Andes Technology Corp.
Investor Conference Report

2020/09/22

ANDES TECHNOLOGY

Safe Harbor Notice

Except for the historical information contained herein, the matters addressed in this presentation are forward-looking statements that involve certain risks and uncertainties that could cause actual results to differ materially, including but not limited to weather, impact of competitive products and pricing, industry-wide shifts in the supply and demand for semiconductor products, rapid technology change, semiconductor industry cycle, and general economic conditions.

Except as required by law, Andes undertake no obligation to update any forward-looking statement, whether as a result of new information, future events or otherwise.

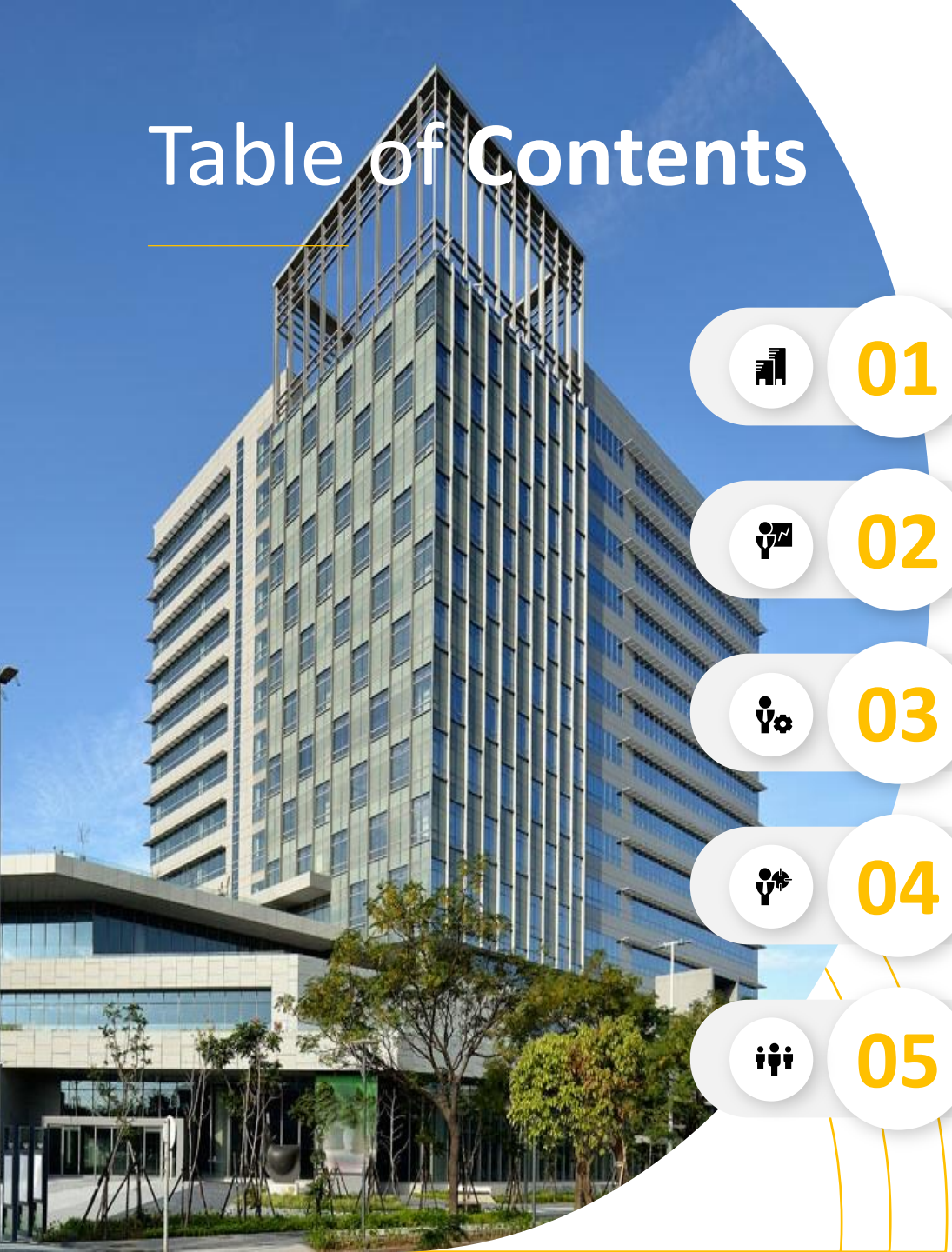

Table of Contents

ANDES TECHNOLOGY

Company Overview

http://www.andestech.com

Andes Highlights

- Founded in March 2005 in Hsinchu Science Park, Taiwan, ROC.
- Well-established high technology IPO company
- Just over 200 people; 80% are engineers.
- EETimes' Silicon 60 Hot Startups to Watch (2012)
- TSMC OIP Award “Partner of the Year” for New IP (2015)
- Founding Premier membership in the RISC-V International Association (RISC-V Foundation) (2020)
- Al Global Media Award “Most Outstanding Embedded Processor IP Supplier– 2020”

Andes Mission

- Innovate performance-efficient processor solution for low-power SoC

Emerging Opportunities

- Smart and Green electronic devices
- Cloud Computing and Internet of Things and Machine Learning

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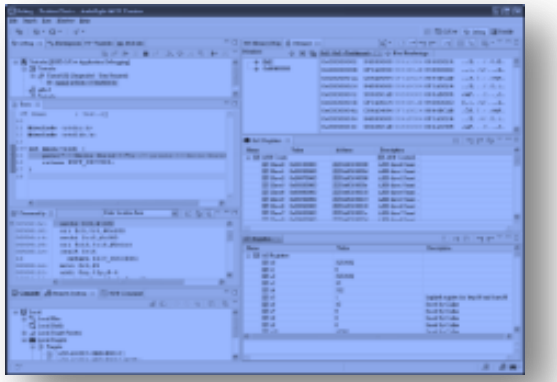
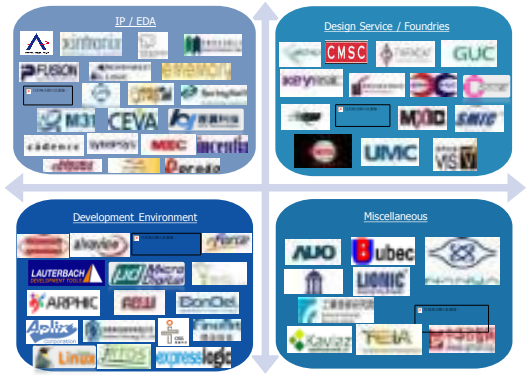
Business Status Overview

- **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





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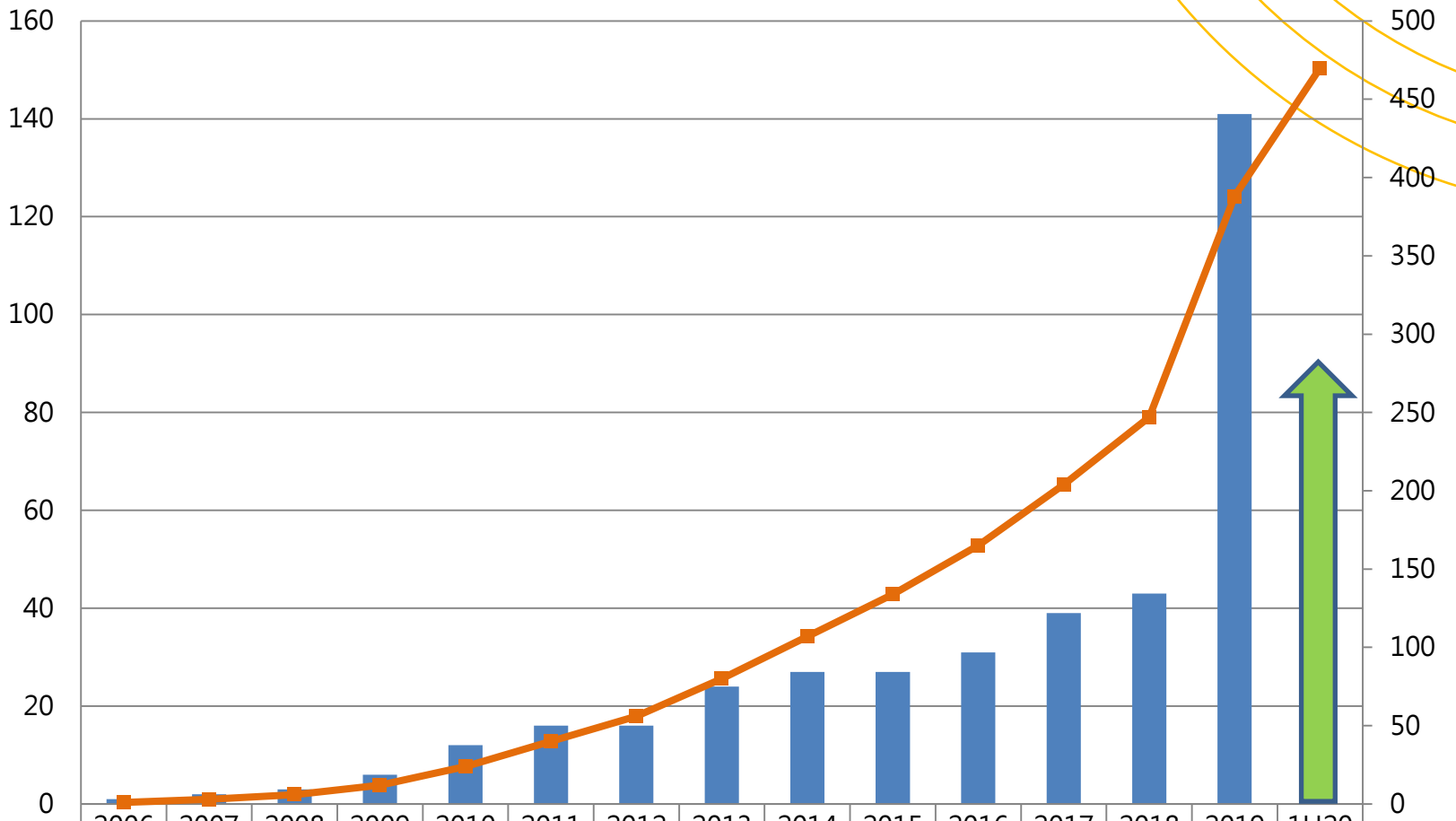
Operation Results

http://www.andestech.com

Agreement Growth Analysis



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	1H20
IP agreements	1	2	3	6	12	16	16	24	27	27	31	39	43	141	82
Accumulated IP agreements	1	3	6	12	24	40	56	80	107	134	165	204	247	388	470

