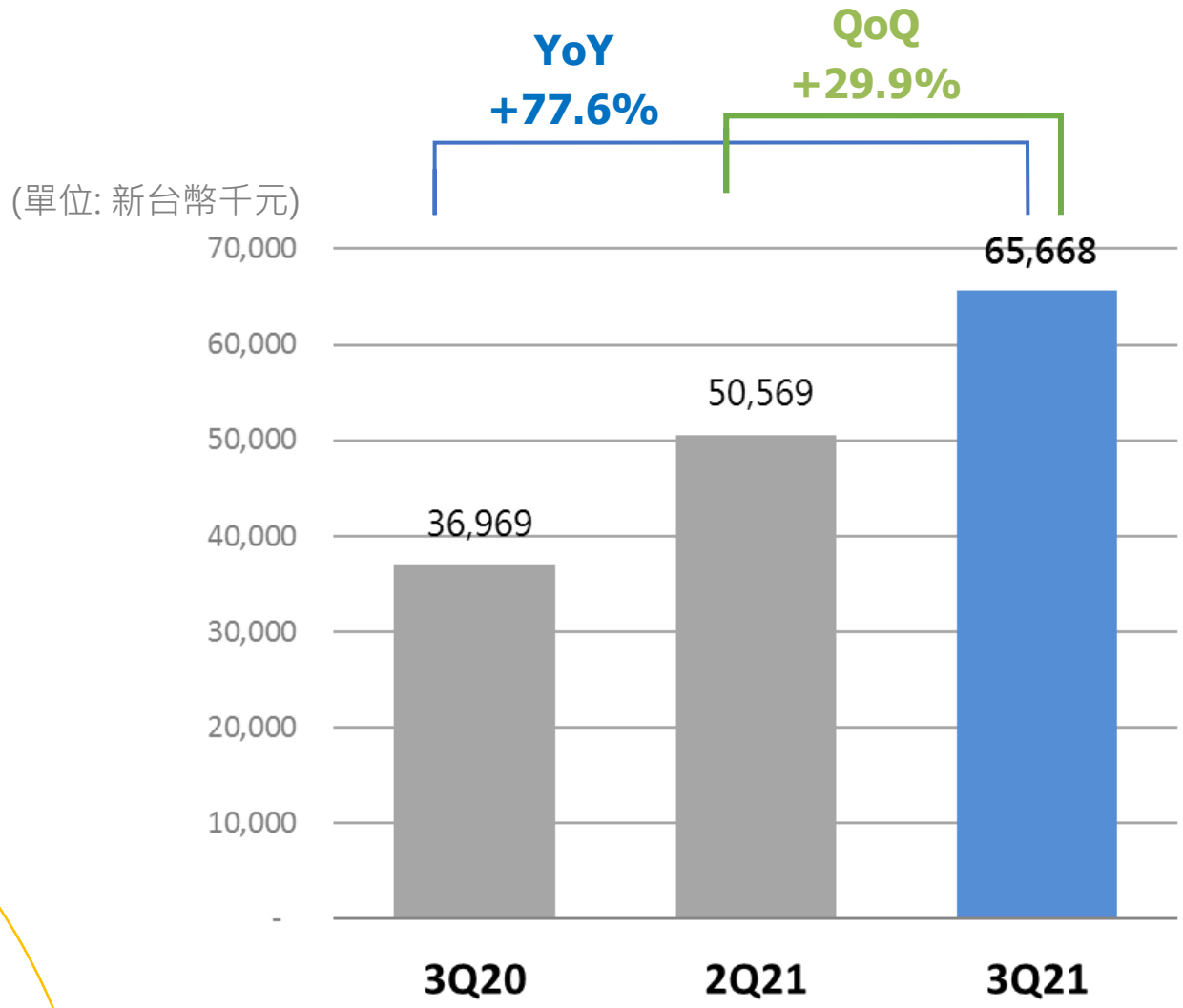


2021年前三季前十大客戶之應用分析

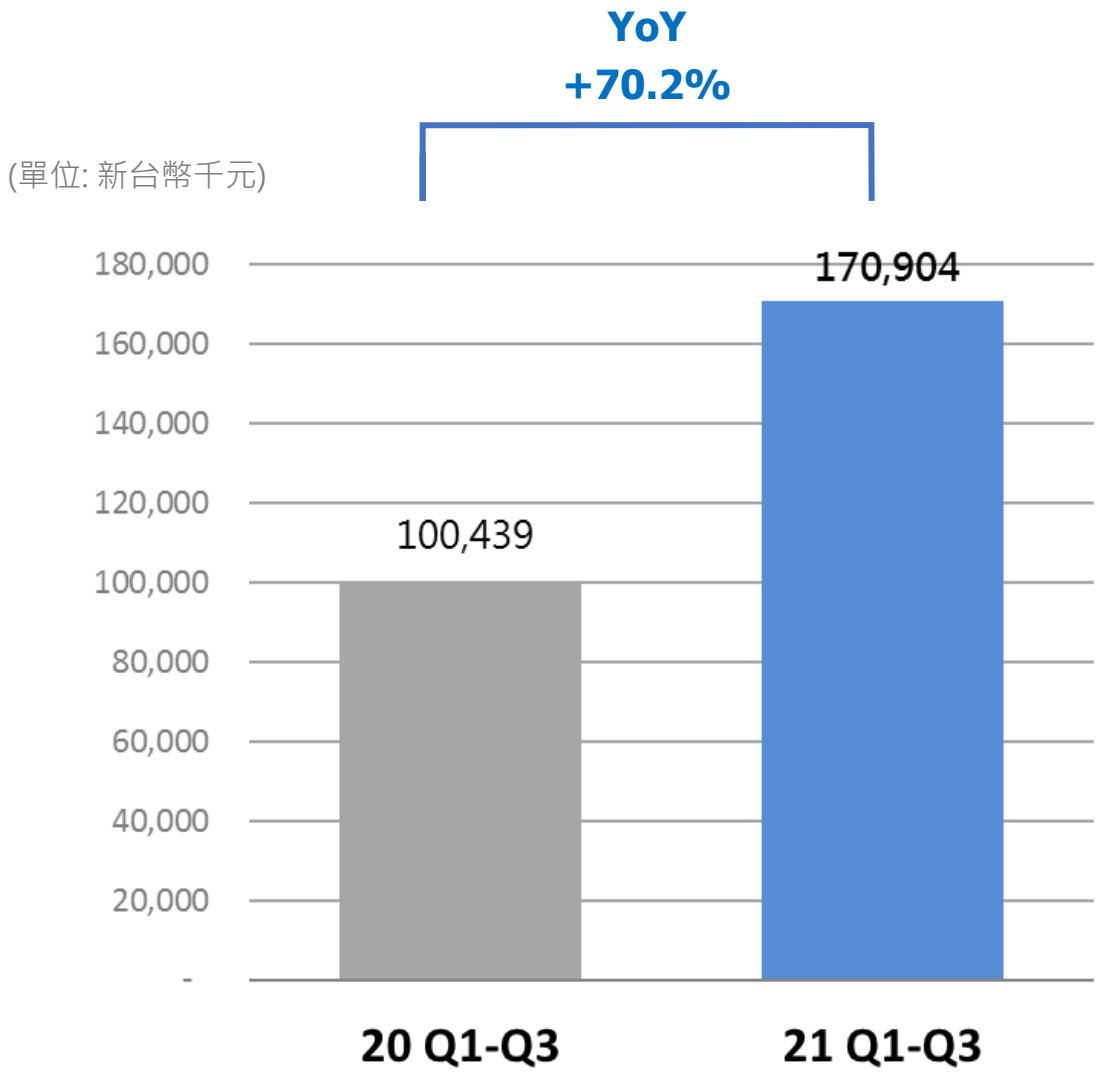
單位: 新台幣千元



2021年第三季權利金收入

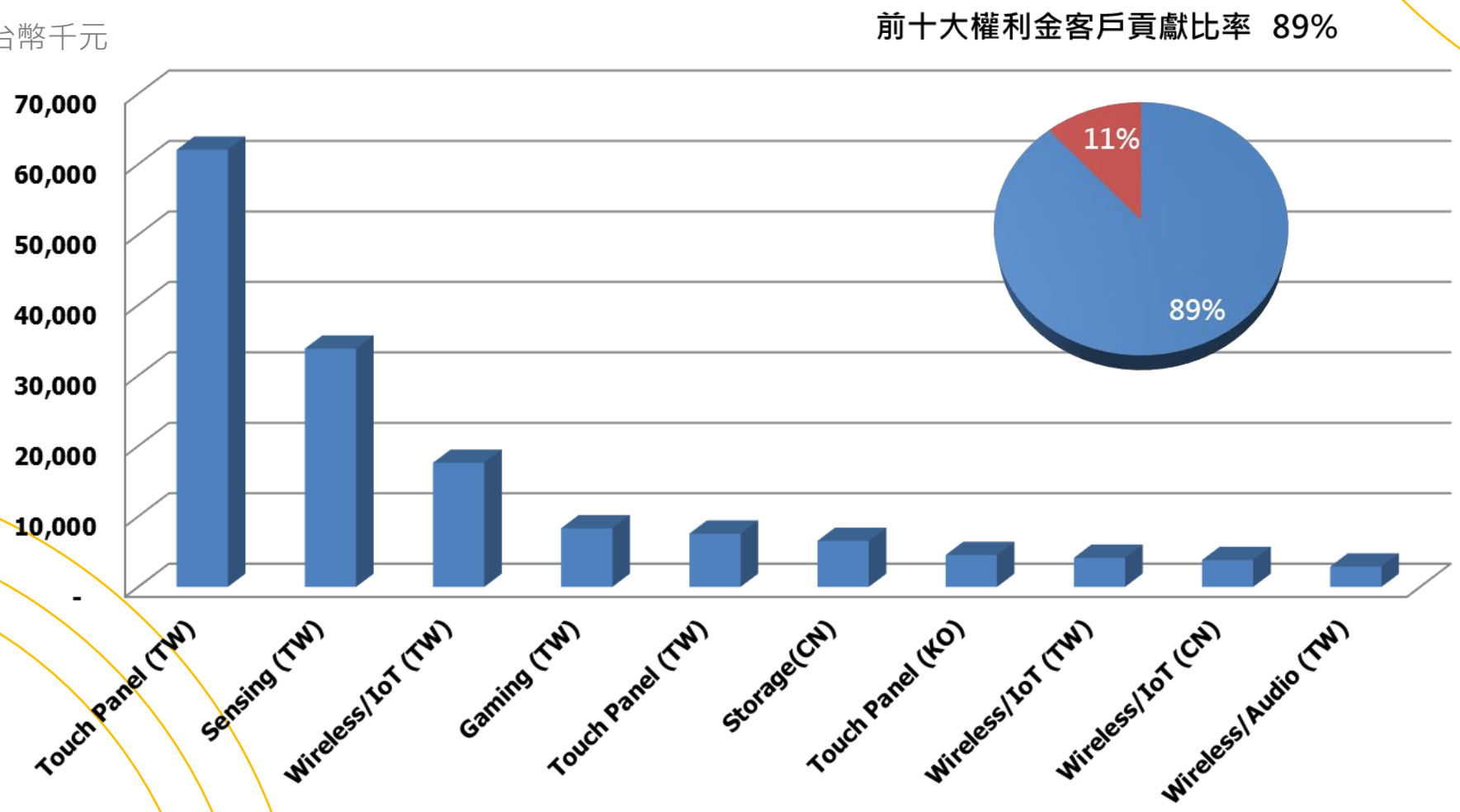


2021年前三季權利金收入



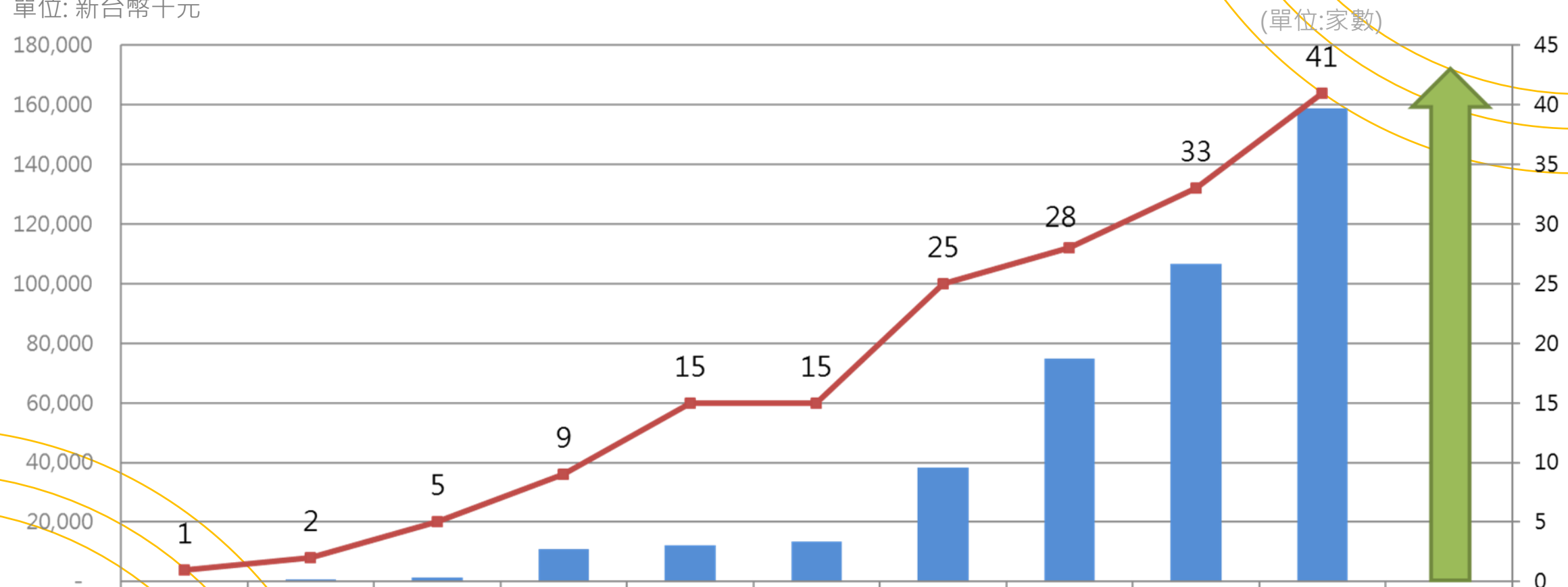
2021年前三季權利金應用分析

單位: 新台幣千元



權利金變動表

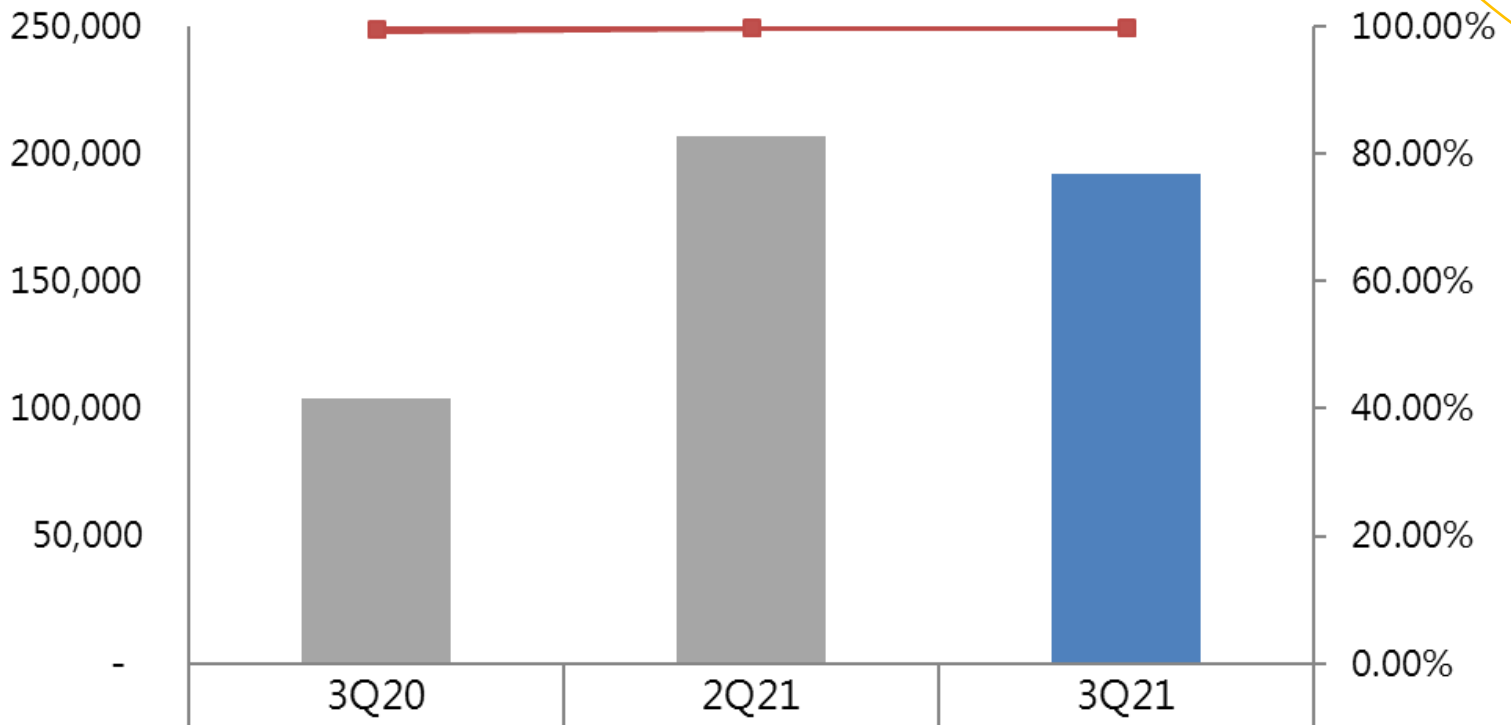
單位: 新台幣千元



