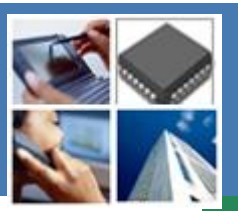
Andes Technology Corporation
2Q18 Investor Conference Report

Driving Innovations™

Stock #: 6533
2018/08/09

Safe Harbor Notice



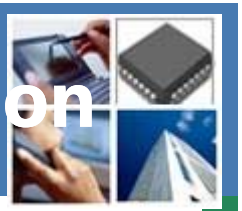
Except for the historical information contained herein, the matters addressed in this presentation are forward-looking statements that involve certain risks and uncertainties that could cause actual results to differ materially, including but not limited to weather, impact of competitive products and 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.

Agenda

- Overview of Andes Technology Corporation
- Operating Results
- Product Application
- New Products and Ecosystems
- Andes Awarded
- Concluding Remarks

Overview of Andes Technology Corporation



Andes Highlights

- Founded in March 2005 in Hsinchu Science Park, Taiwan, ROC.
- Core RD team from **AMD**, **DEC**, **Intel**, **MIPS**, **nVidia**, and **Sun** veterans.
- Under 150 people now; 80% are engineers.
- EETimes' Silicon 60 **Hot Startups to Watch** (2012)
- **TSMC OIP Award** "Partner of the Year" for New IP (2015)
- A founding member of **RISC-V Foundation** (2016)
- **IPO in Taiwan Stock Exchange** (March 2017)

Andes Mission

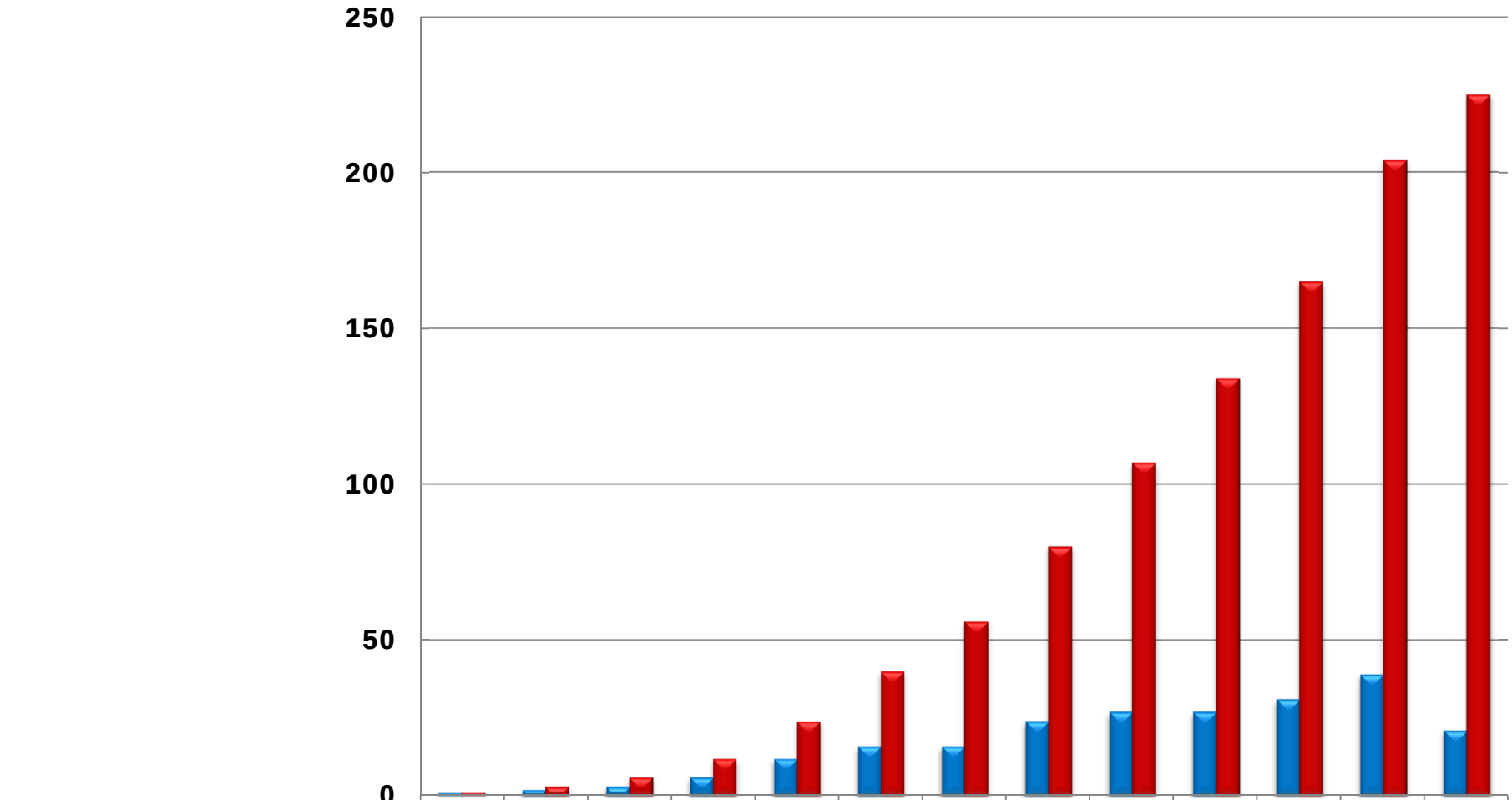
- Innovate **performance-efficient** processor solution for **low-power** SoC