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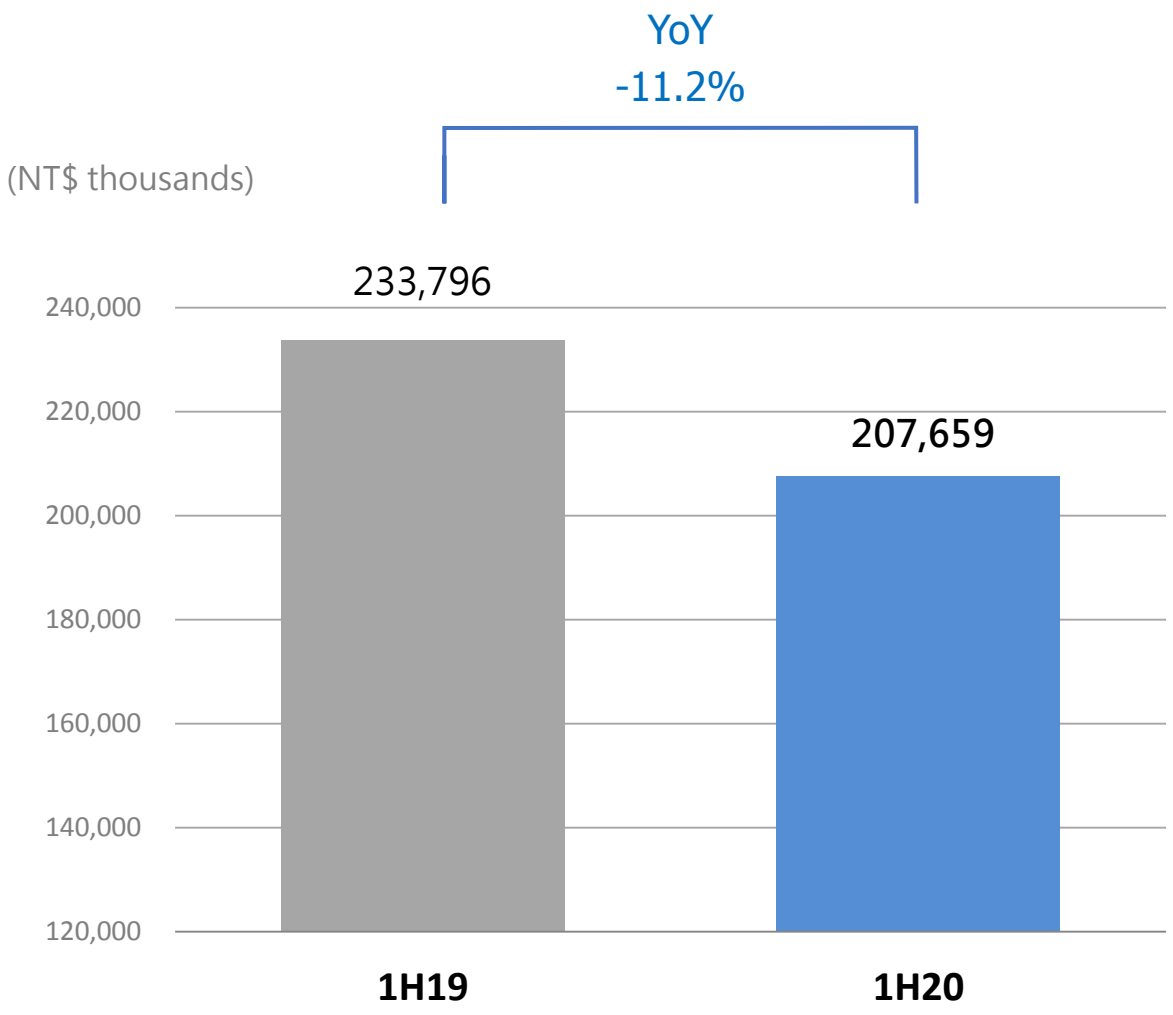
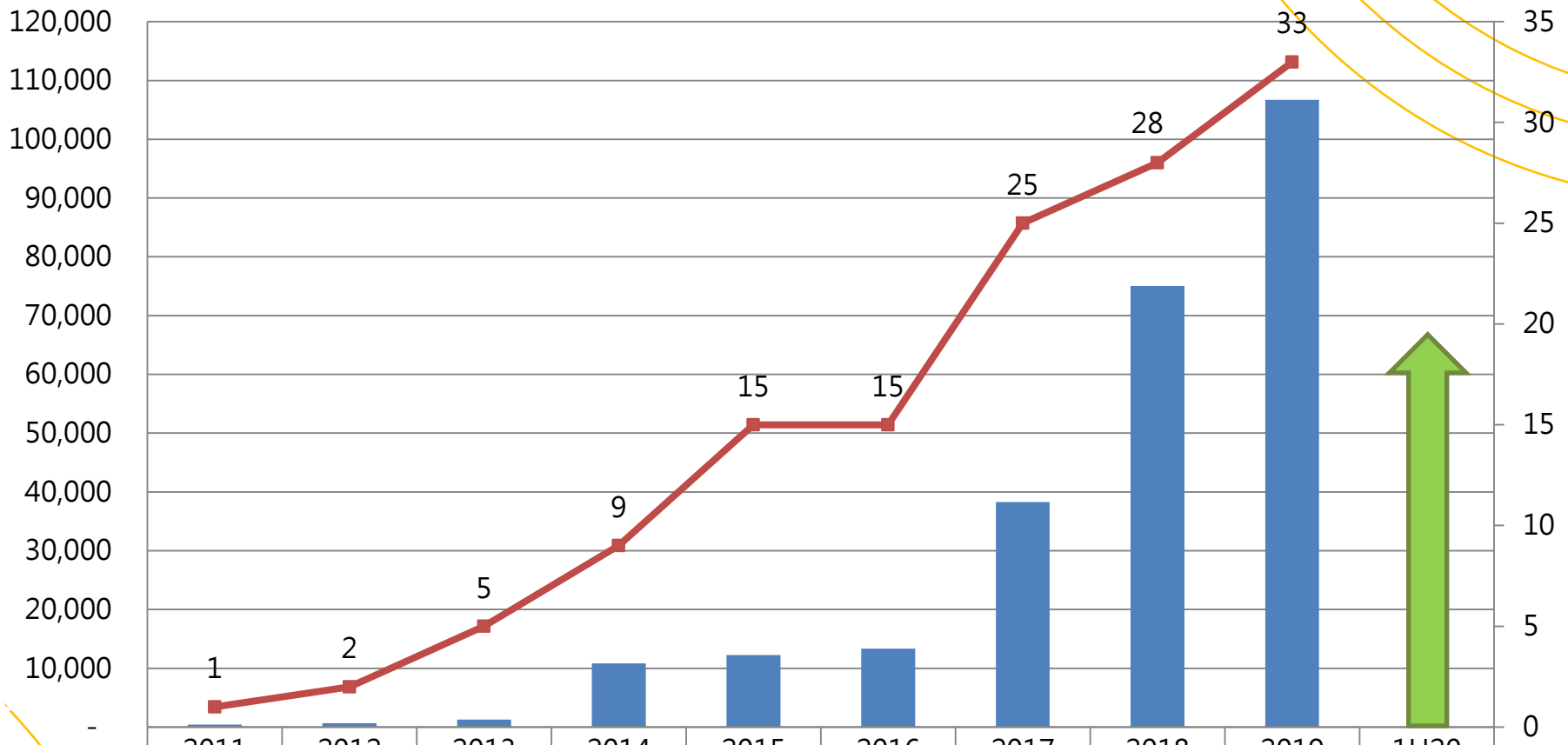
1H20 Revenue Analysis



1H20 Royalty Analysis



	2011	2012	2013	2014	2015	2016	2017	2018	2019	1H20
Royalty	445	660	1,285	10,819	12,232	13,320	38,287	74,953	106,716	63,469
Customer numbers	1	2	5	9	15	15	25	28	33	