	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021 Q1-Q3
權利金	445	660	1,285	10,819	12,232	13,320	38,287	74,953	106,716	158,792	170,904
客戶數	1	2	5	9	15	15	25	28	33	41	

2021年第三季營業毛利與毛利率

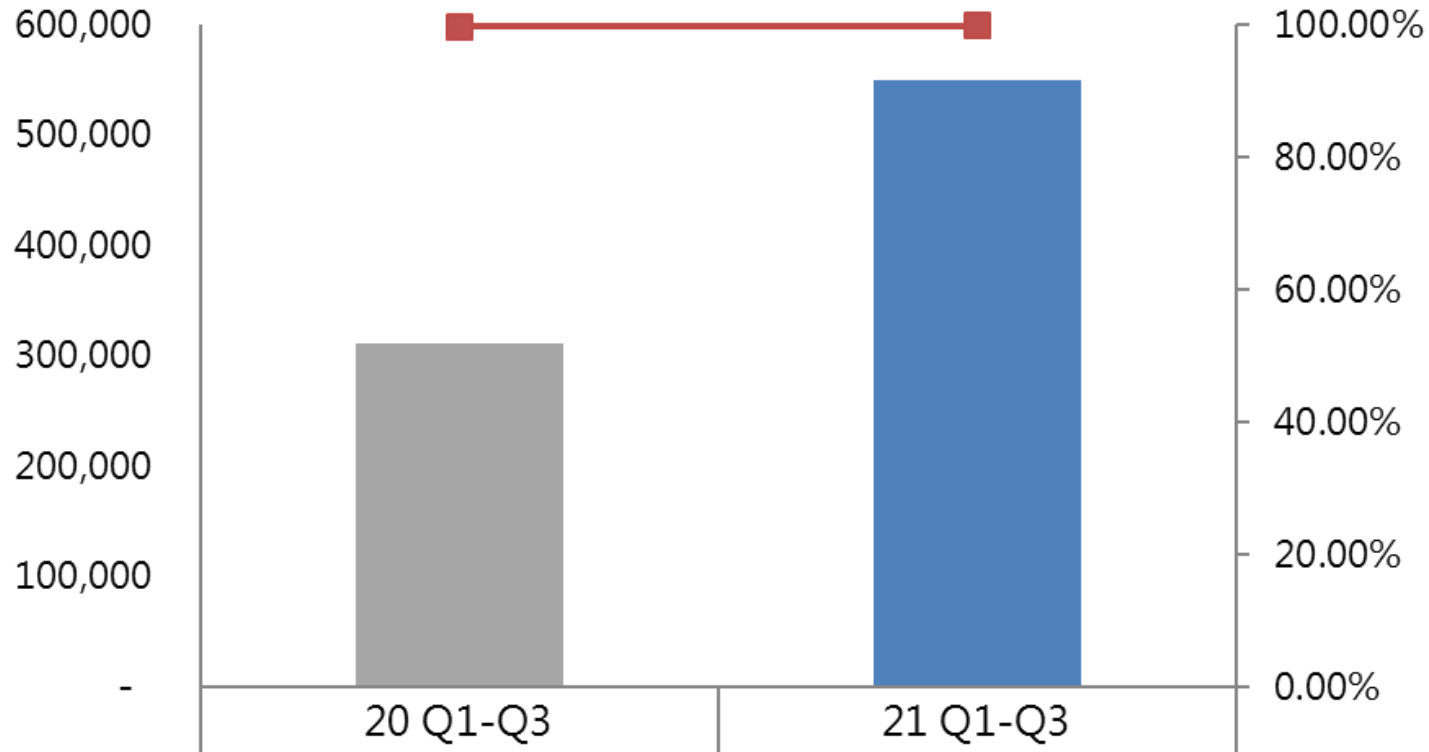
(單位:新台幣千元)



	3Q20	2Q21	3Q21
營業毛利	104,177	207,160	192,022
毛利率	99.43%	99.90%	99.89%

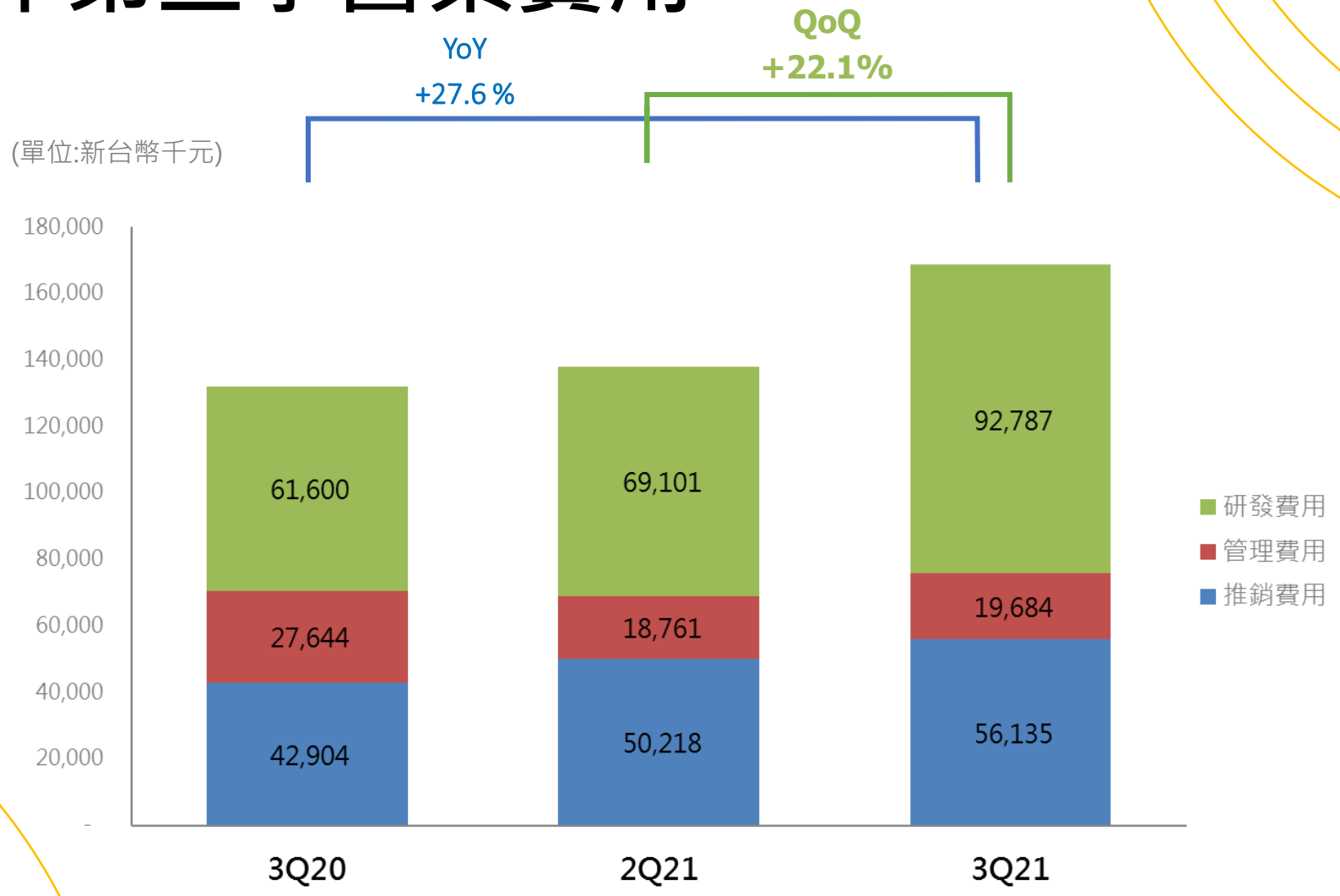
2021年前三季營業毛利與毛利率

(單位:新台幣千元)

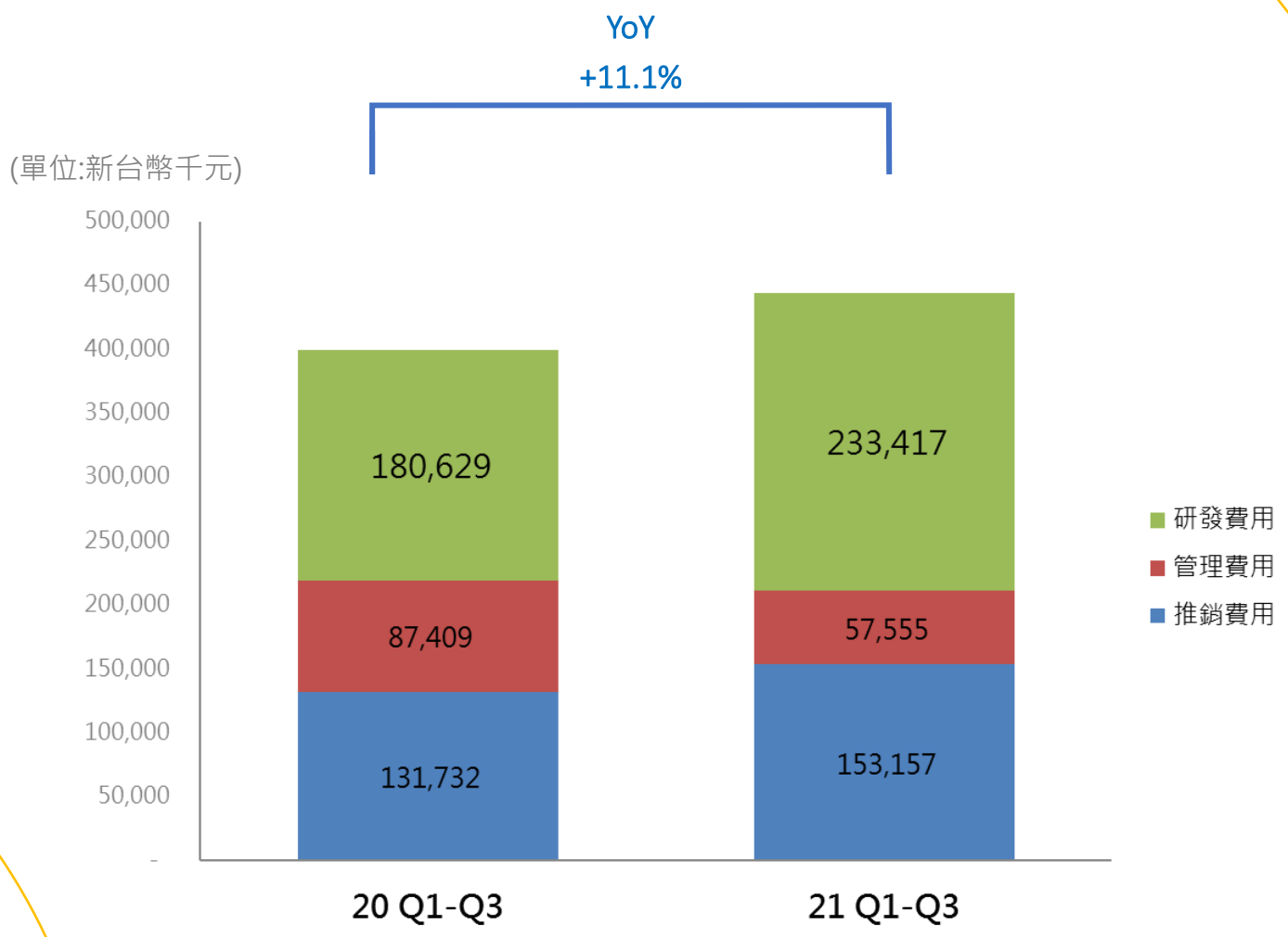


	20 Q1-Q3	21 Q1-Q3
營業毛利	311,568	549,882
毛利率	99.73%	99.85%

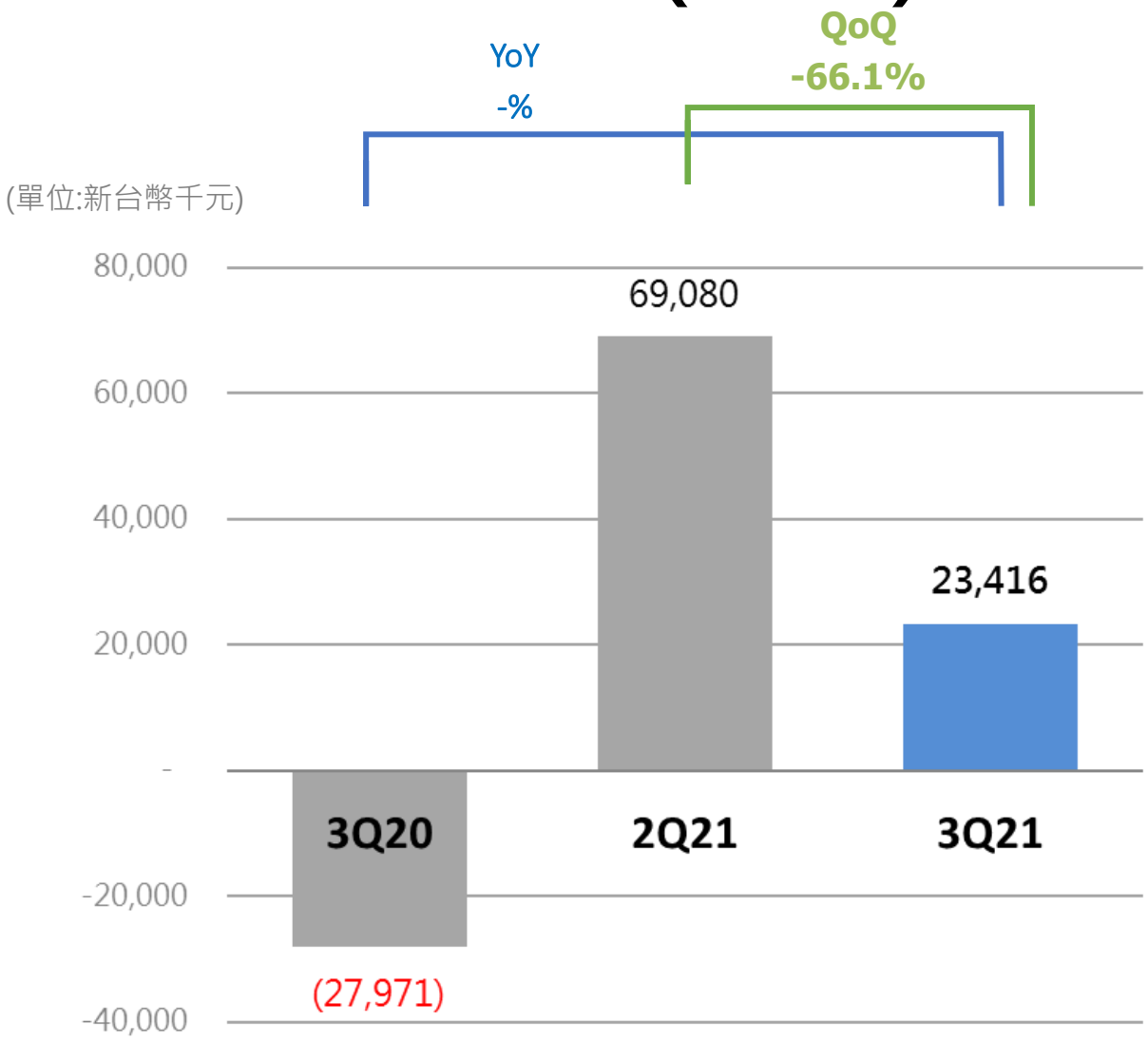
2021年第三季營業費用



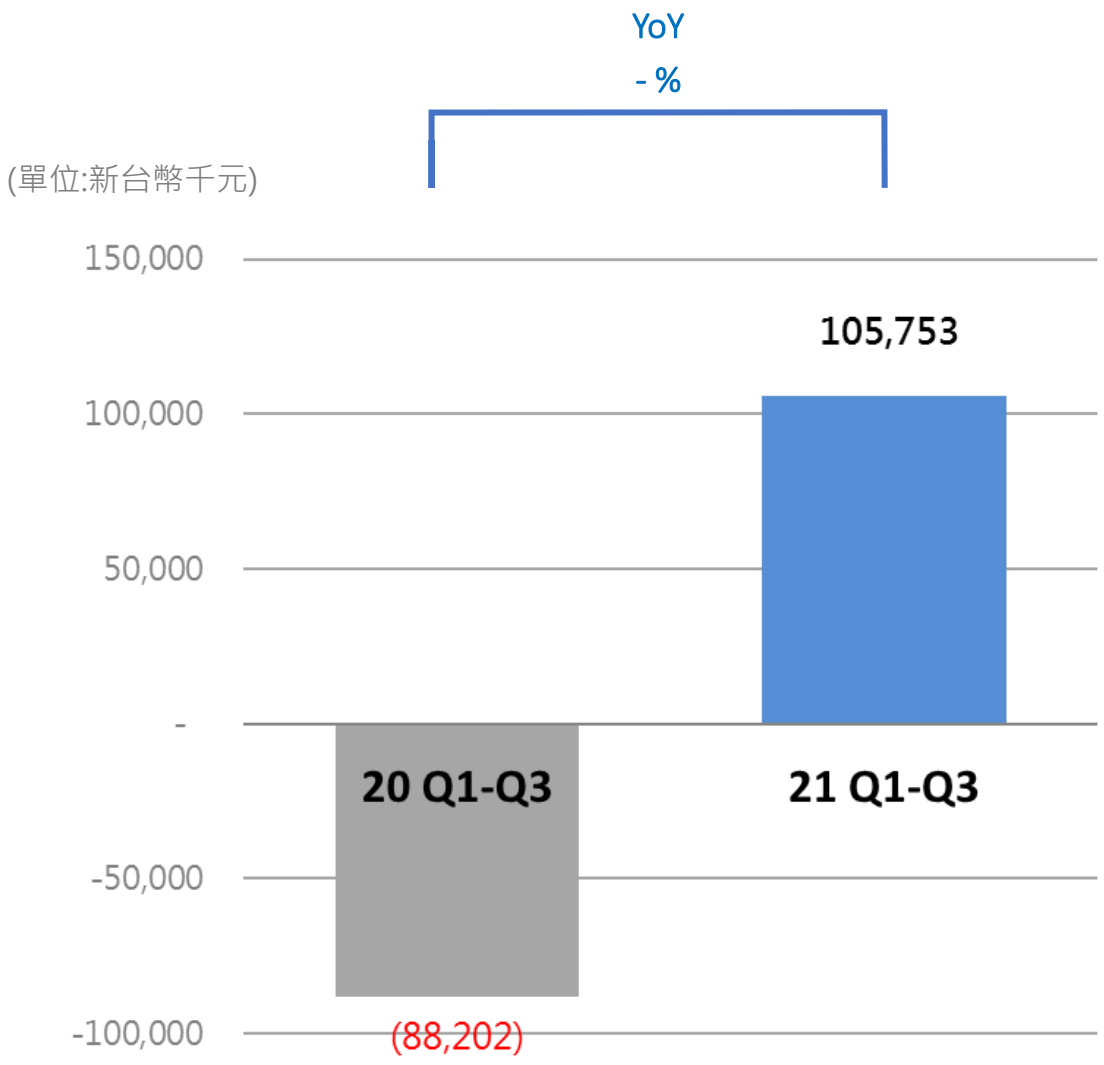
2021年前三季營業費用



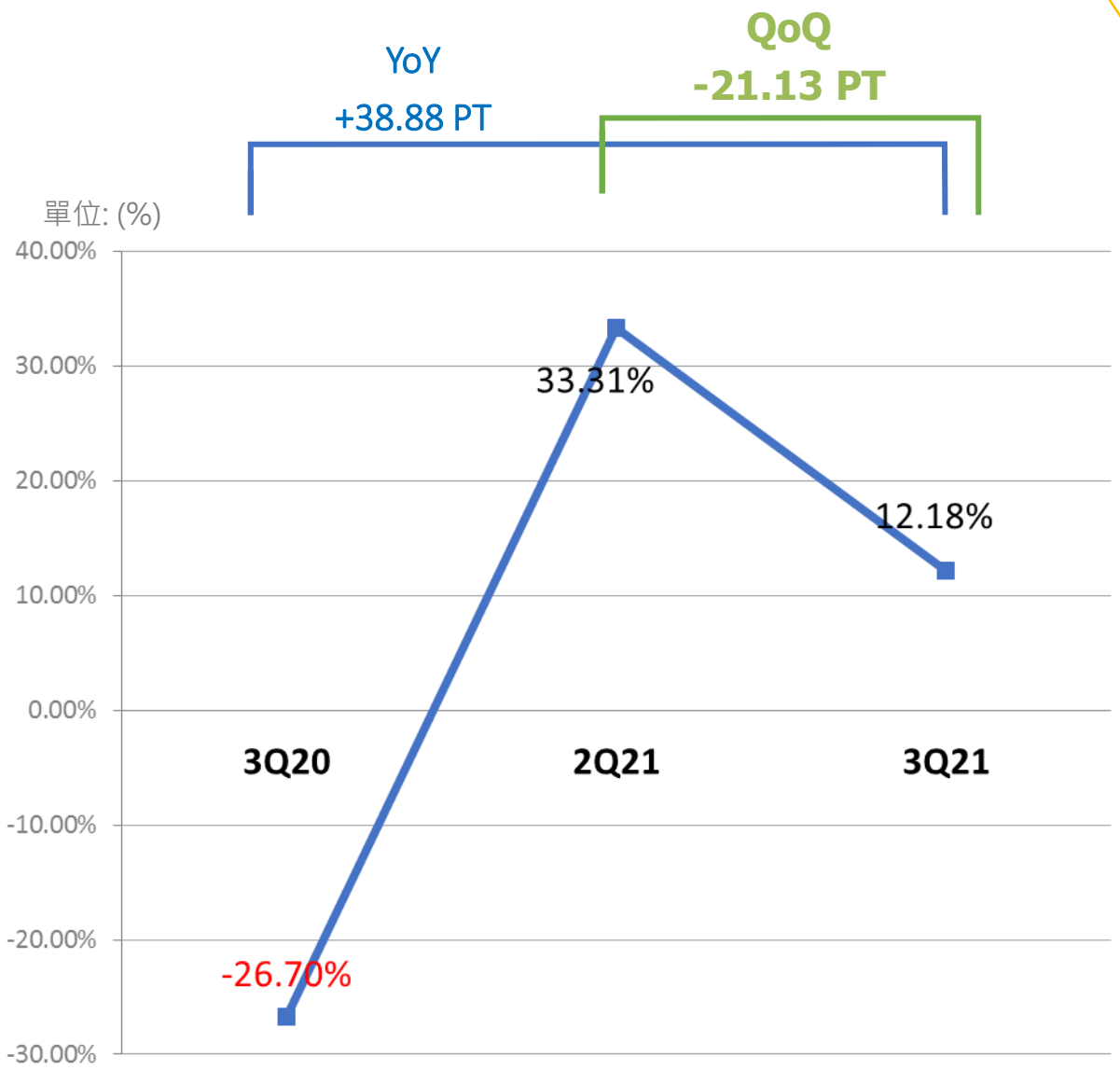
2021年第三季營業利益(損失)



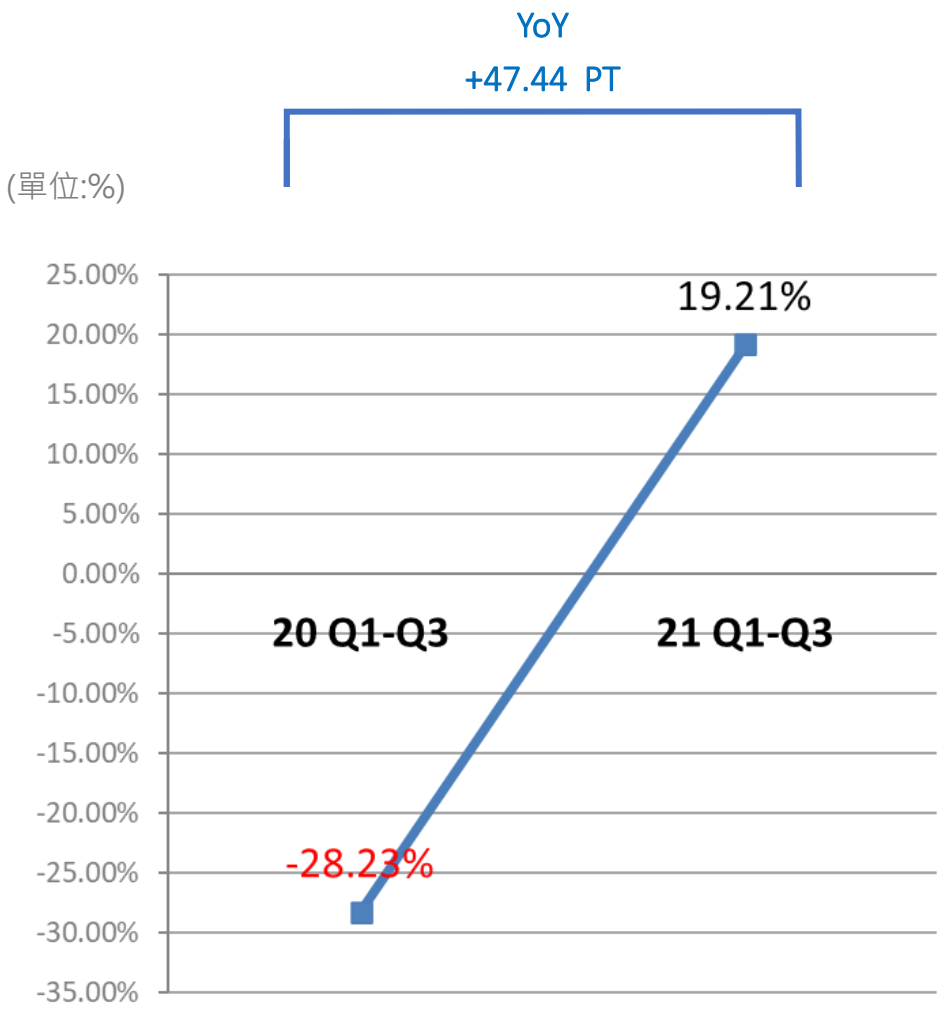
2021年前三季營業利益(損失)