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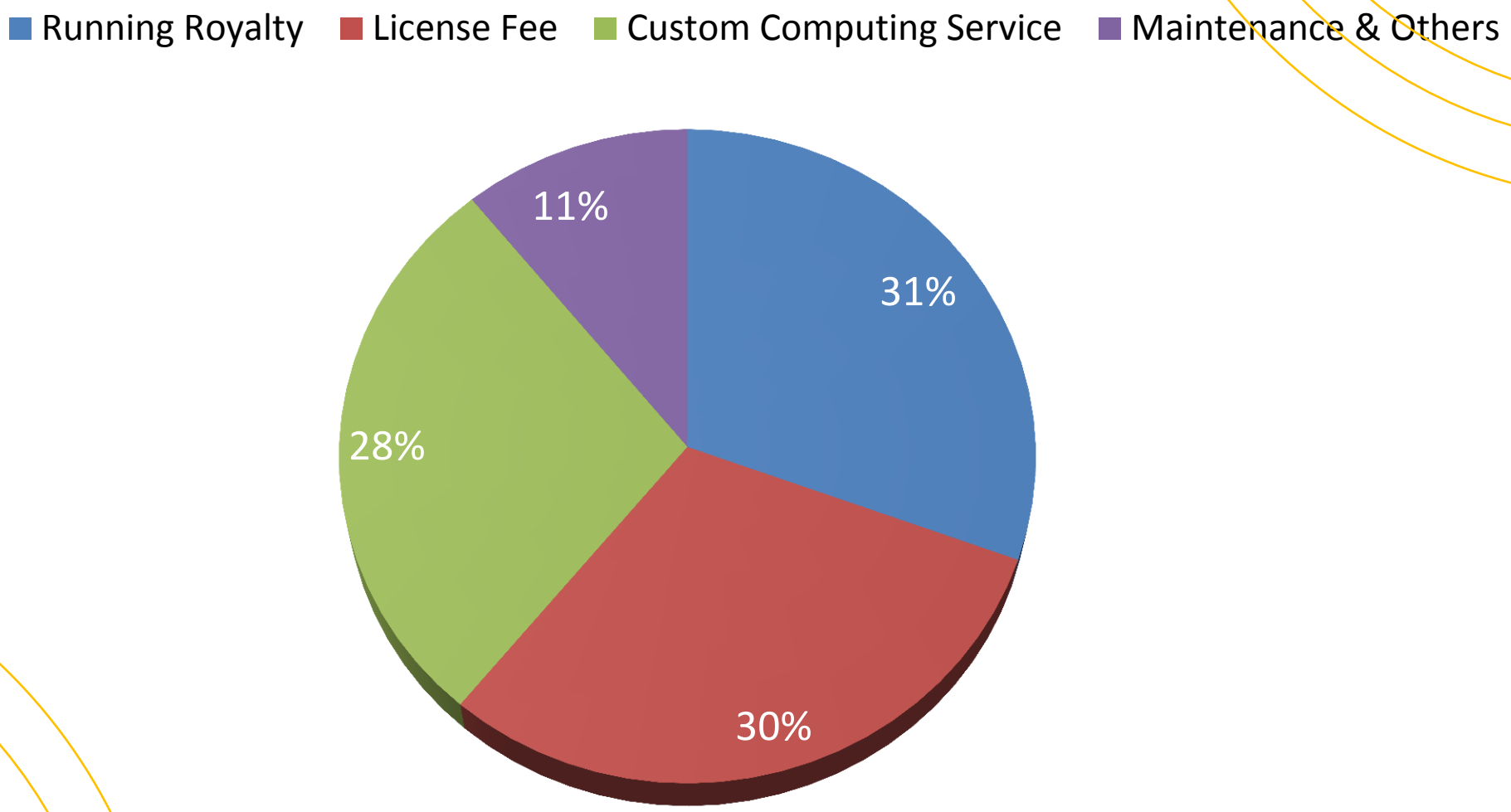
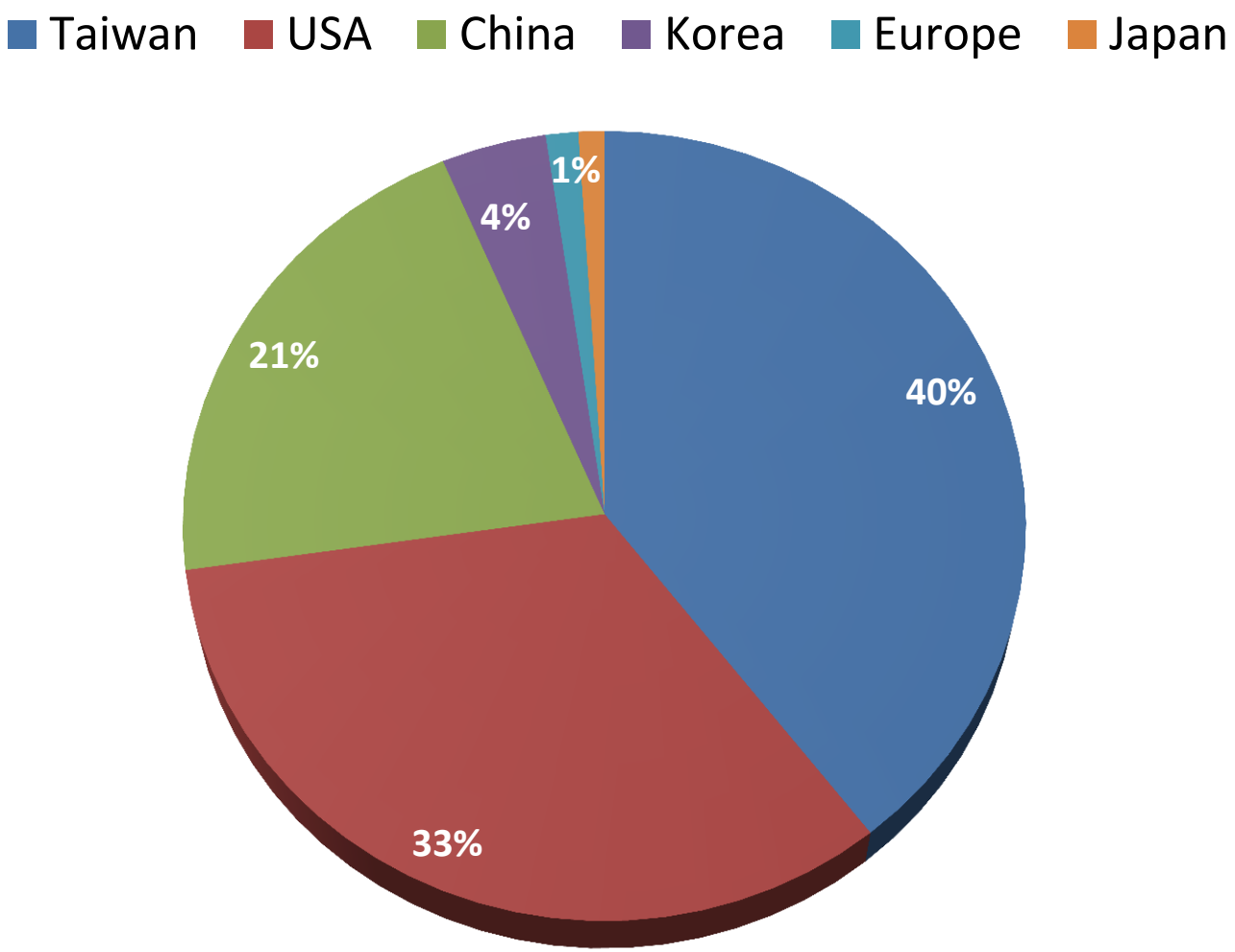
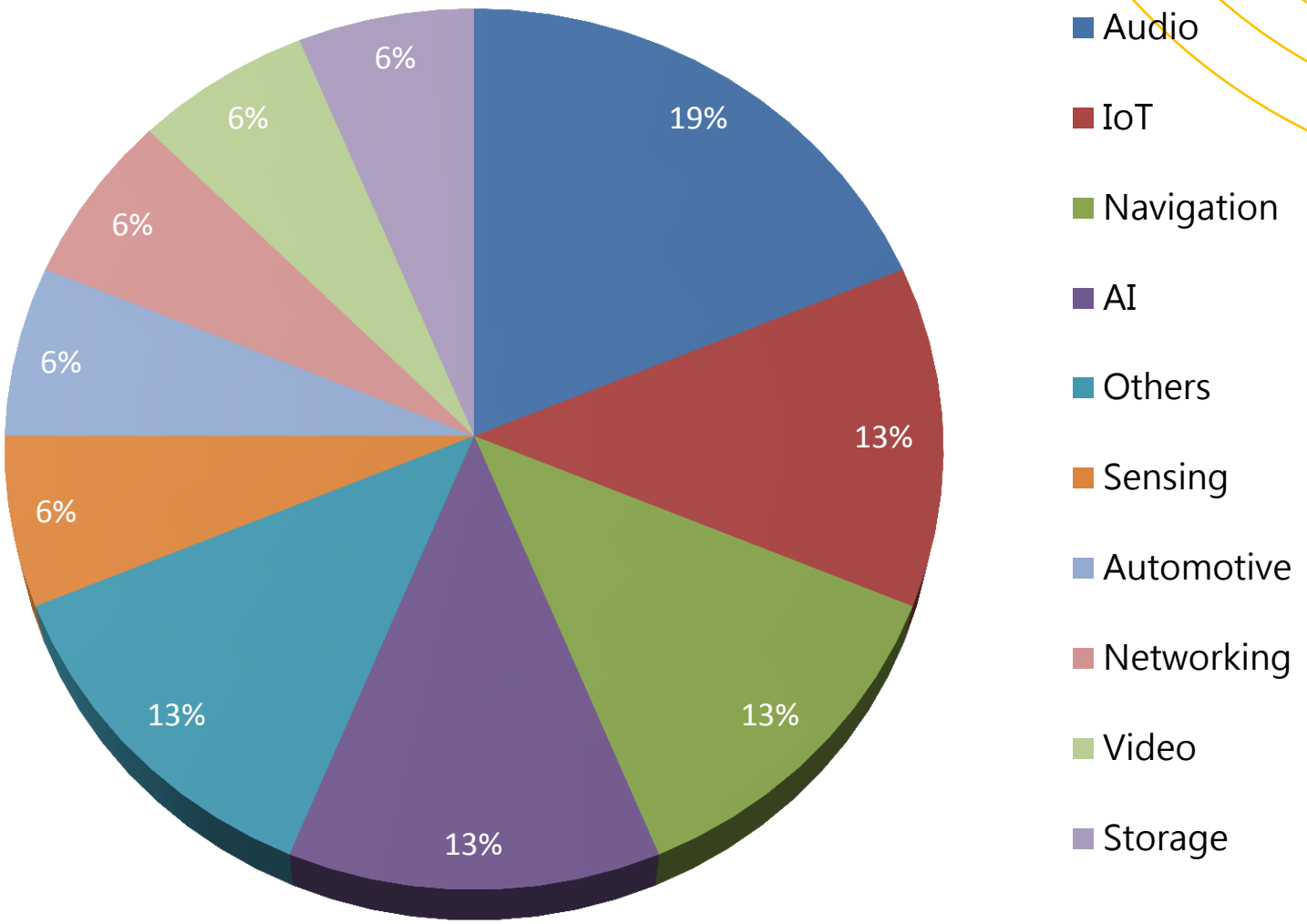
1H20 Revenue Analysis by Payment Model



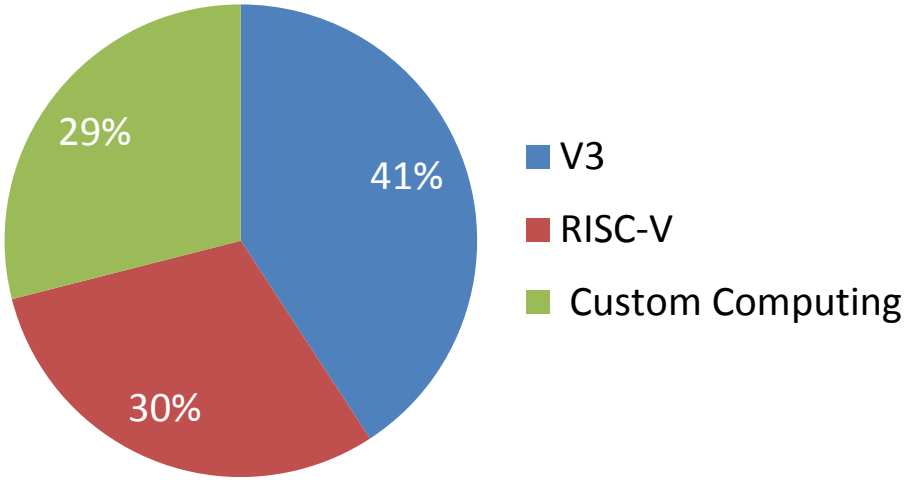
1H20 Revenue Analysis by Region

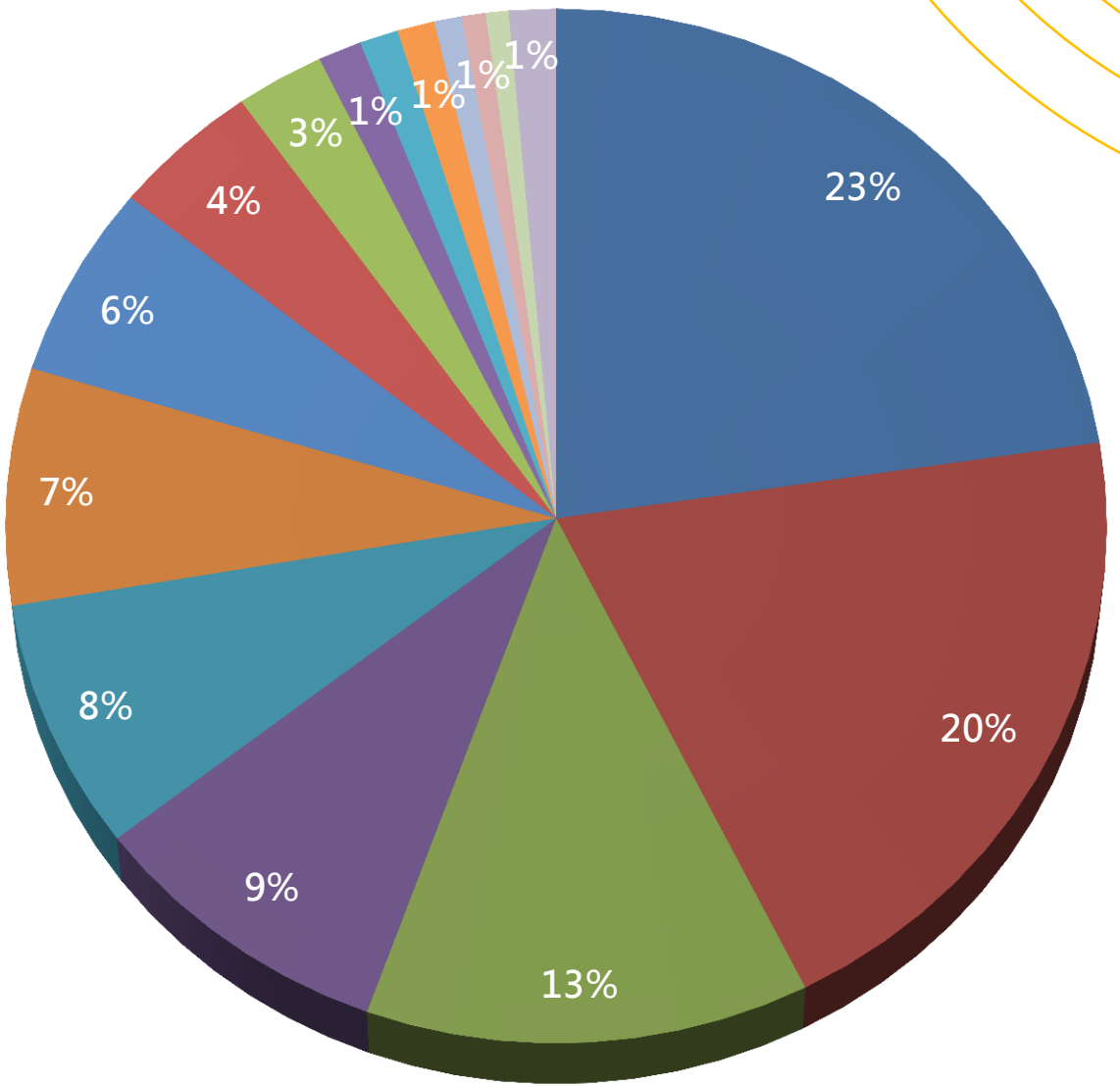


1H20 Customer Application Analysis

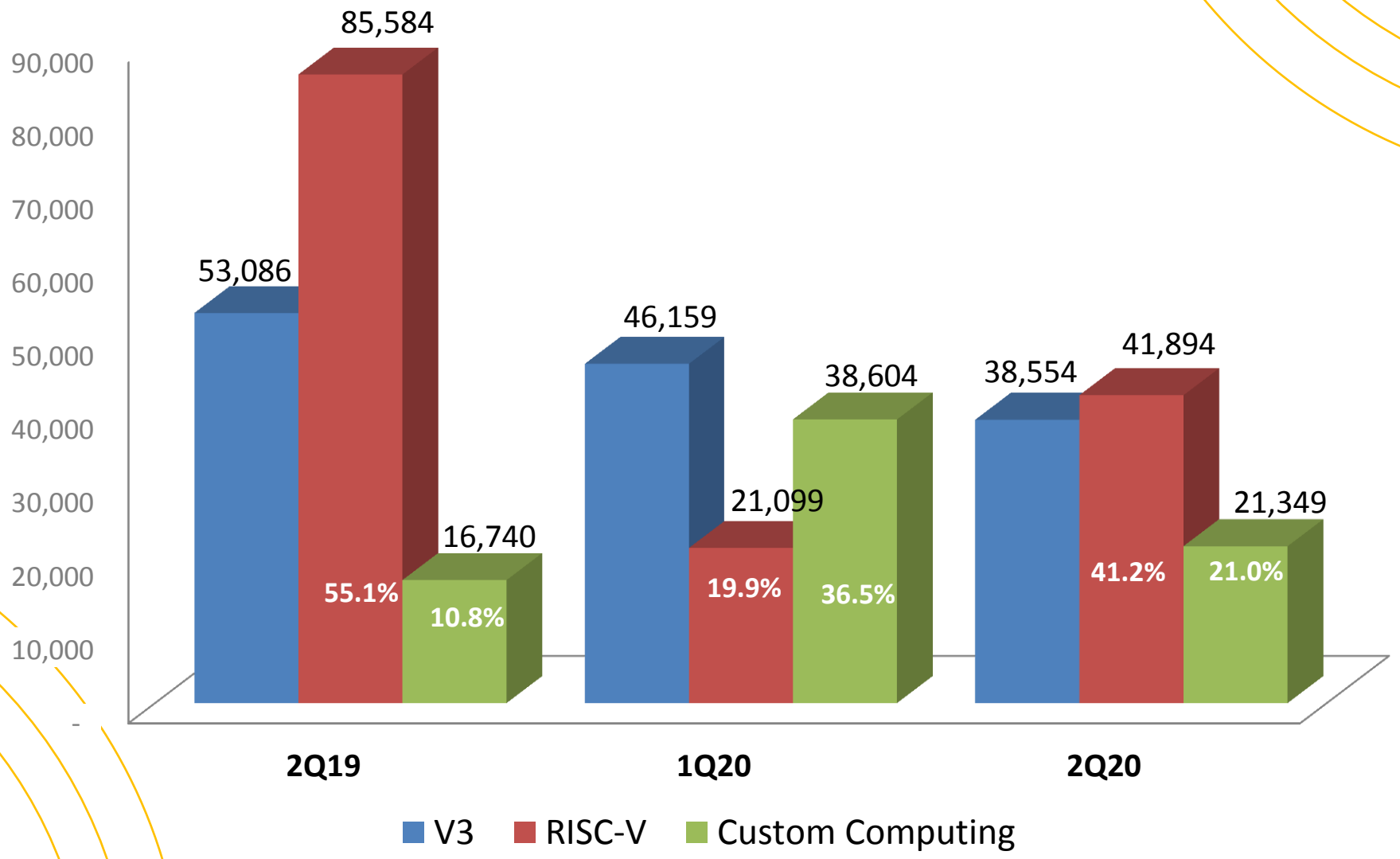


1H20 Revenue Analysis by Product



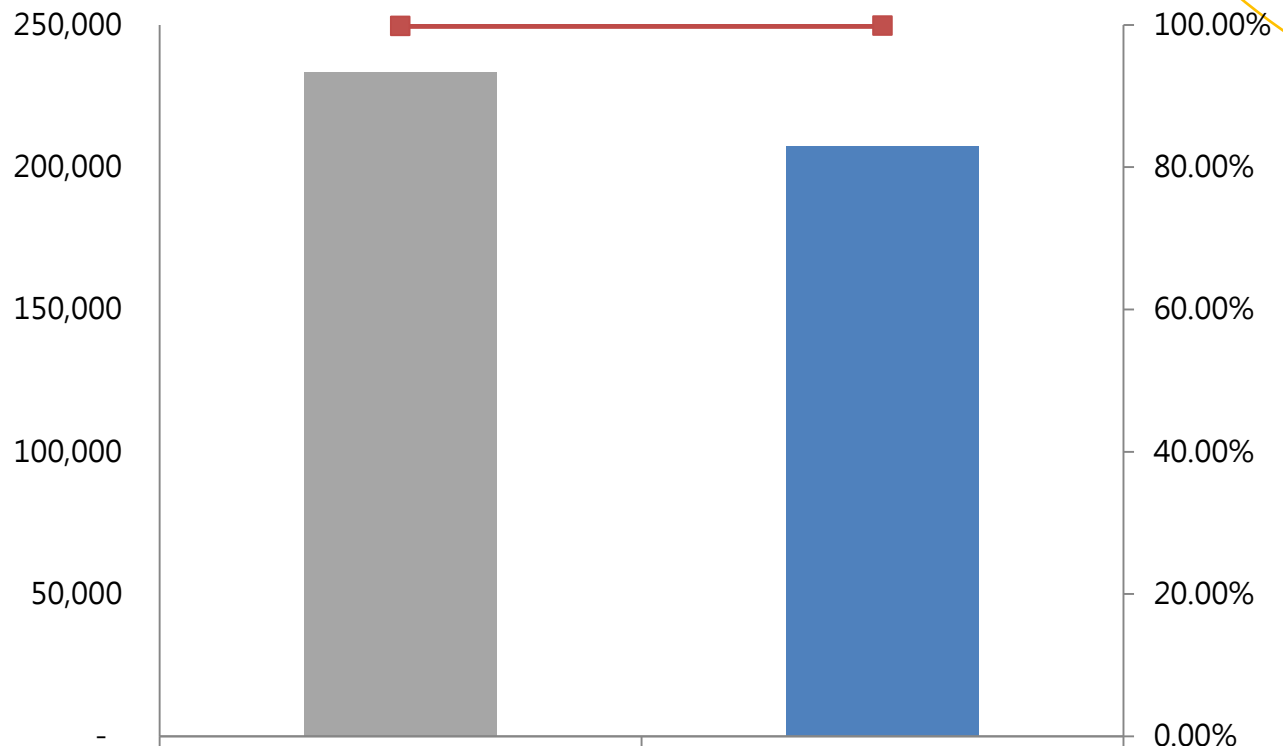


1H20 Revenue Analysis - RISC-V



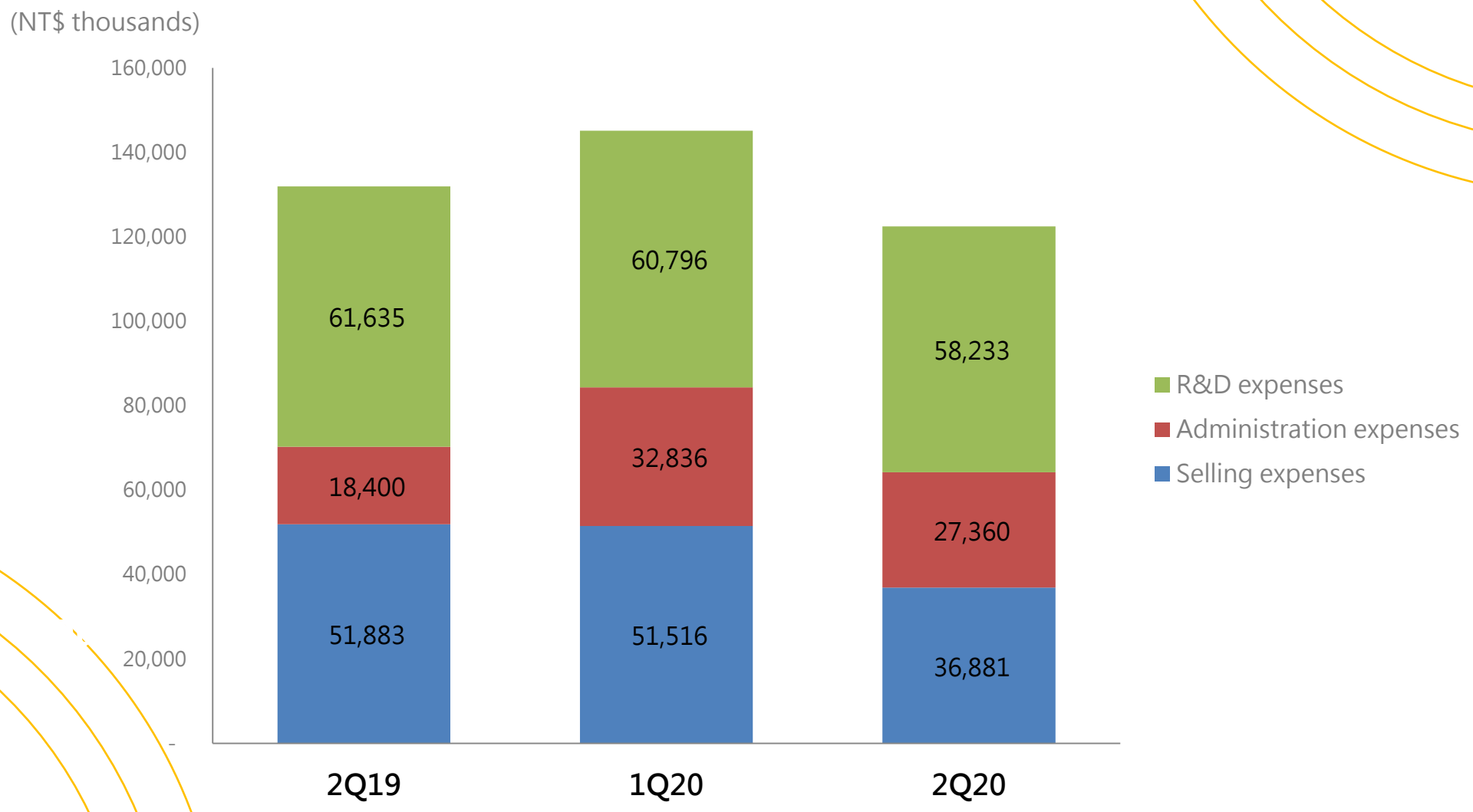
1H20 Consolidated Gross Margin

(NT$ thousands)