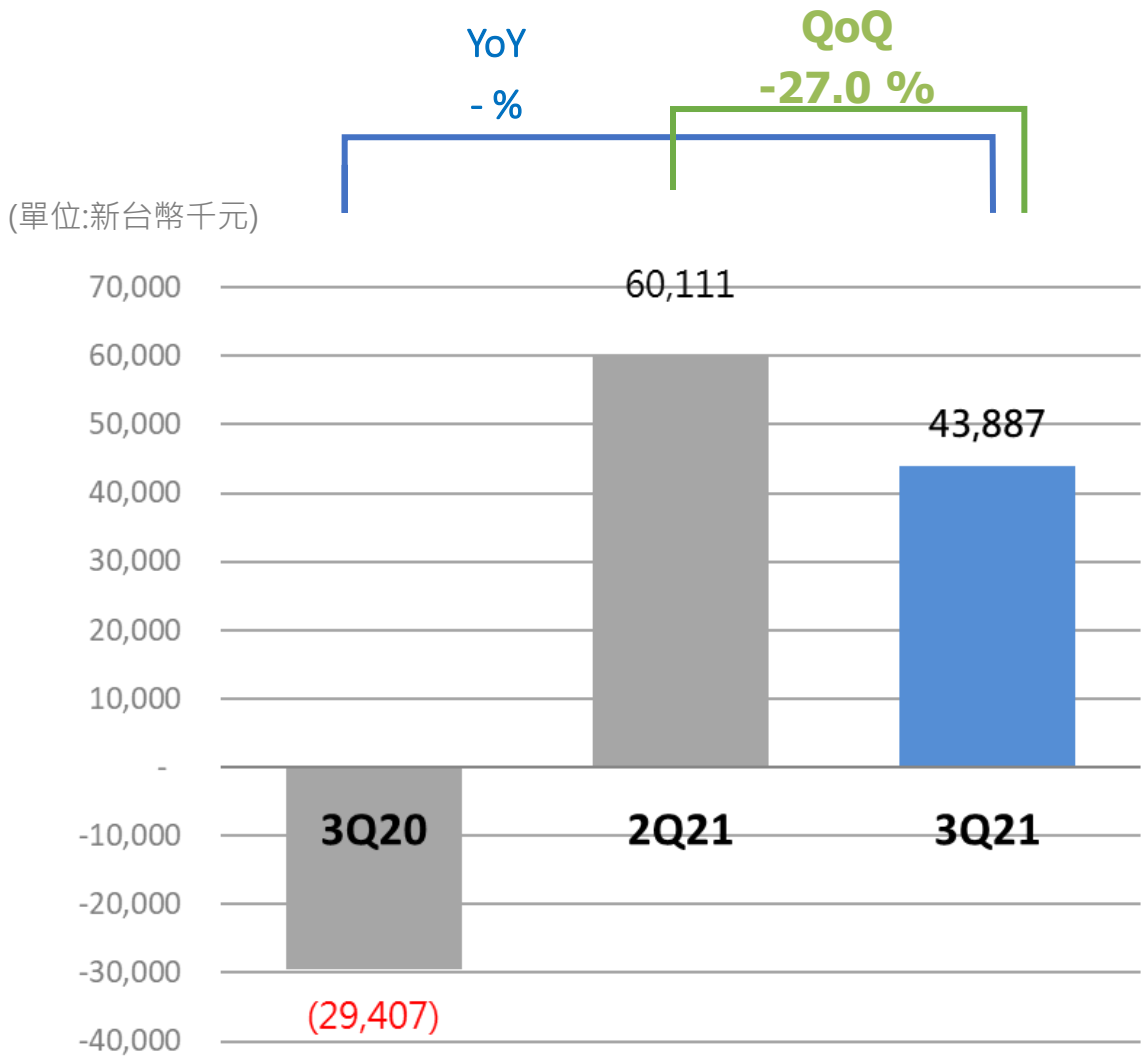
2021年第三季營業利益率



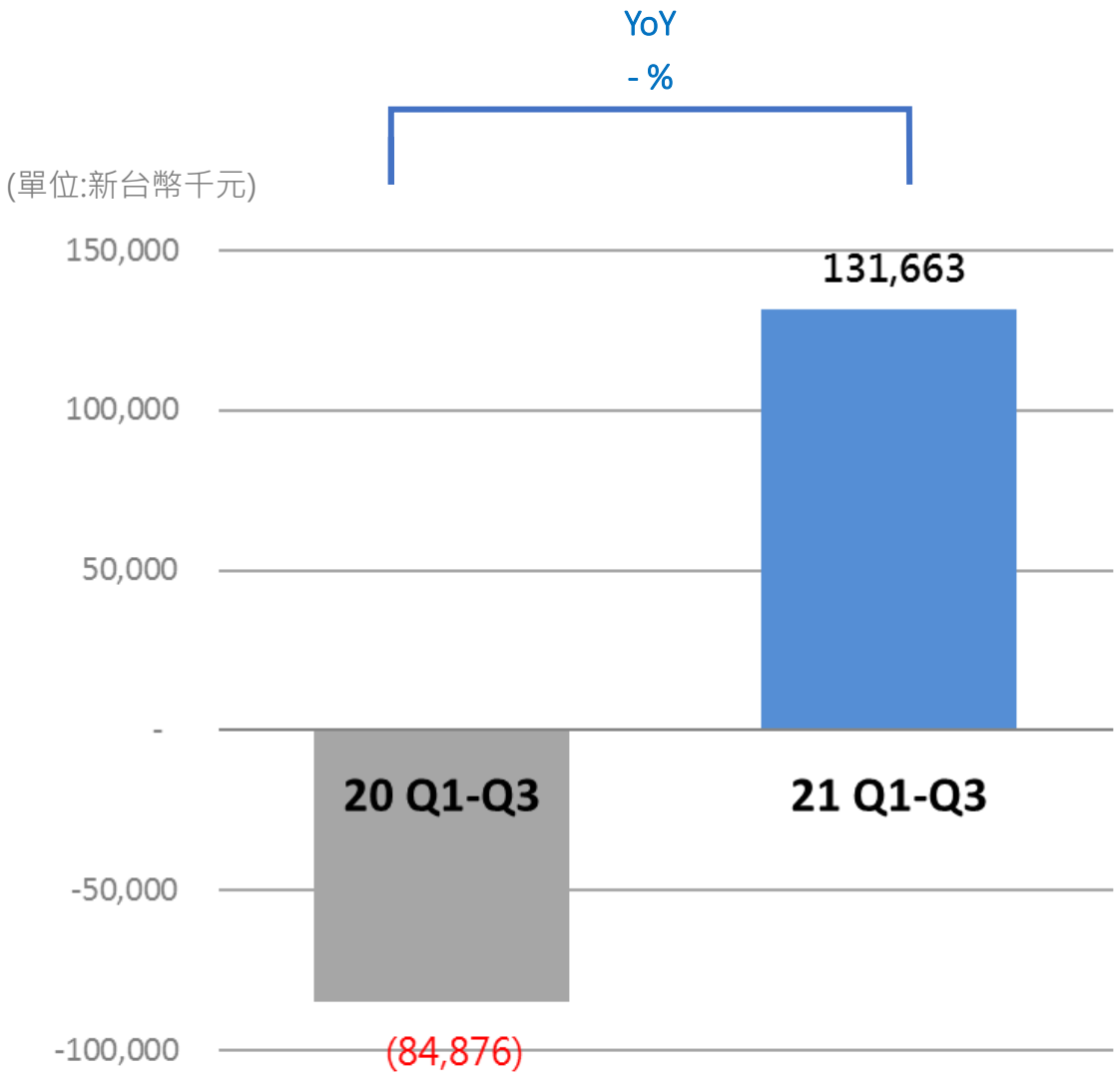
2021年前三季營業利益率



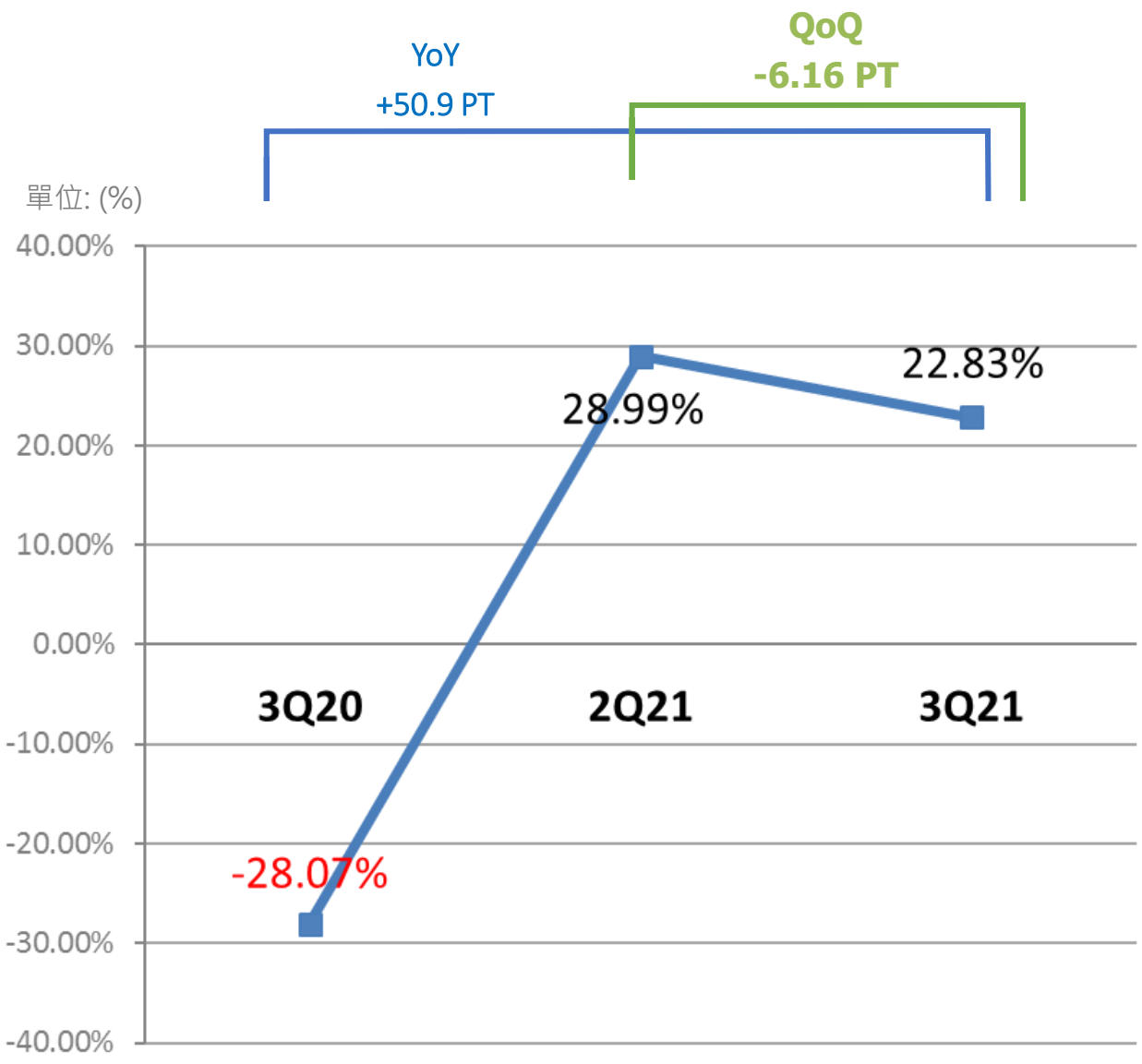
2021年第三季合併淨利(淨損)



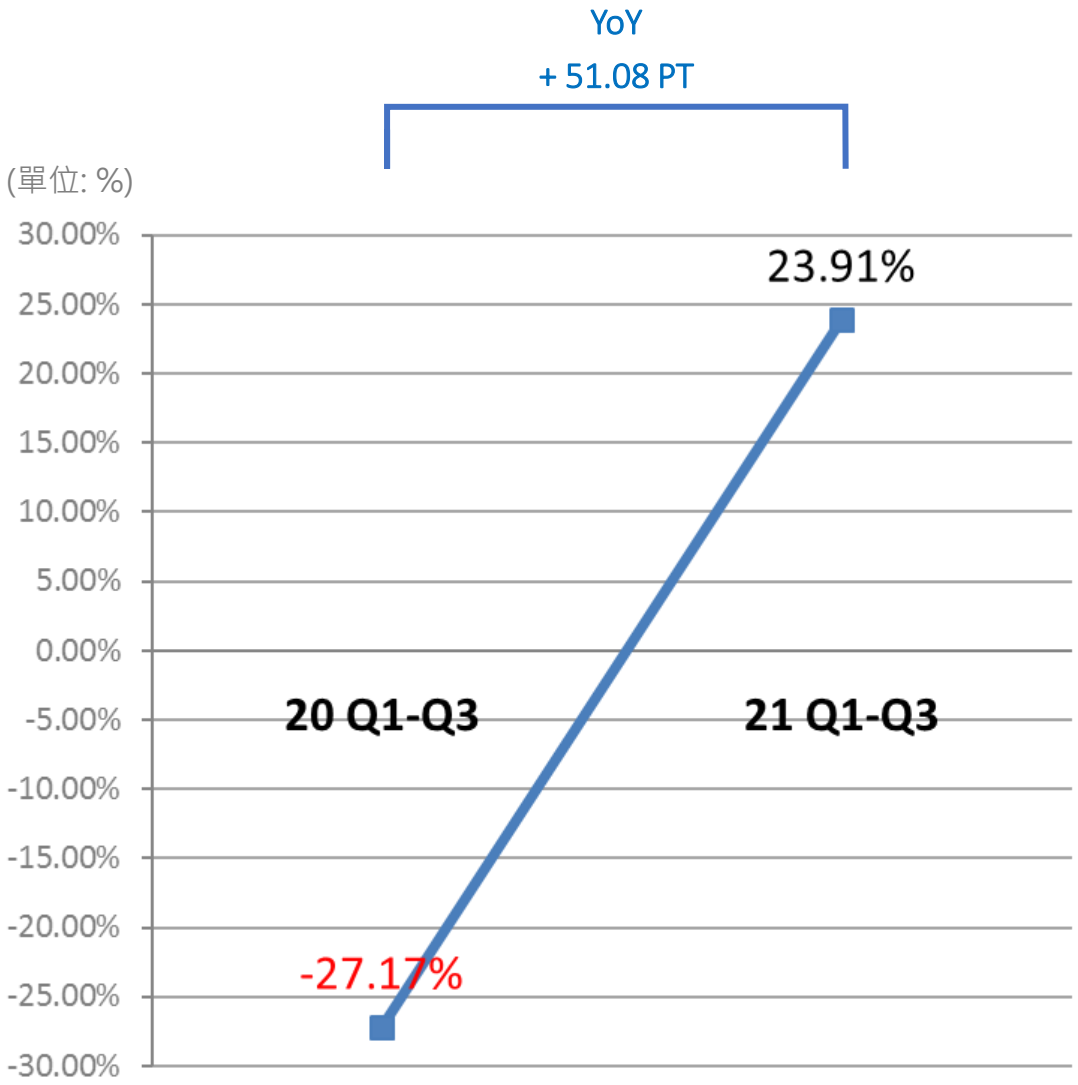
2021年前三季合併淨利(淨損)