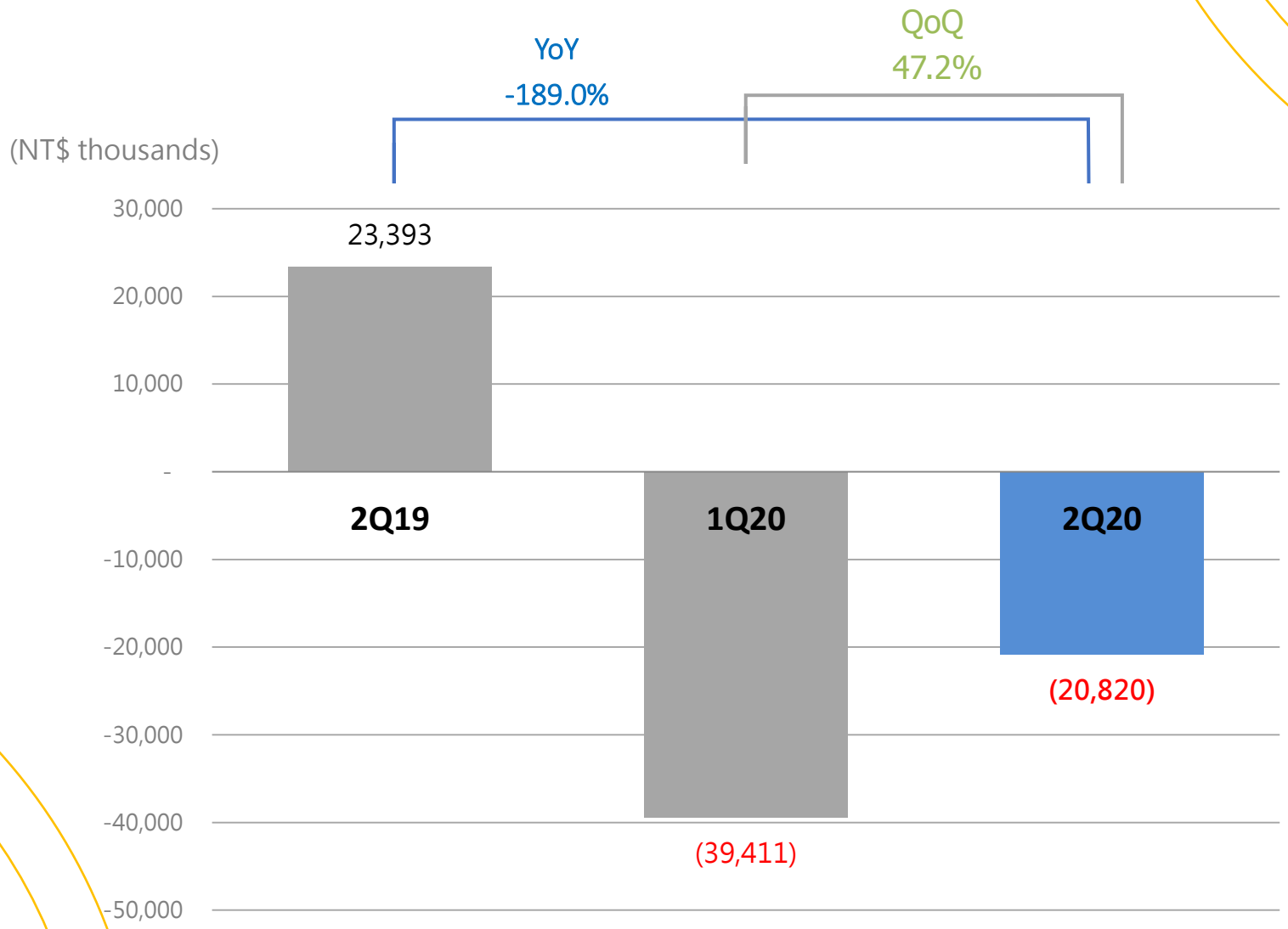


	1H19	1H20
Gross Profit	233,409	207,391
Gross Margin	99.83%	99.87%

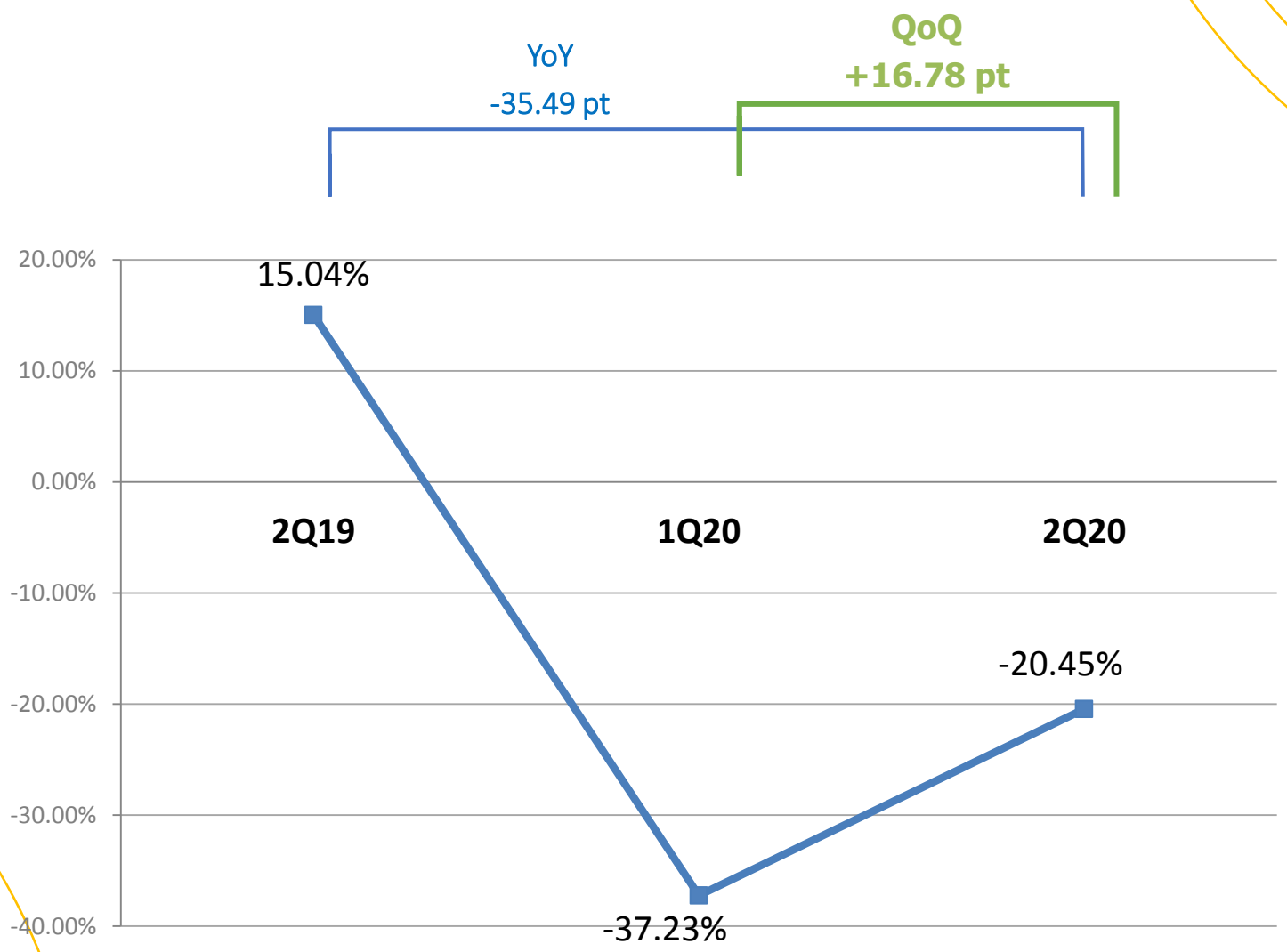
1H20 Consolidated Operating Expenses



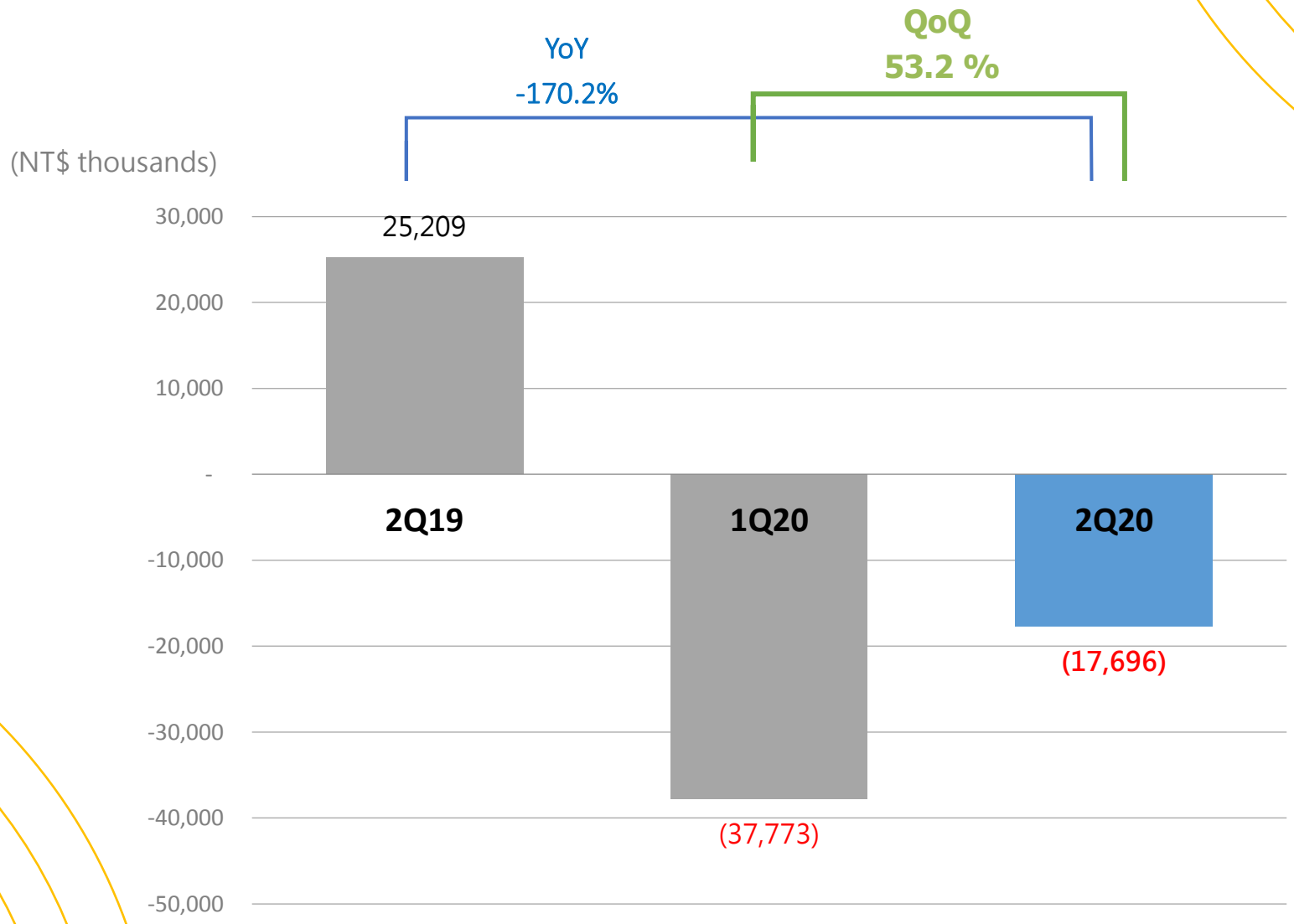
Consolidated Operating Income (Loss)



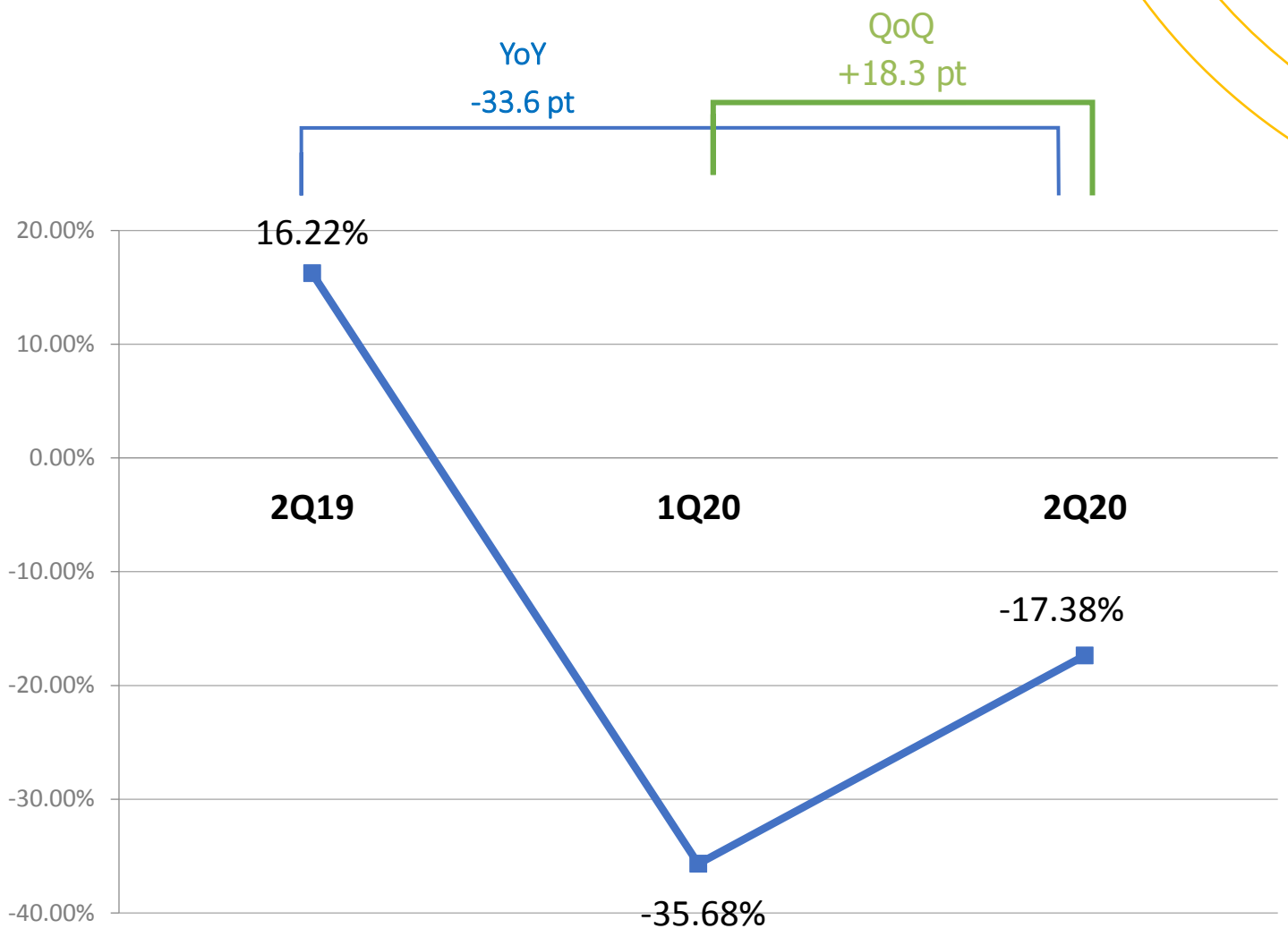
Consolidated Operating Margin



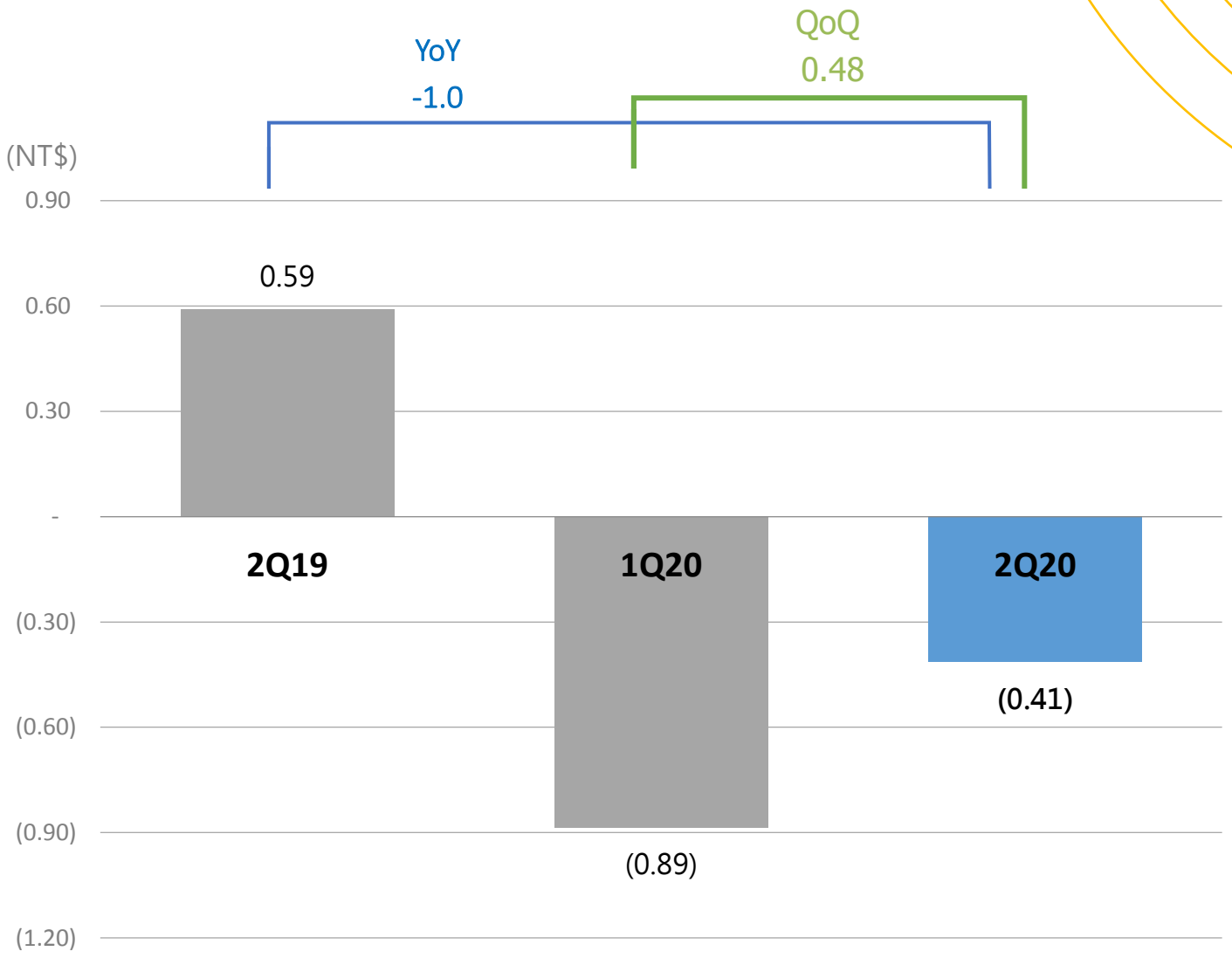
Consolidated Net Income (Loss)



Consolidated Net Profit Margin



Consolidated Earnings Per Share



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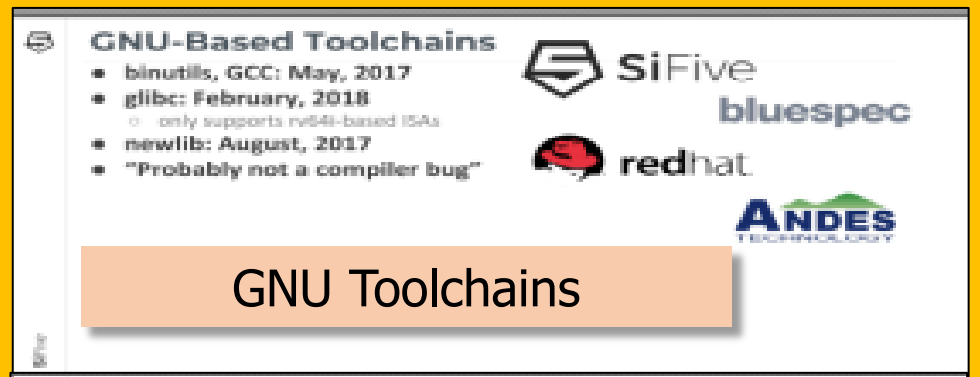
Product Applications

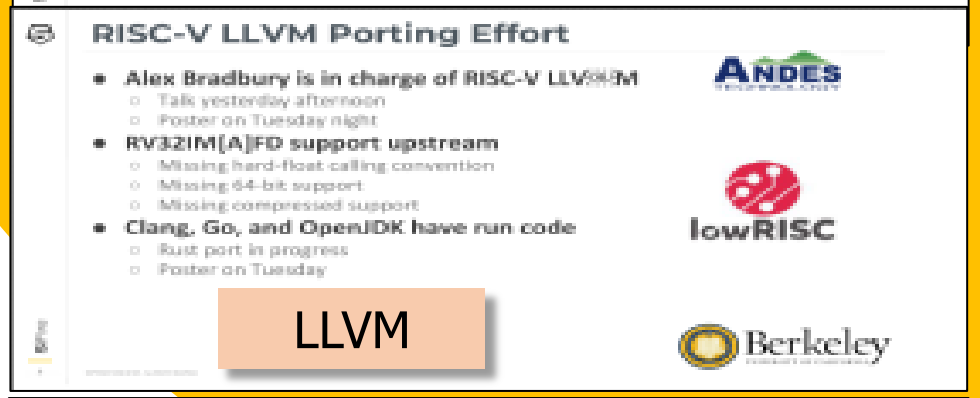
http://www.andestech.com

Andes Updates

- 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





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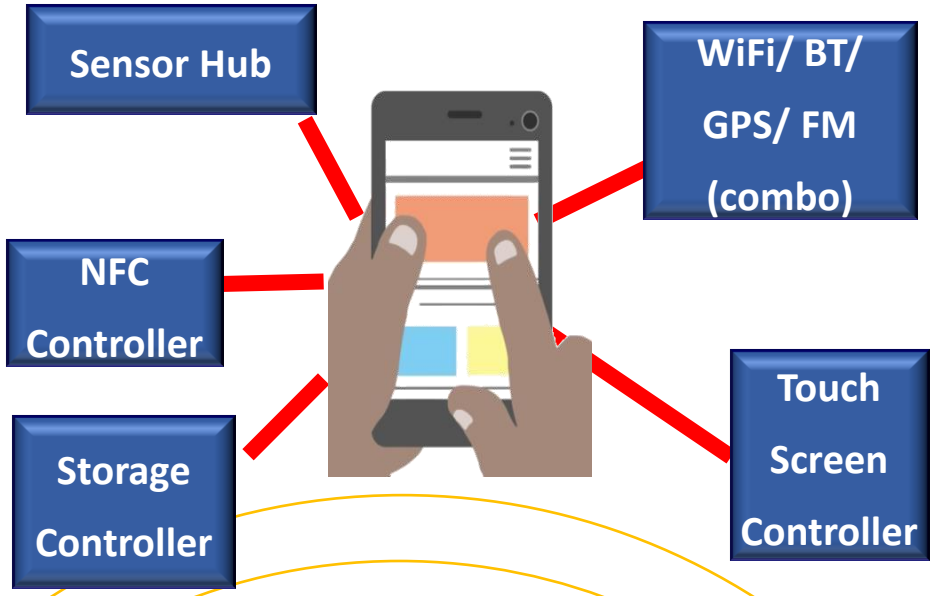
Andes Embedded in Various Applications