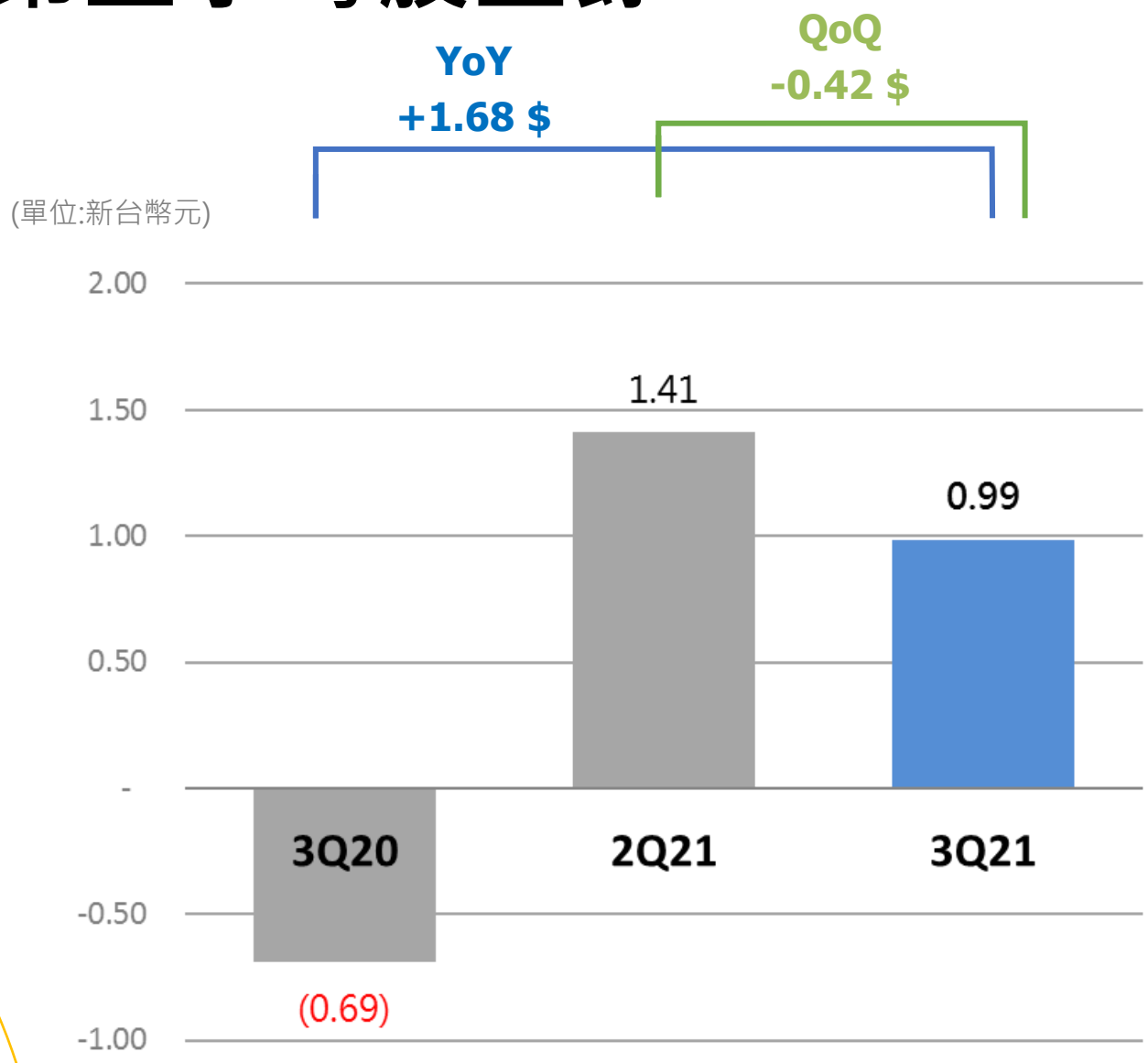
2021年第三季合併淨利率(淨損率)



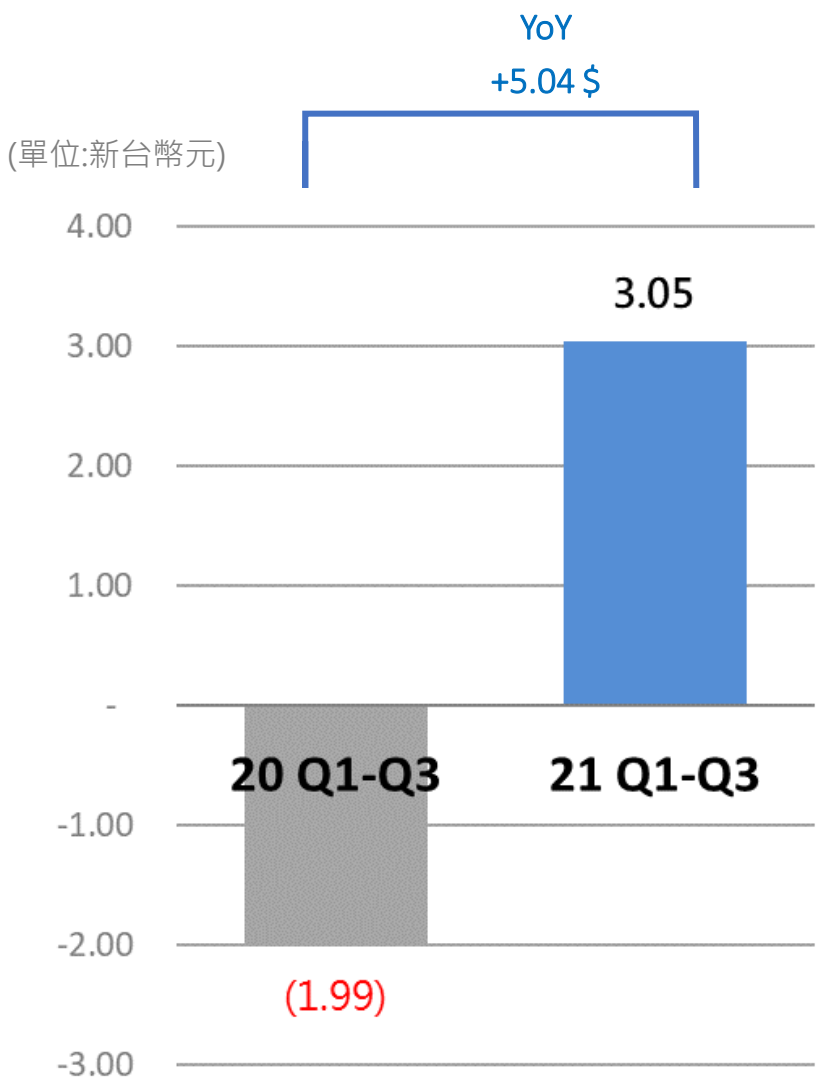
2021年前三季合併淨利率(淨損率)