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, 802.11ax, AI processors** (using Andes Custom Extension, ACE)

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V5 Adoptions: From MCU to Datacenters

- **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

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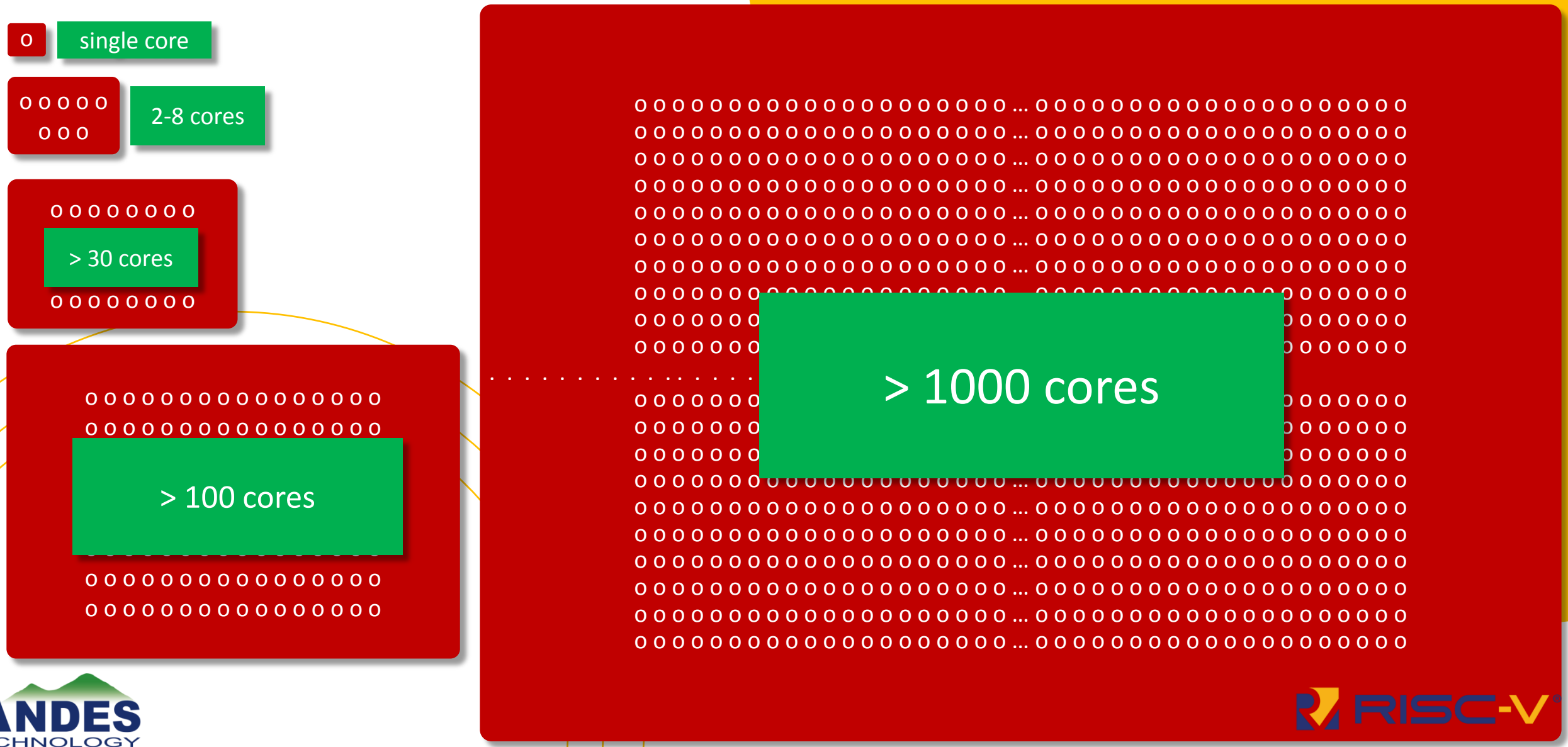
Andes RISC-V Cores Adopted in SoC



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RISC-V

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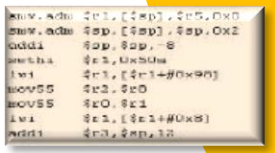
New Products and Ecosystems

http://www.andestech.com

Andes RISC-V Product Overview

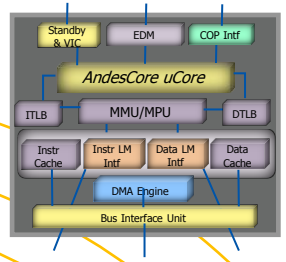
Best extensions to RISC-V

AndeStar™ Architecture V5

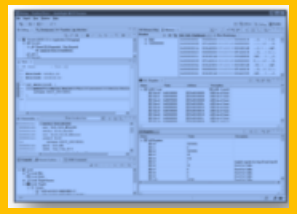


AndesCore™ Processors

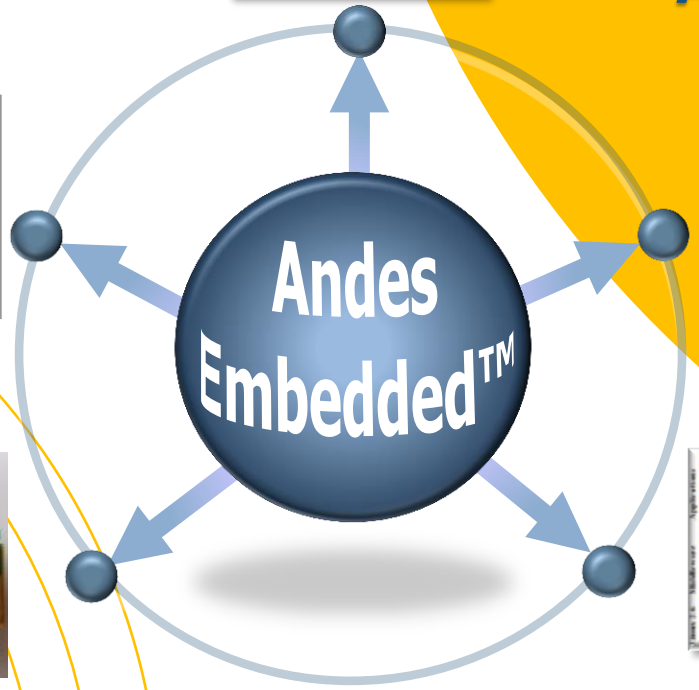
Highly optimized design with leading PPA



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

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Product Lines

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Andes RISC-V Product Roadmap

	RV32/RV64
Cache-Coherent 1-4 Cores	A25MP AX25MP
Linux with FPU/DSP	A25 AX25
Fast/Compact with FPU/DSP	N25F D25F NX25F
N22 2-stage (700 MHz)	5-stage (1.1 GHz)

Vector Ext.

27-Series:

Vector Ext.
MemBoost

NX27V
A27/AX27
and more.

5-stage (1.1 GHz)

Superscalar

45-Series:

Dual Issue
MemBoost

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

8-stage (1.2 GHz)

Benefits

- 512-bit SIMD raises MobileNet by 30x (CNN for mobile vision)
- boost performance by 50%
- Raise bandwidth to 3x; Cut latency by 40%

Applications:

- AIOT, Comm., ML/DL, Multimedia, Networking, Storage
- For data processing as well as control processing

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Andes V5 Architecture for All Levels of Computing

AndeStar™ V5 CPUs	Conventional Computing Architecture	Domain Specific Architecture (DSA)
RISC-V RV32/64 / 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

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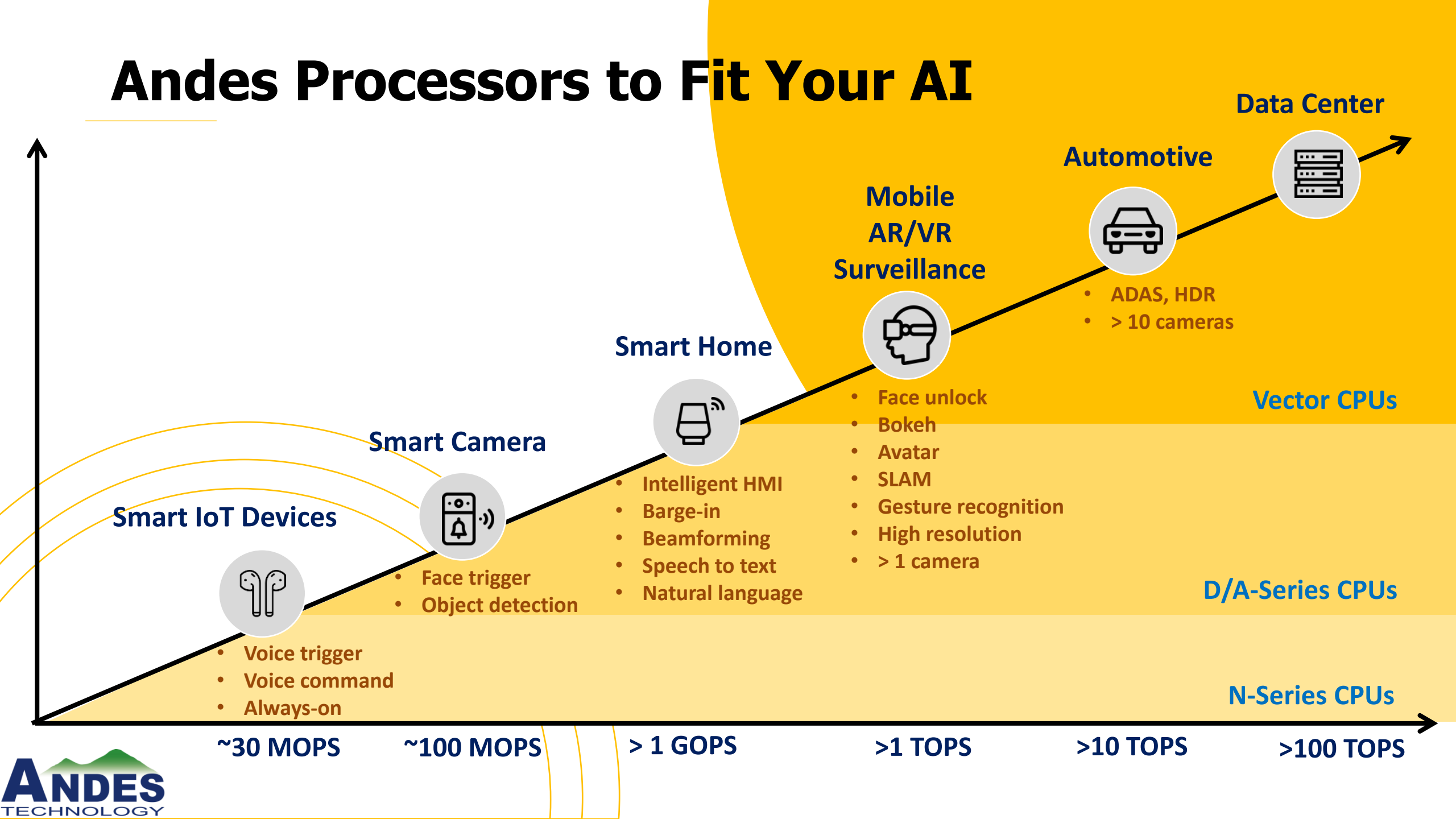
Andes Processors to Fit Your AI