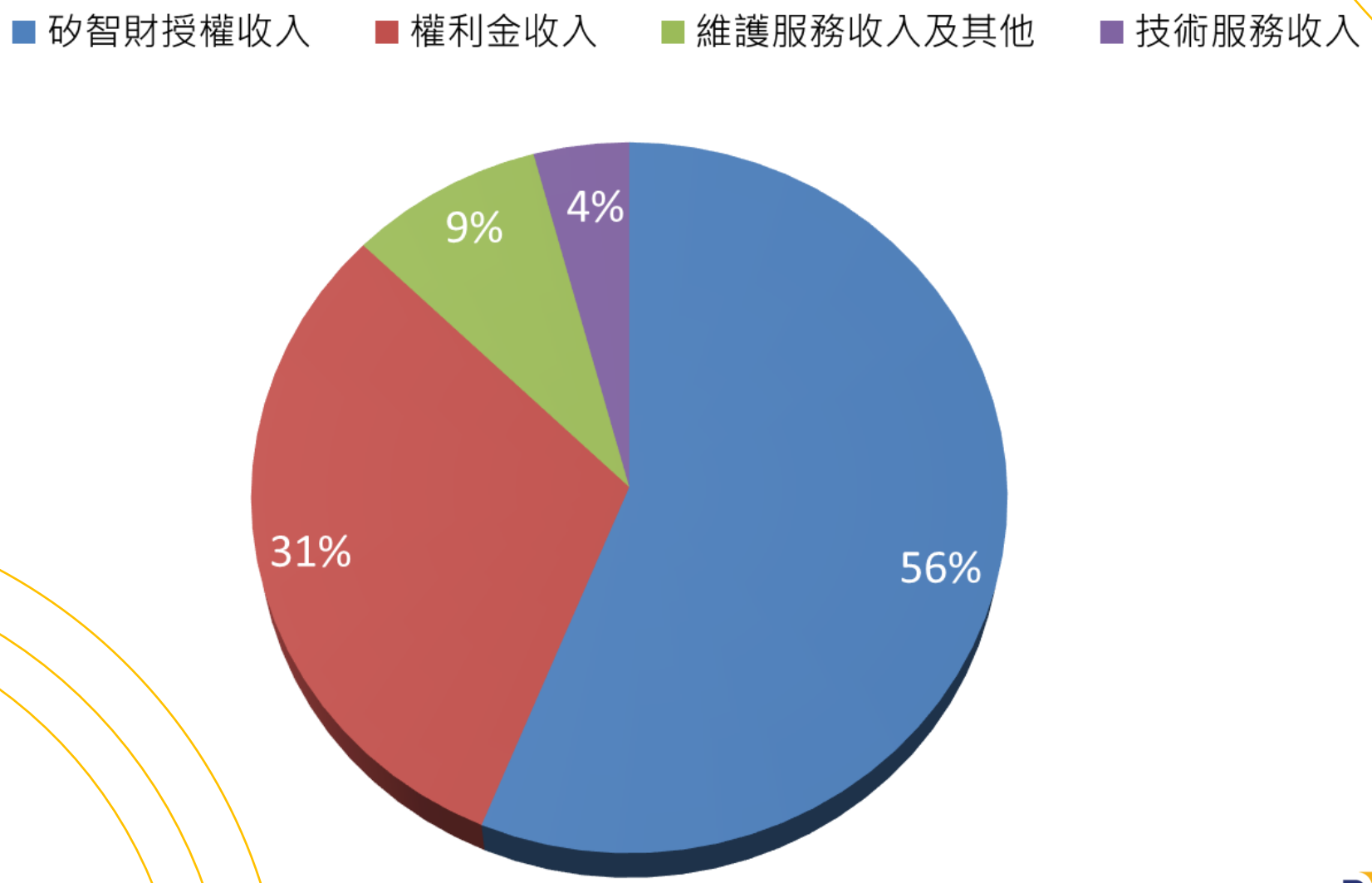
2021年第三季每股盈餘



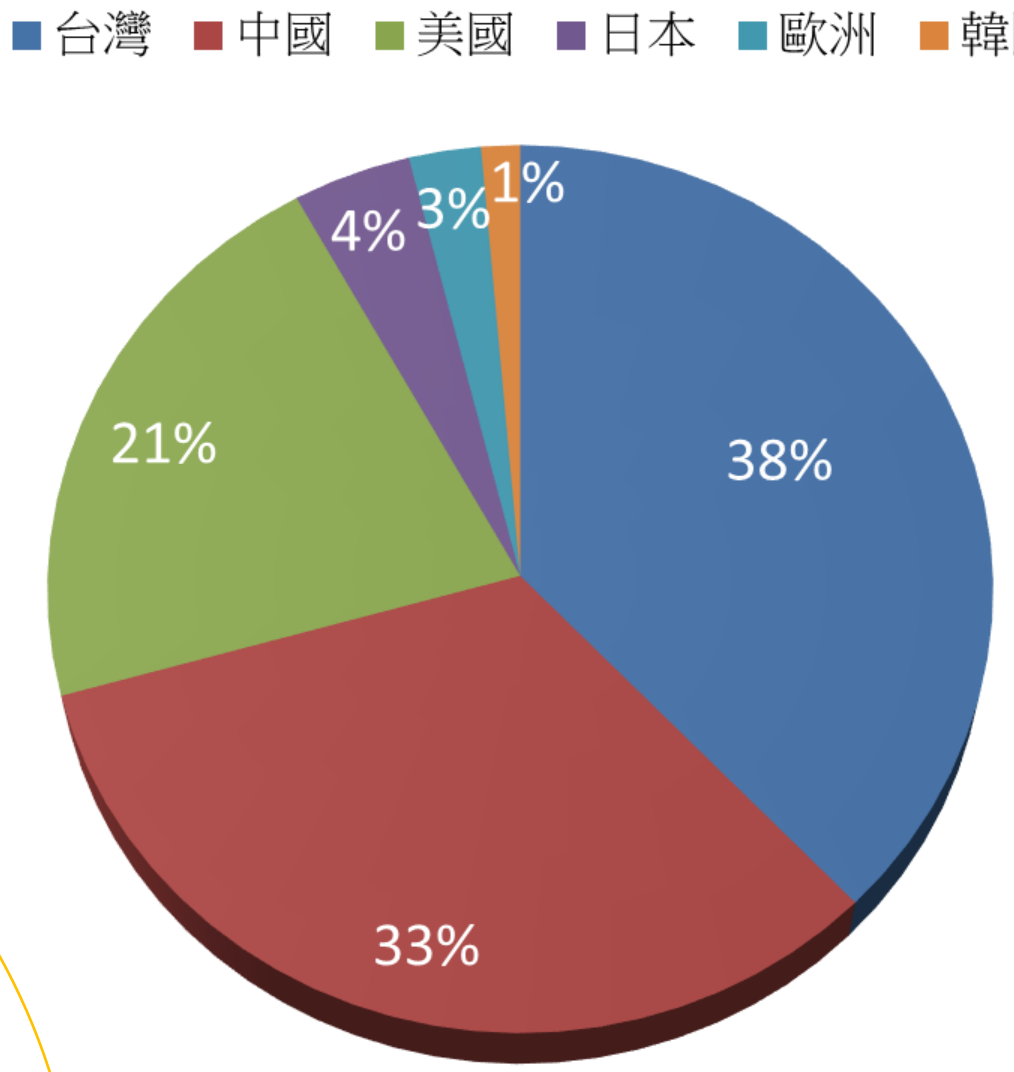
2021年前三季每股盈餘



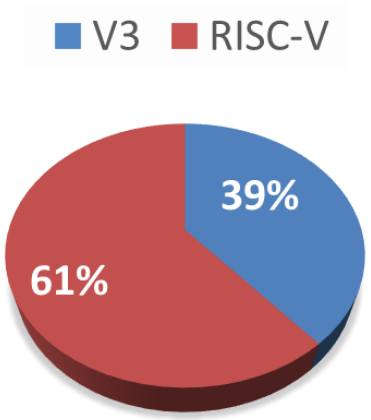
2021年前三季銷售分析-收入模式

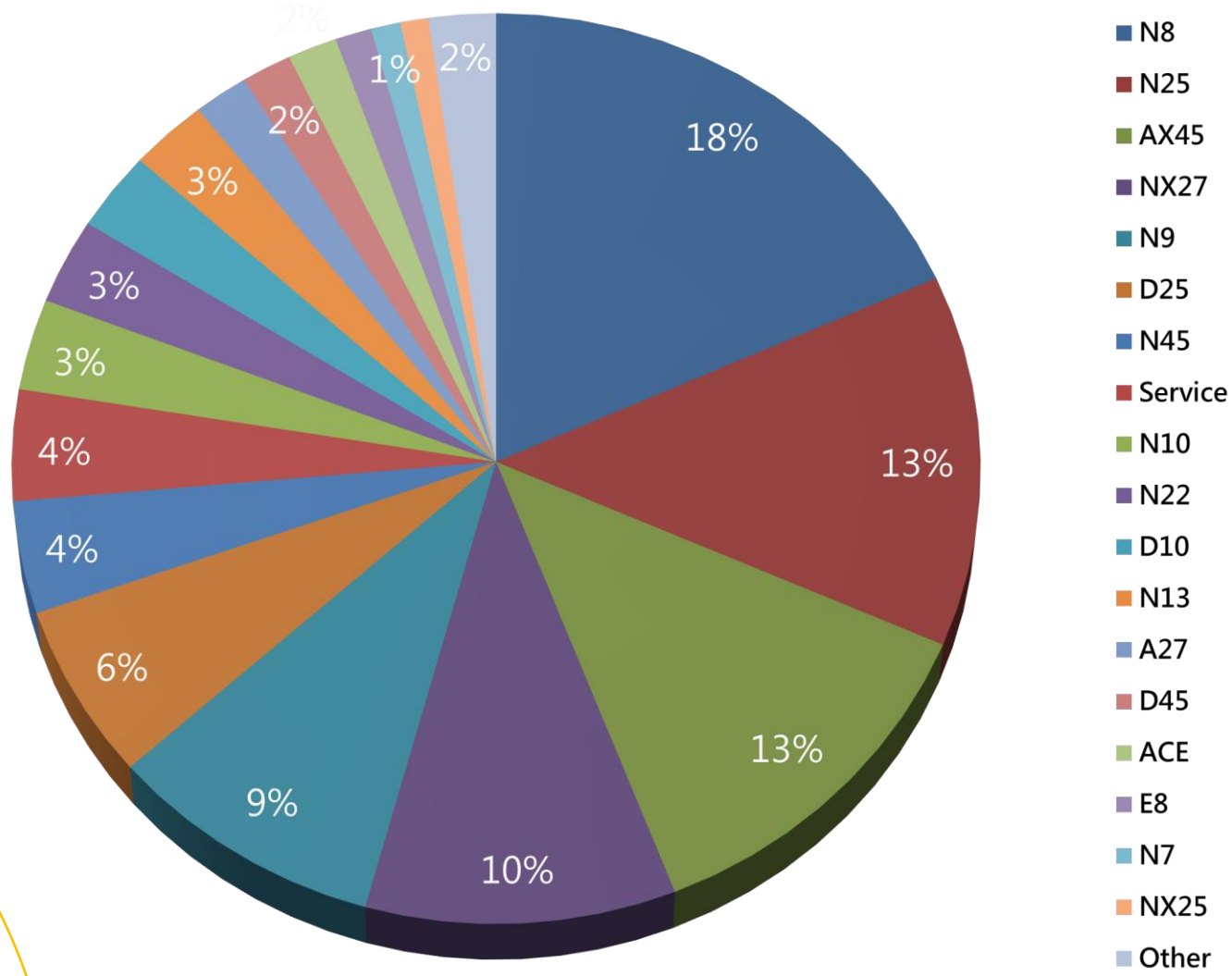


2021年前三季銷售分析-地區別

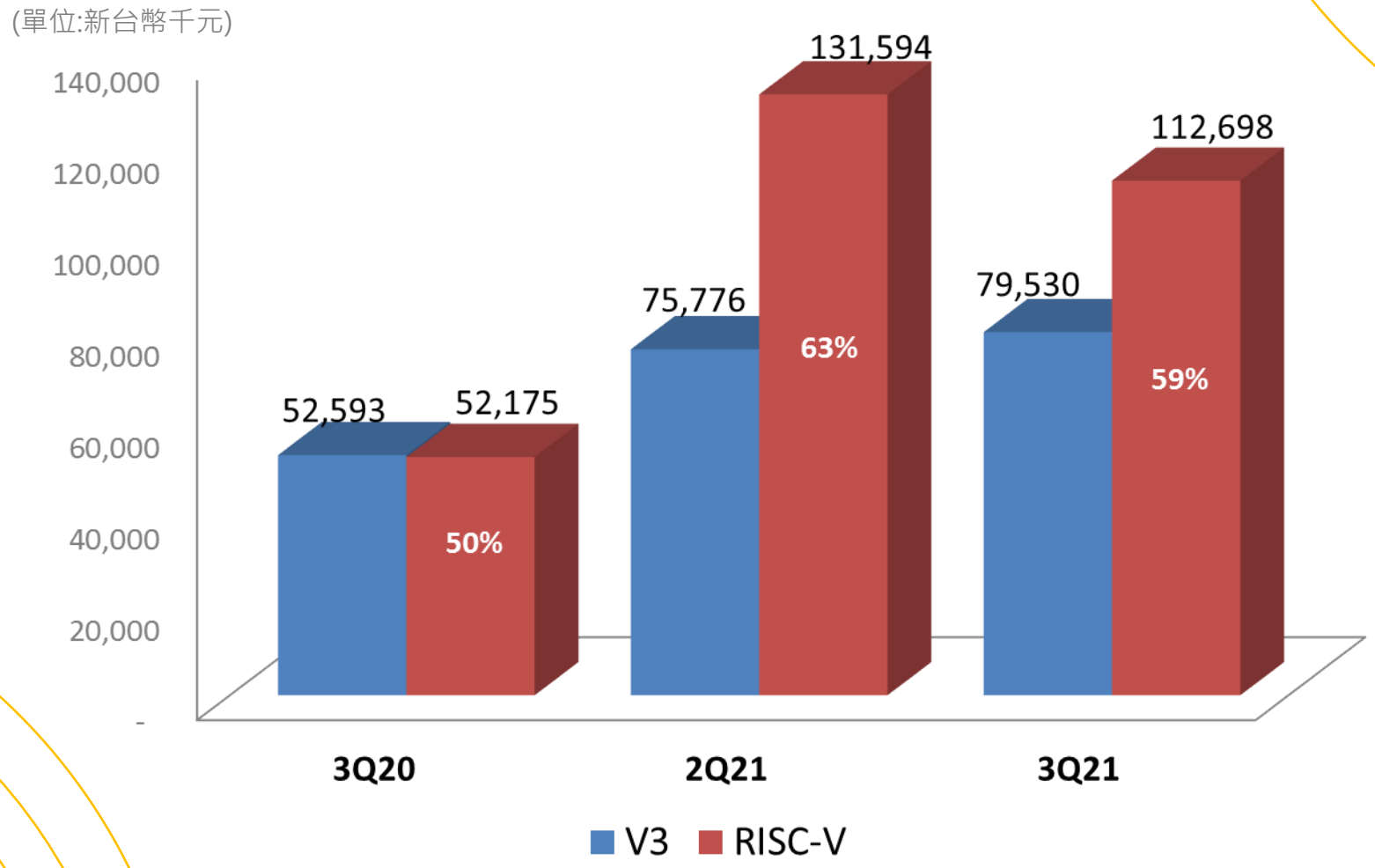


2021年前三季銷售分析-產品別

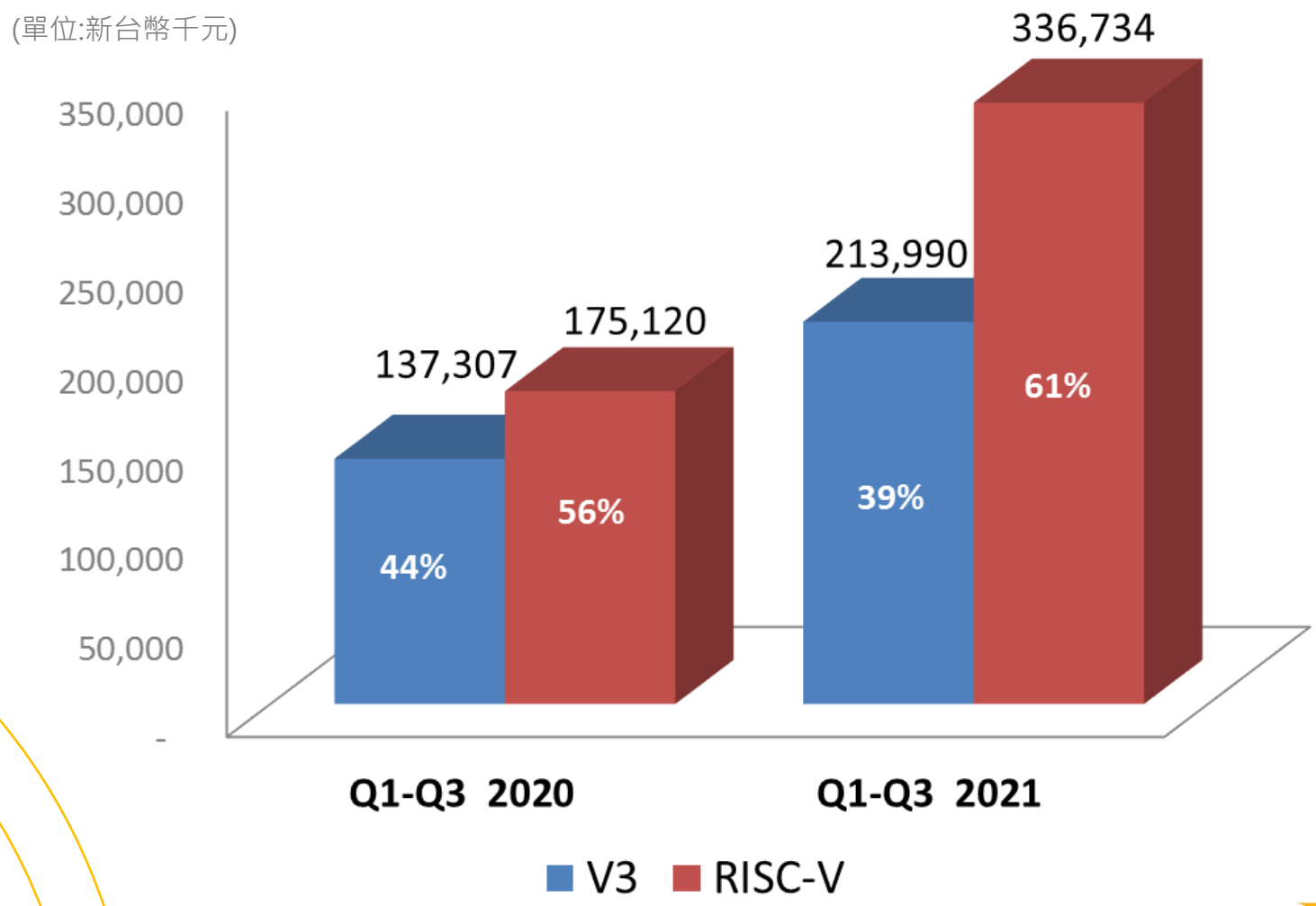




2021年第三季銷售分析- RISC-V



2021年前三季銷售分析- RISC-V



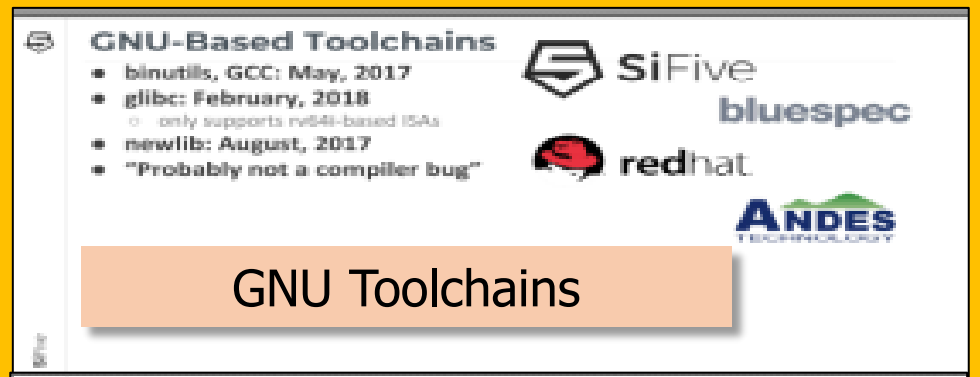
產品應用

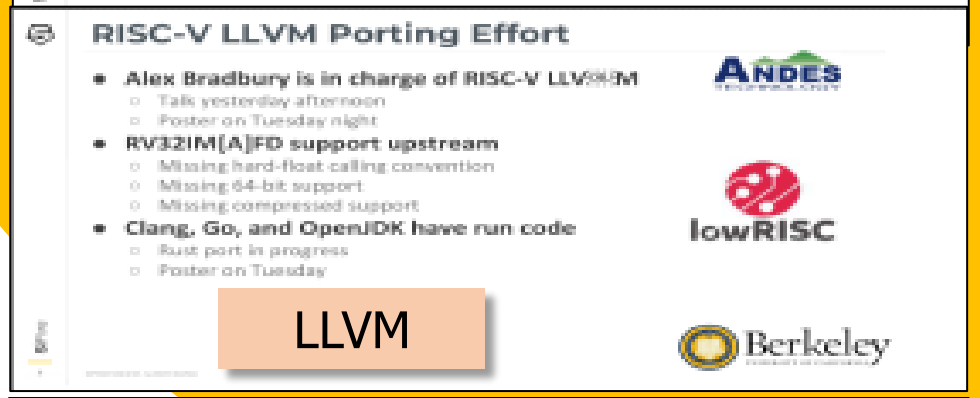
http://www.andestech.com

晶心概況

- A **16**-year-old public CPU IP company
- **2B+** Andes-Embedded SoC annually in 2020

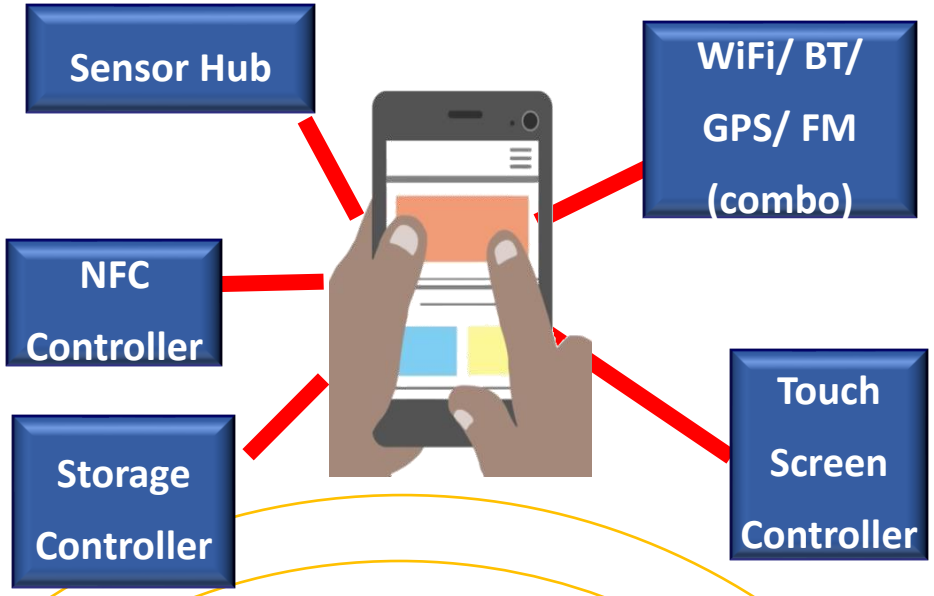
- A **founding premier** member of the RISC-V International
- An active role in RISC-V International & its extension task groups
  - **RISC-V Board Director**
  - **Member of Technical Steering Committee**
  - RISC-V Ambassador
  - Chair of P-extension (Packed DSP/SIMD) Task Group
  - Co-chair of Fast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





ANDES TECHNOLOGY

晶心嵌入各式各樣新的應用



Andes Embedded in Smart Phones

Smart Speakers: WiFi IoT

Bike Sharing: GPS Ctrl

X-Trail: ADAS Ctlr

Switch: Game Flash Ctlr

- In leading **machine learning computers** for datacenter
- In tier-one **switch routers** for datacenter
- Recent applications: **5G networking, WiFi 6/7, AI processors** (using Andes Custom Extension, ACE)