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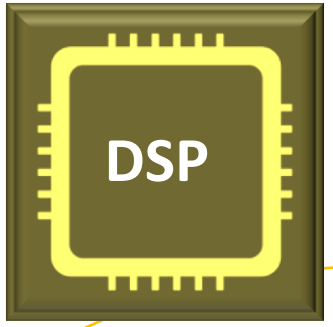
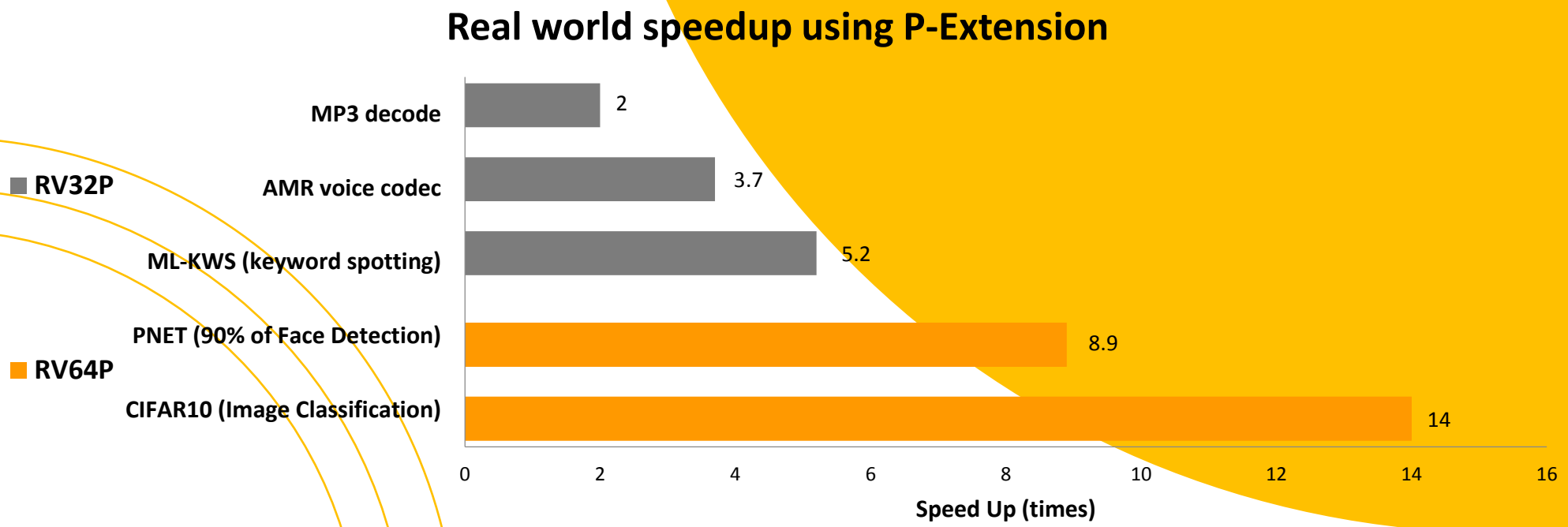
RISC-V DSP Extension

- 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

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NX27V One Vector 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)

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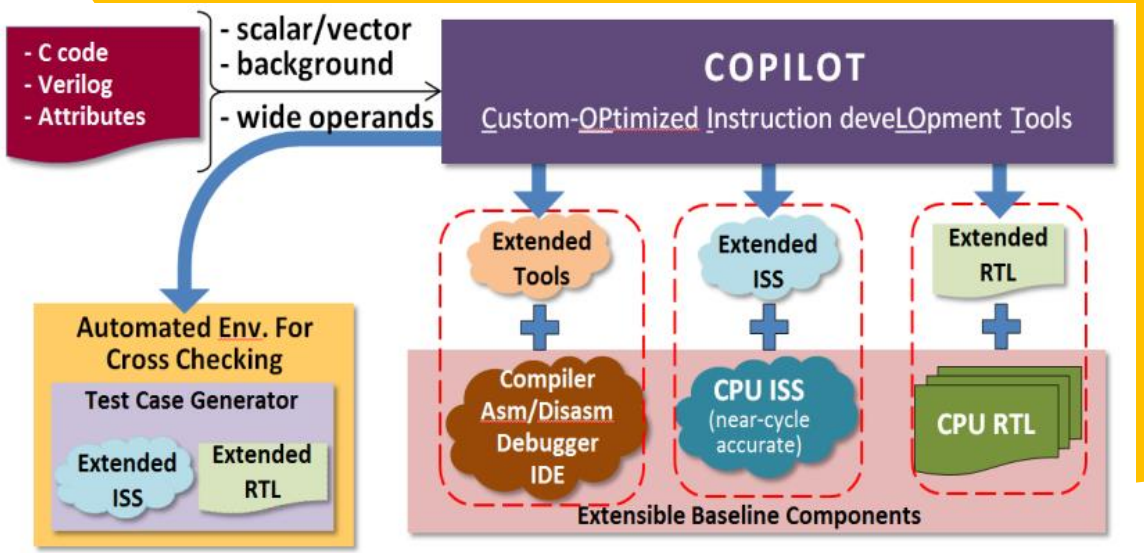
Andes Custom Extension

- ❖ 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



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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

*: Andes Custom Extension

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RISC-V®

Bring Andes Strength to RISC-V Cores

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

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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
  - Closely reviewing activities of other Task Groups

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Andes Helps Strengthen RISC-V Ecosystem

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

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Andes Position in RISC-V

- 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

Two Ecosystems: Andes and Knect.me

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knectme™

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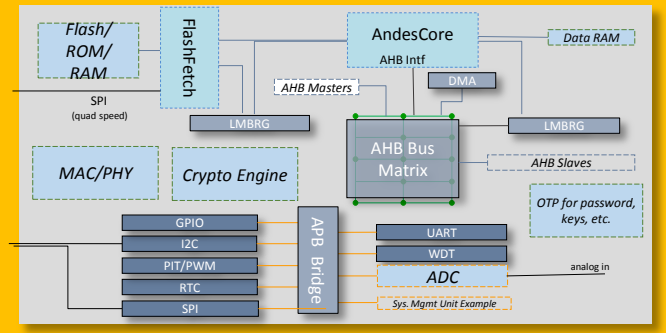
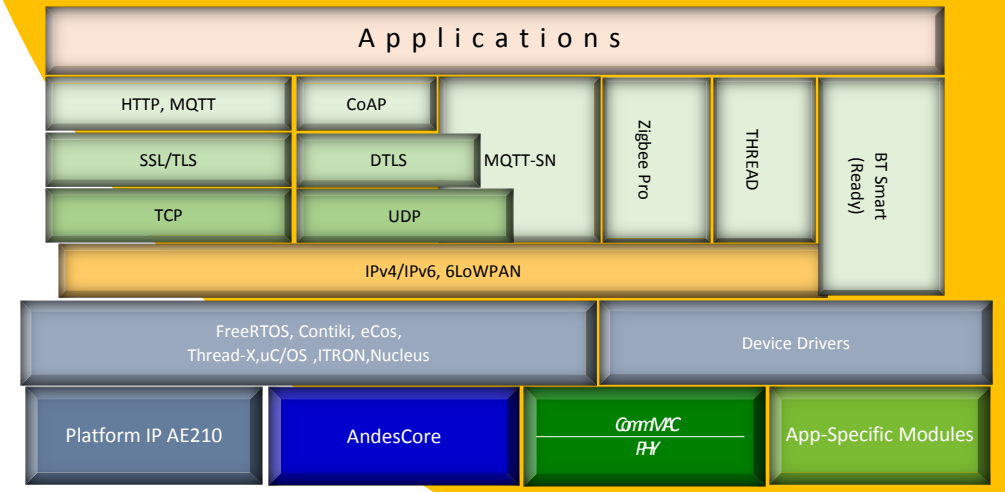
Knect.me™ Ecosystem

- **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





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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 1st year, including
    - 1 year e-service
    - FreeStart AE250 RTL
    - Corvette F1 FPGA board

For more info., please visit
www.andestech.com

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Event Promotion

RISC-V Summit in San Jose

2020: Diamond Sponsor

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Concluding Remarks

A Trusted Computing Expert

Andes Technology

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 Foundation new technology development, contributing and leveraging RISC-V eco-system.

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

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RISC-V®

Thank You

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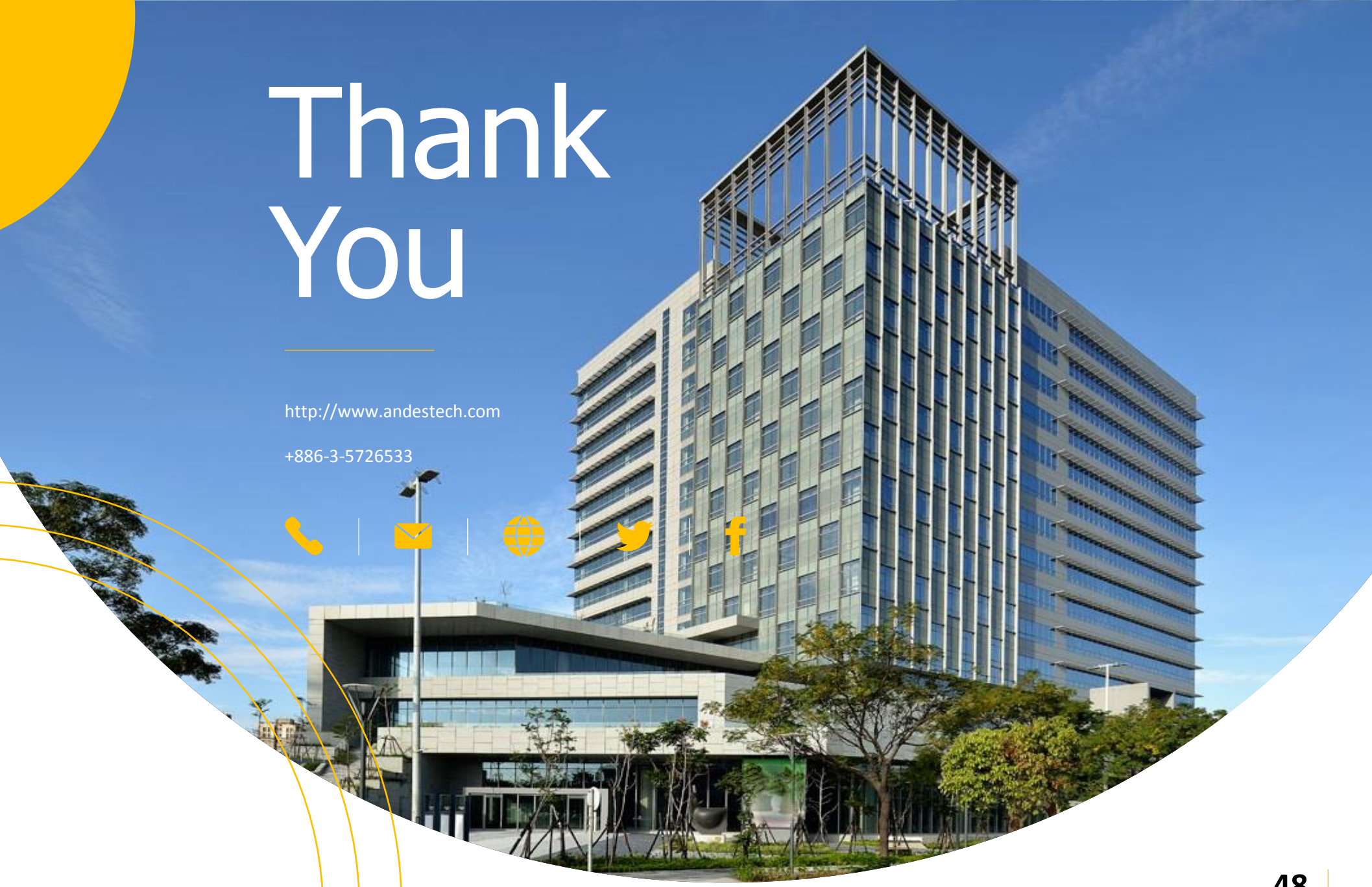

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