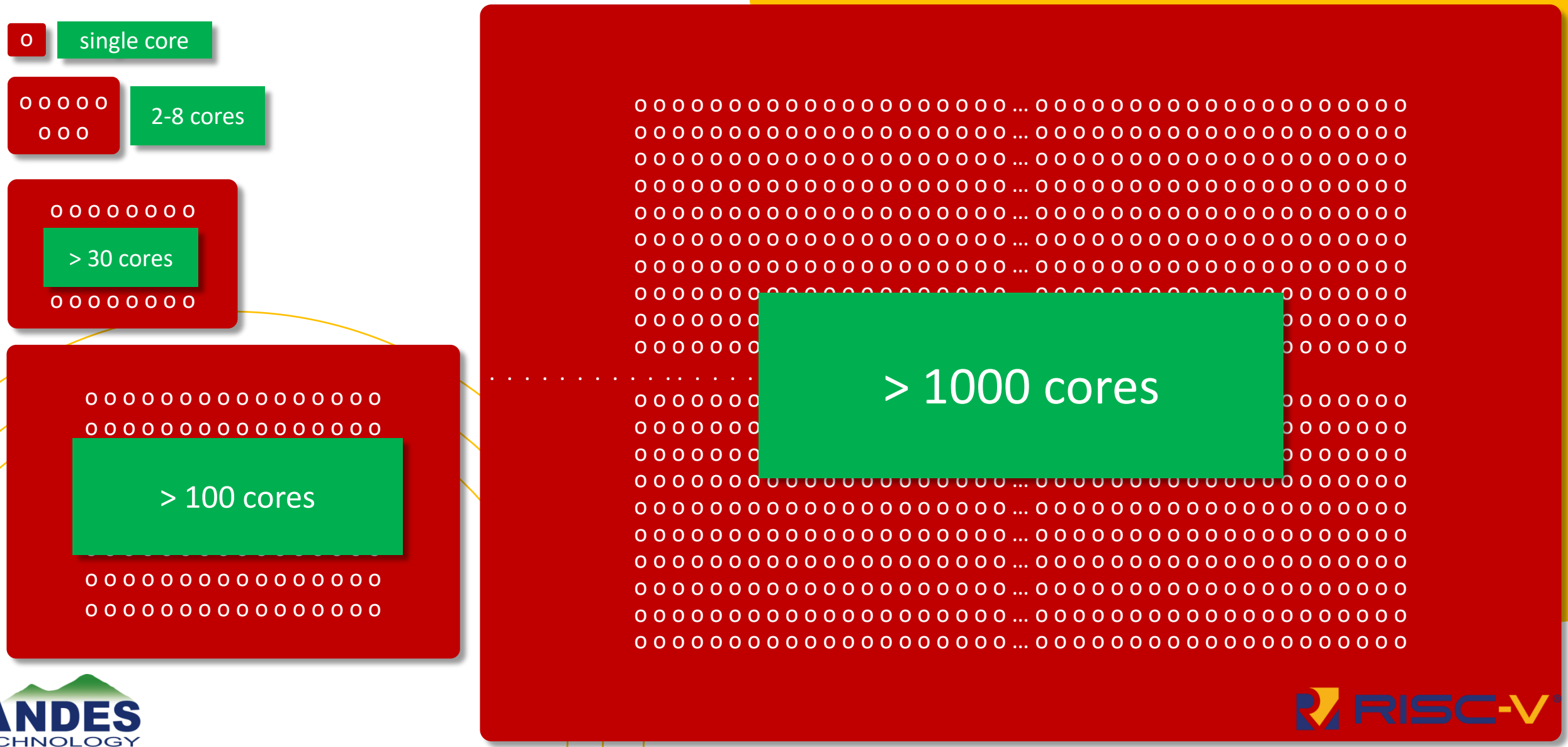
ANDES TECHNOLOGY

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 5nm**
- **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



ANDES TECHNOLOGY

RISC-V

新產品及生態系統

http://www.andestech.com

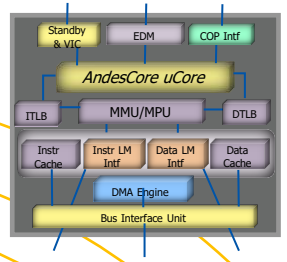
晶心RISC-V產品概述

Best extensions to RISC-V

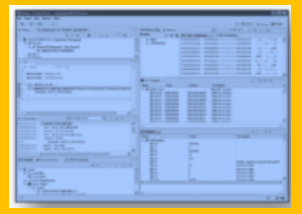
AndeStar™ Architecture V5

AndesCore™ Processors

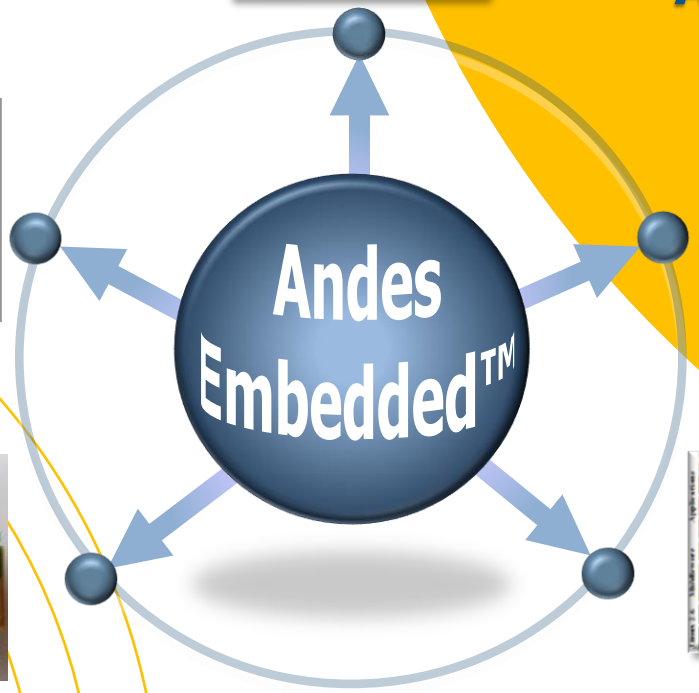
Highly optimized design with leading PPA



AndeSight™ Tools



Professional IDE with high code quality



Handy peripheral IPs to speed up SoC construction

AndeShape™ Platforms

Extensive SW stacks from bare metal, RTOS to Linux

AndeSoft™ Stacks

Andes V5適用於廣泛的運算架構

AndeStar™ V5 CPUs	Conventional Computing Architecture	Domain Specific Architecture (DSA)
RISC-V RV32/64 / ANDES TECHNOLOGY Andes Extension		
N/D-series N22 N(X)25 D25…	**Leading PPA Embedded Processor** IoT, Sensing, Storage, Audio, GPS	Andes Custom Extension
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	

- Define custom instruction to handle time critical codes
- Better approach for accelerator /co-processor to do particular jobs
- Automation Tool for the generation of toolchain, ISS, partial RTL and verification

晶心RISC-V產品路線圖

RV32/RV64

Cache-Coherent 1-4 Cores	A25MP AX25MP
Linux with FPU/DSP	A25 AX25
Fast/Compact with FPU/DSP	N25F D25F NX25F

5-stage (1.1 GHz)

N22
2-stage
(700 MHz)

Vector Ext.

27-Series:

Vector Ext.
MemBoost

NX27V
A27/AX27
A27L2/AX27L2
and more.

5-stage (1.1 GHz)

Superscalar

45-Series:

Dual Issue
MemBoost

N45/NX45
D45/DX45
A45/AX45
A45MP/AX45MP
and more.

8-stage (1.2 GHz)

Benefits

512-bit SIMD raises MobileNet by 66x
(CNN for mobile vision)

boost performance by 50%

Raise bandwidth to 3x; Cut latency by 40%

ANDES TECHNOLOGY

RISC-V®

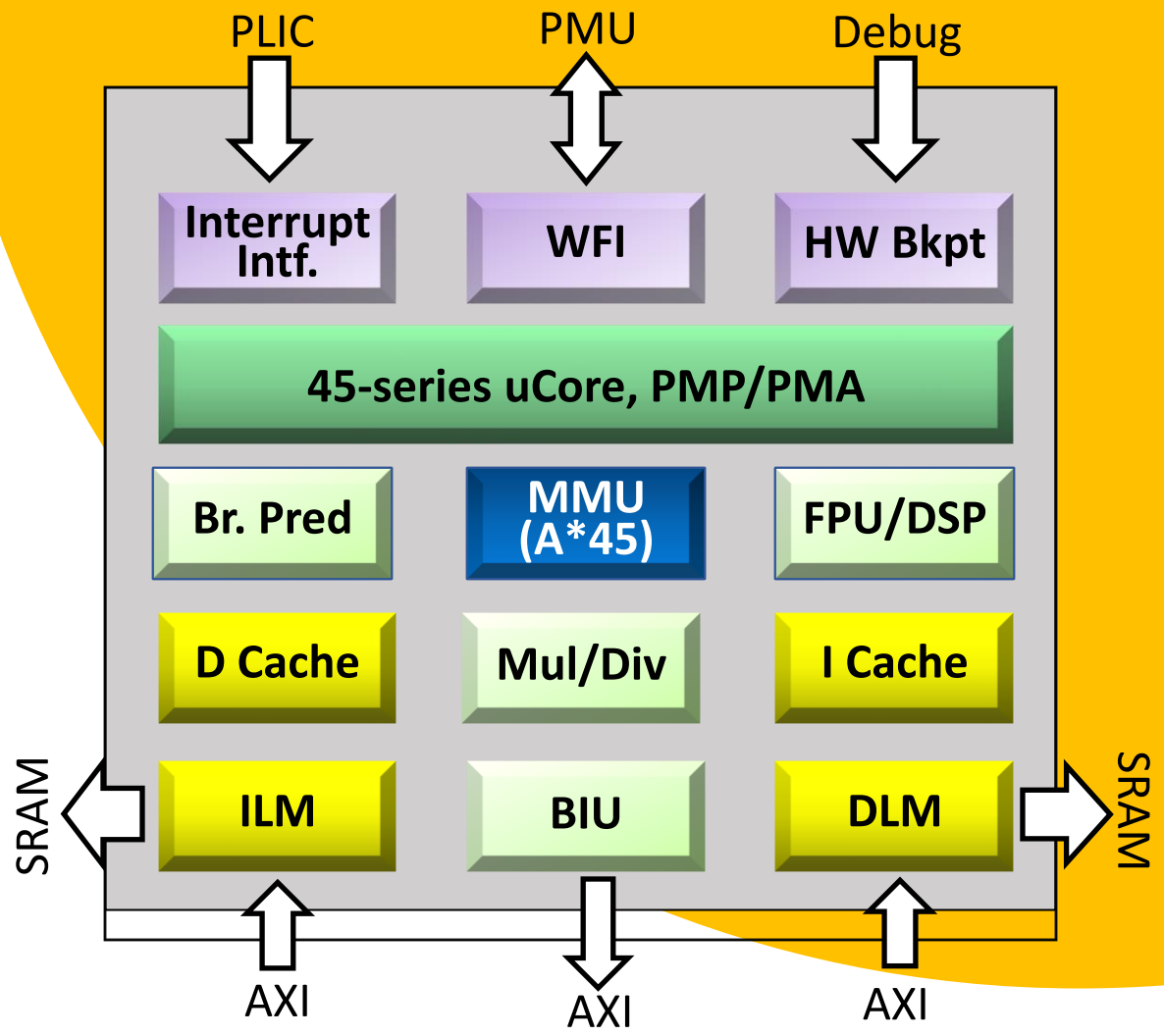
AndeCore™ 45 系列產品

32-bit AndesCore™ N45/D45/A45/A45MP

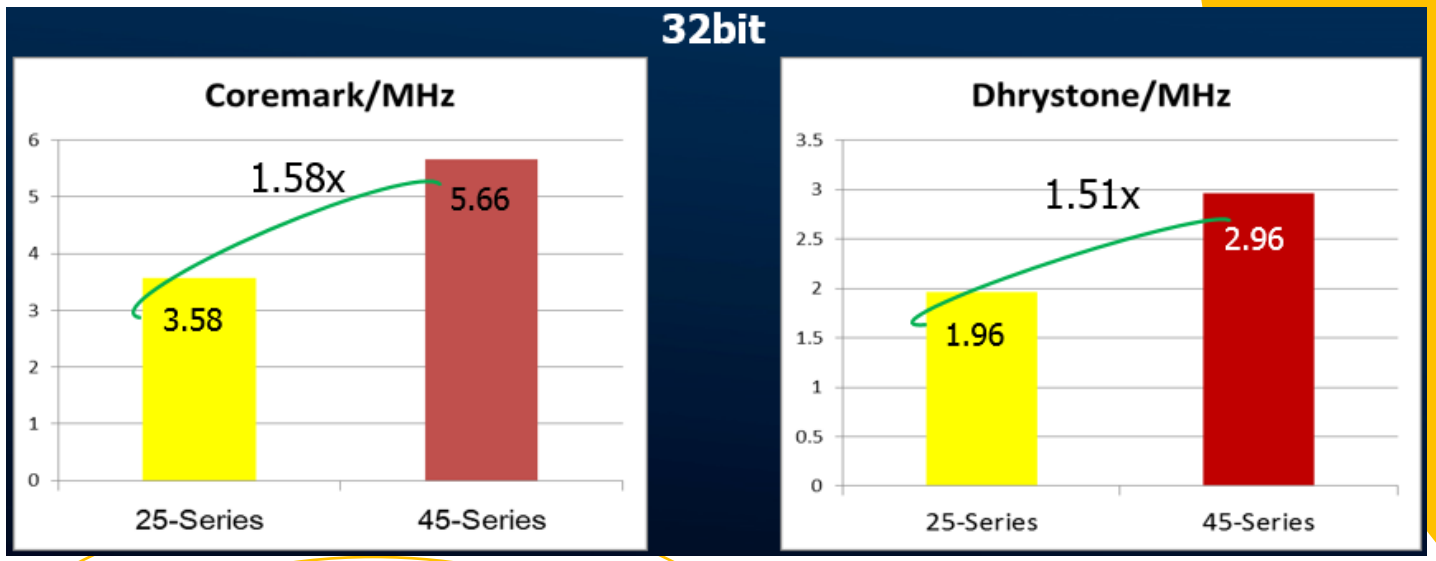
64-bit AndesCore™ NX45/AX45/AX45MP

AndesCore™ 45-Series概述

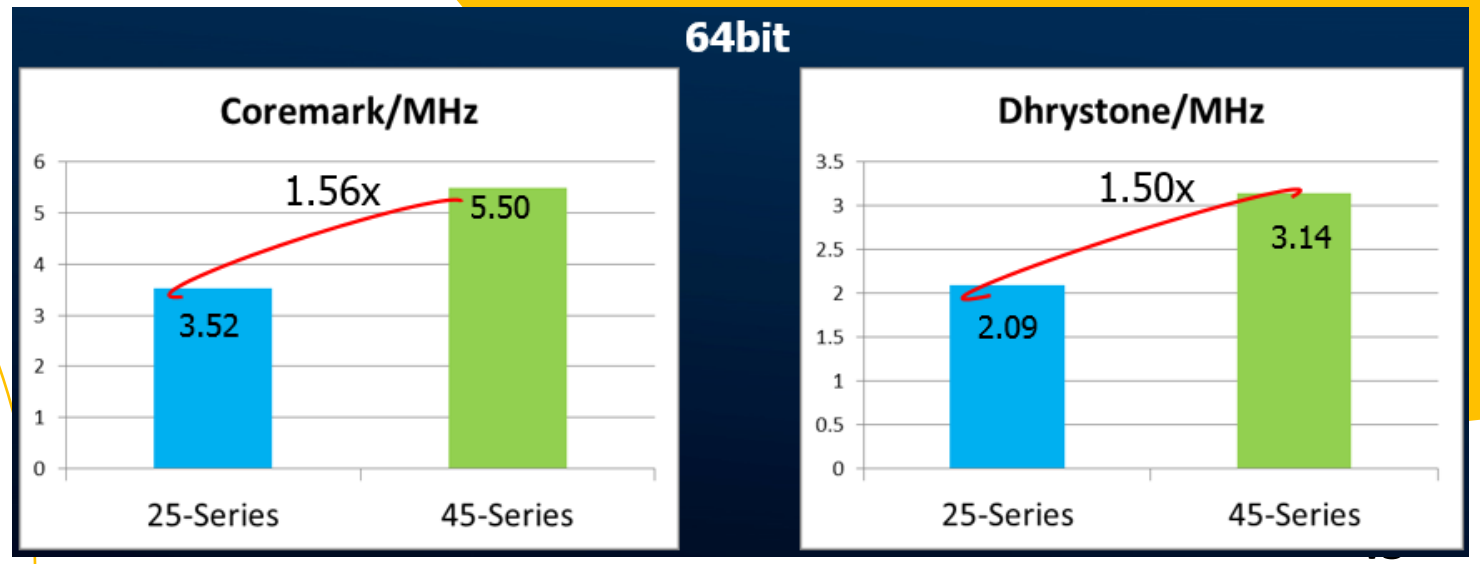
- 8-stage In-Order Dual-Issue
- AndeStar™ V5 ISA:
  - RV*GCN (S/D FPU): All Series
  - RV*P-ext (DSP/SIMD): D45/A(X)45
  - MMU for Linux Applications: A(X)45
- MemBoost memory subsystem
- Low power dynamic branch prediction
- Unaligned data accesses
- Fast or small multiplier
- StackSafe™ (Andes Ext.)
- CoDense™ (Andes Ext.)
- Multi-core support: A(X)45MP



AndesCore™ 45 vs. 25 Series Performance Enhancement

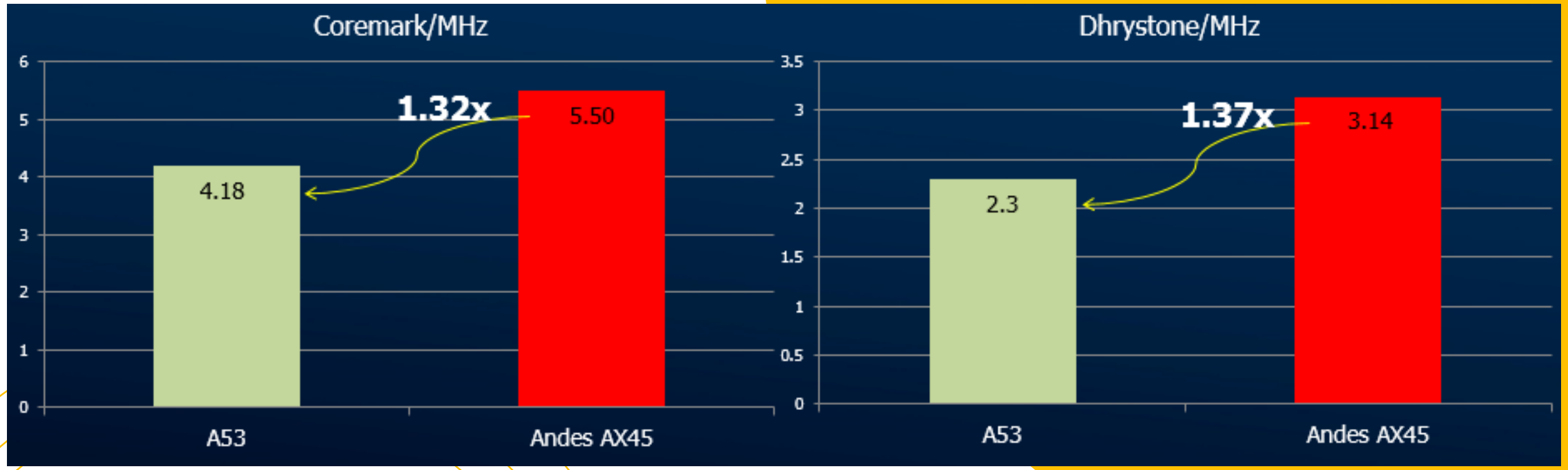


- **> 1.5X** Coremark & Dhrystone performance enhancement, compared with single-issue 25 series



ANDES TECHNOLOGY

AX45 Can Do More (vs. 64bit A-series)



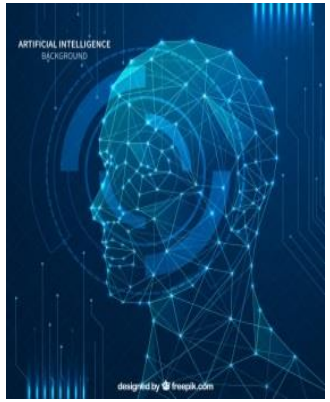
- **A53**
  - 8-stage In-Order Dual Issue
  - **Widely adopted by industries in many applications**

- **AX45**
  - 8-stage In-Order Dual Issue
  - **Performance is better!**
    - **Coremark/MHz: 1.32x**
    - **Dhrystone/MHz: 1.37x**

ANDES TECHNOLOGY

27 & 45系列產品的目標市場

- AI/Deep Learning
- AR/VR
- 5G



- Networking

- Storage

- Video Surveillance

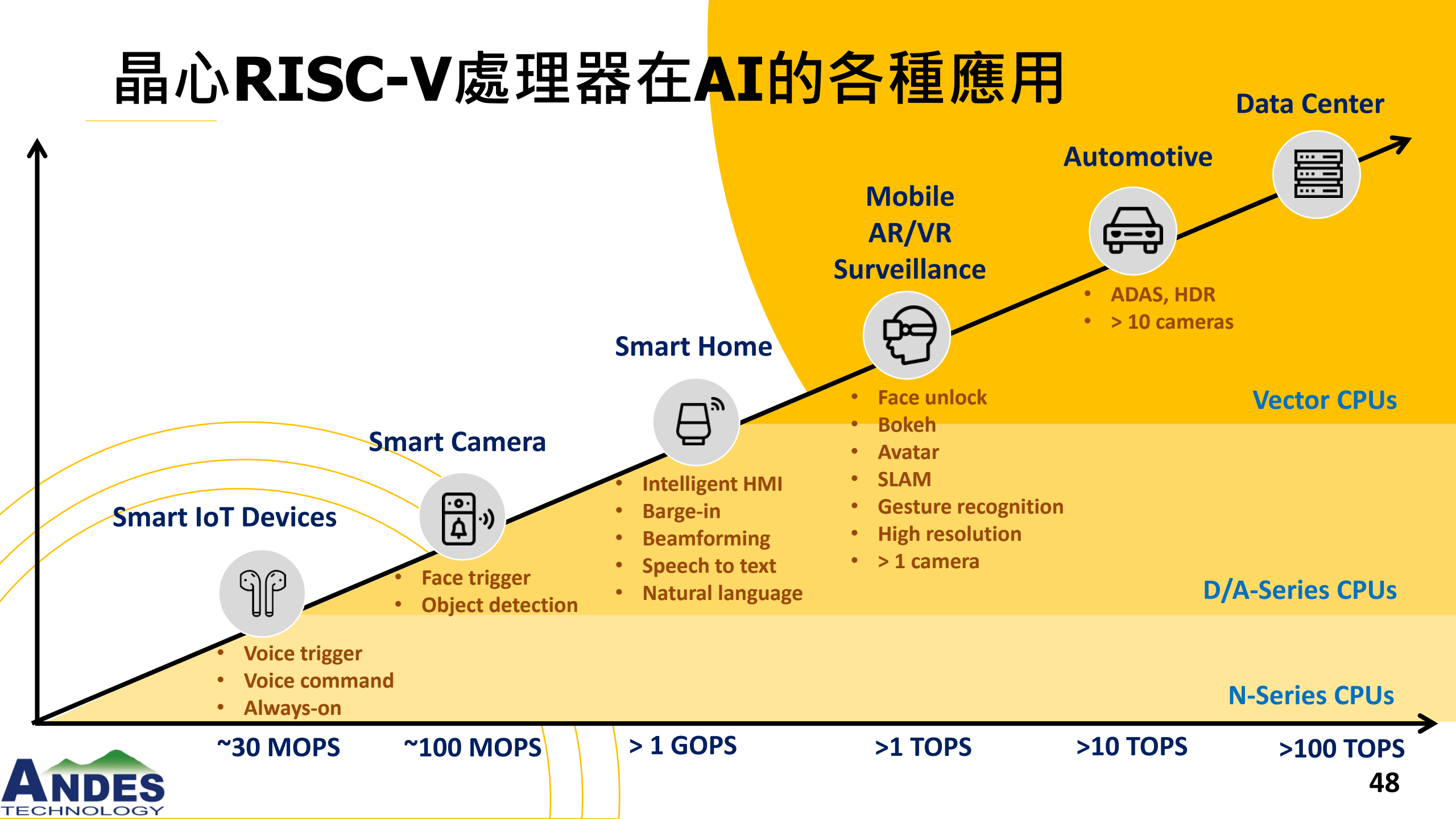
- ADAS

- V2X (Vehicle to Everything)

- IVI (In-Vehicle-Infotainment)

Metaverse and more…

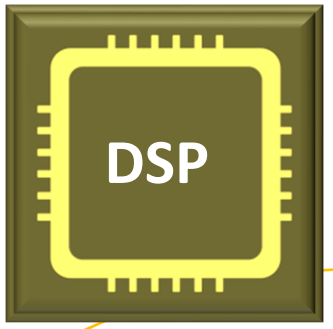
晶心RISC-V處理器在AI的各種應用

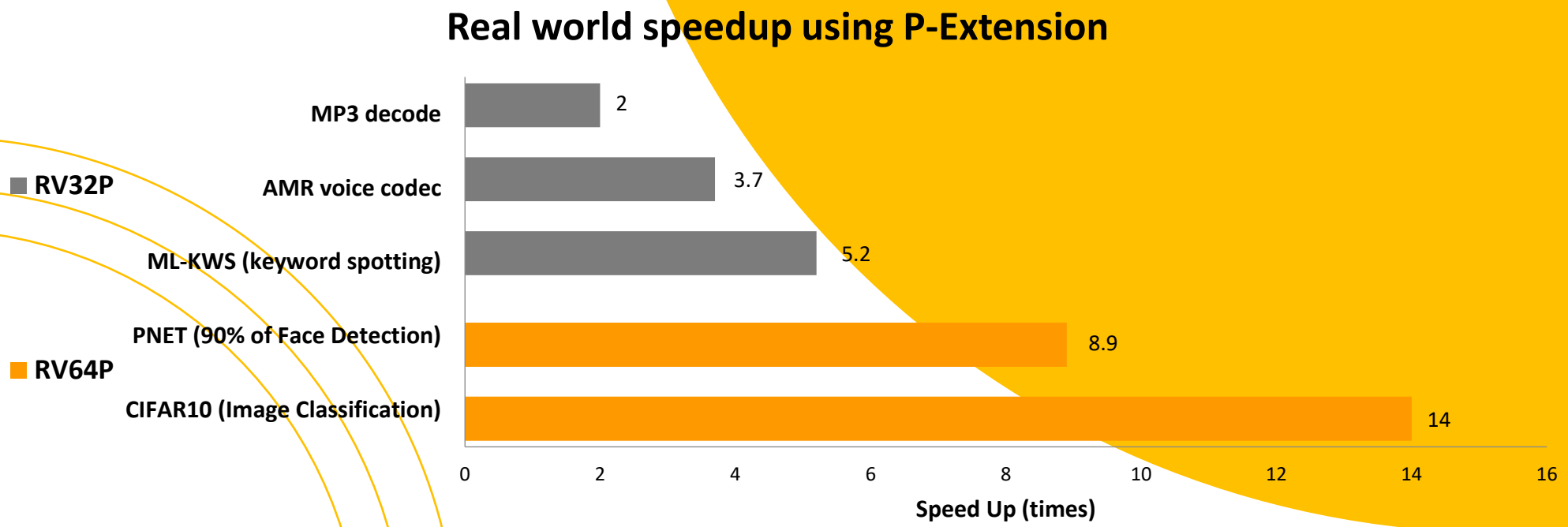


ANDES TECHNOLOGY

RISC-V DSP Extension

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





❖ Increase power efficiency to your DSP applications

ANDES TECHNOLOGY

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

NX27V

*512b → Cloud Computing – Datacenter, HPC, Server

*256b → Edge Computing – 5G, Vision Processing

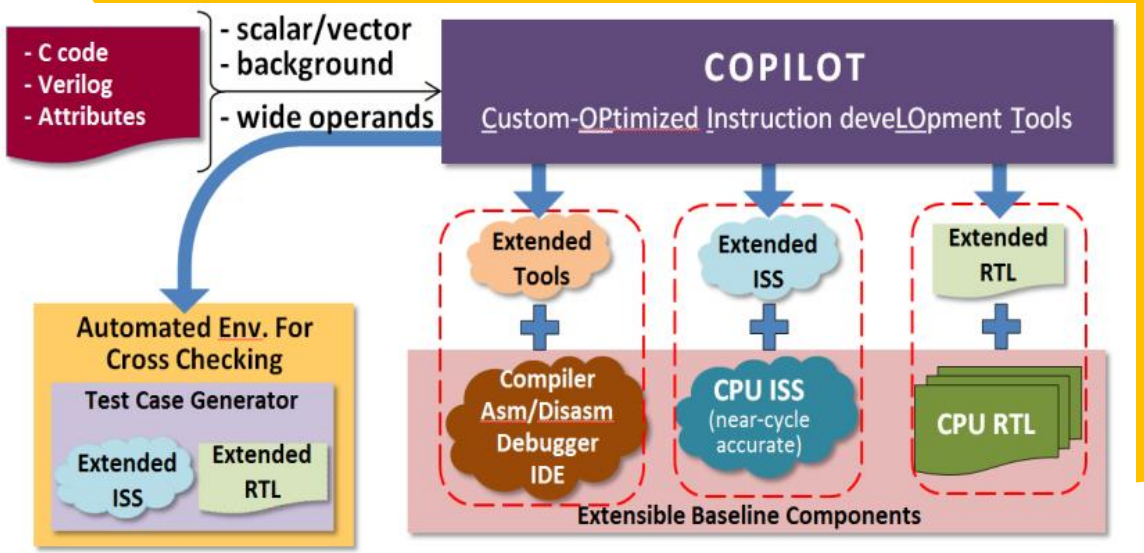
*128b → Endpoint Computing – Natural Language Processing

* 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 *world-leading* supplier shipping the commercial RISC-V cores to market with the support of

P-Extension	• D25, D45, A(X)25(MP), A(X)27(L2), A(X)45(MP)
V-Extension	• NX27V, NX45V
Custom-Extension (w/ ACE* support)	• Entire 25, 27, 45 series

*: Andes Custom Extension

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

Aggressive in RISC-V Community

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
  - Vice Chair of TEE 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

總結

http://www.andestech.com

A Trusted Computing Expert

Successfully rolled out new series of RISC-V cores (w/ leading P-, V- and Custom-Ext.), custom computing service and FreeStart program to extend more oppty.

Aggressively involved in RISC-V International new technology development, contributing and leveraging RISC-V eco-system.

Becoming a technology contributor, market promoter, and sales leader in the RISC-V industry

Thank You

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