Emerging Opportunities

- **Smart** and **Green** electronic devices
- **Cloud Computing, Artificial Intelligence** and **Internet of Things**

Operating Results

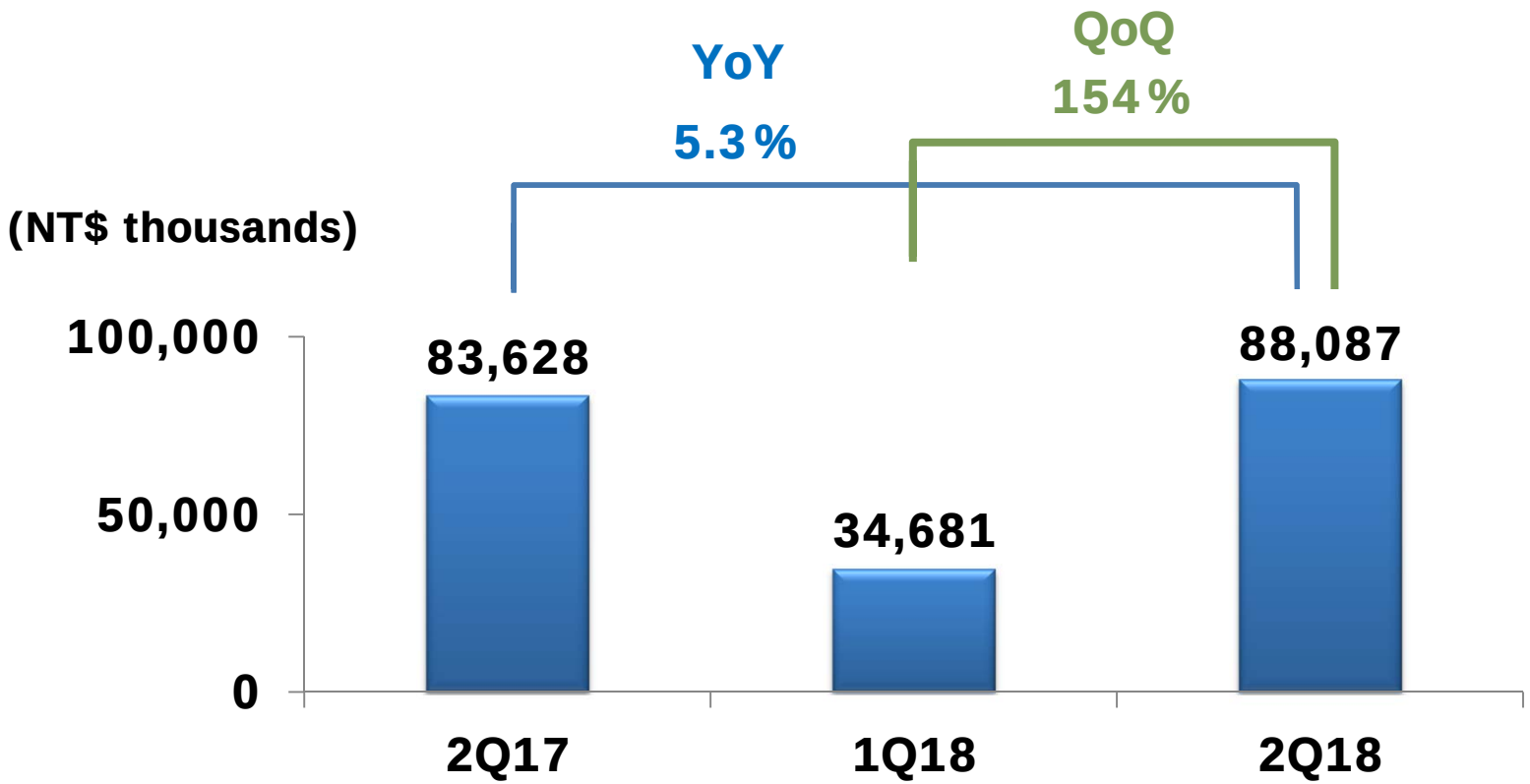
Agreement Growth Analysis



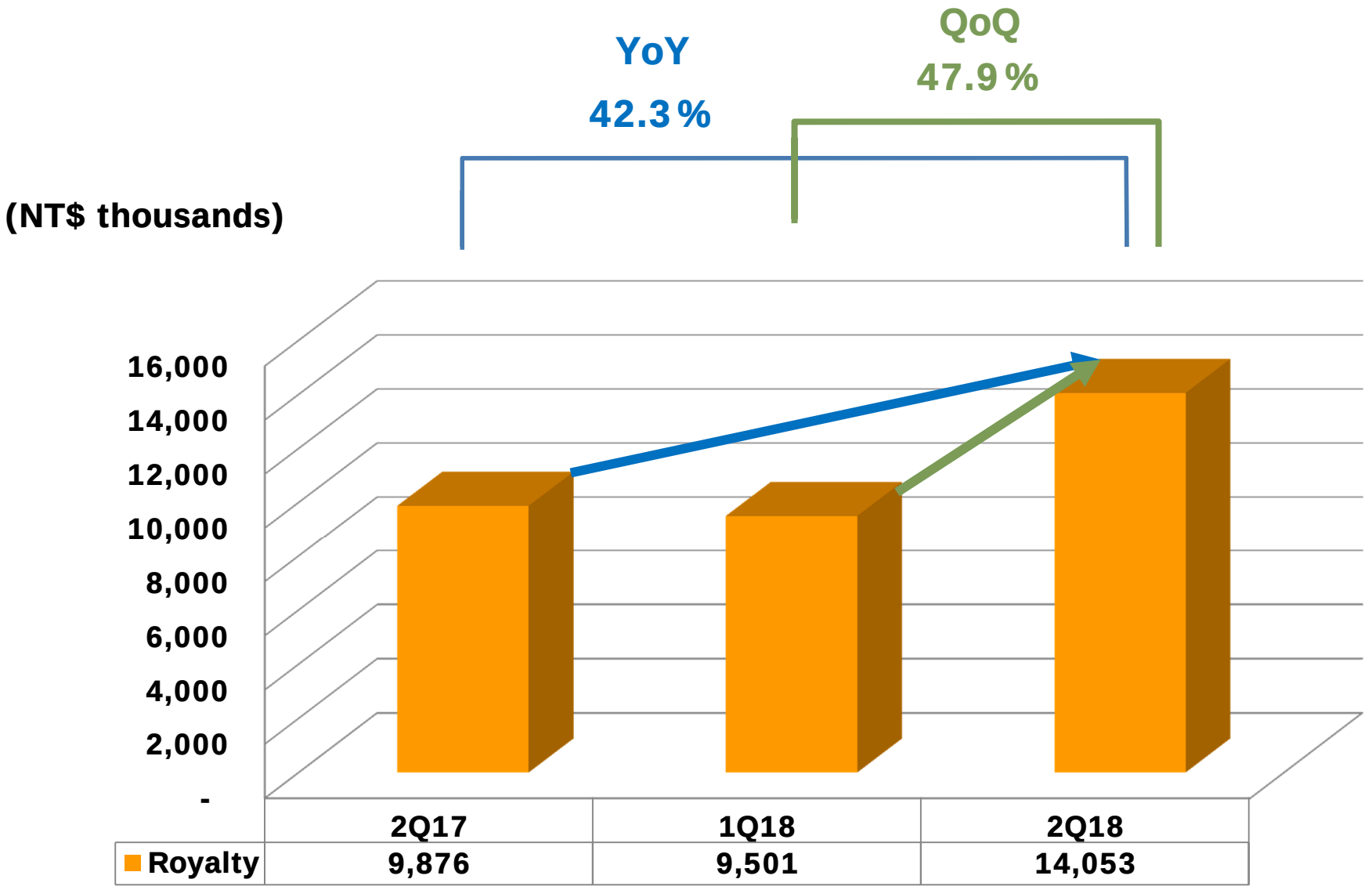
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	1H18
IP agreements	1	2	3	6	12	16	16	24	27	27	31	39	21
Accumulated IP agreements	1	3	6	12	24	40	56	80	107	134	165	204	225

Consolidated Revenue

- 2Q18 Revenue : NT$88.08M
- YoY: Up 5.3%
- QoQ: Up 154%



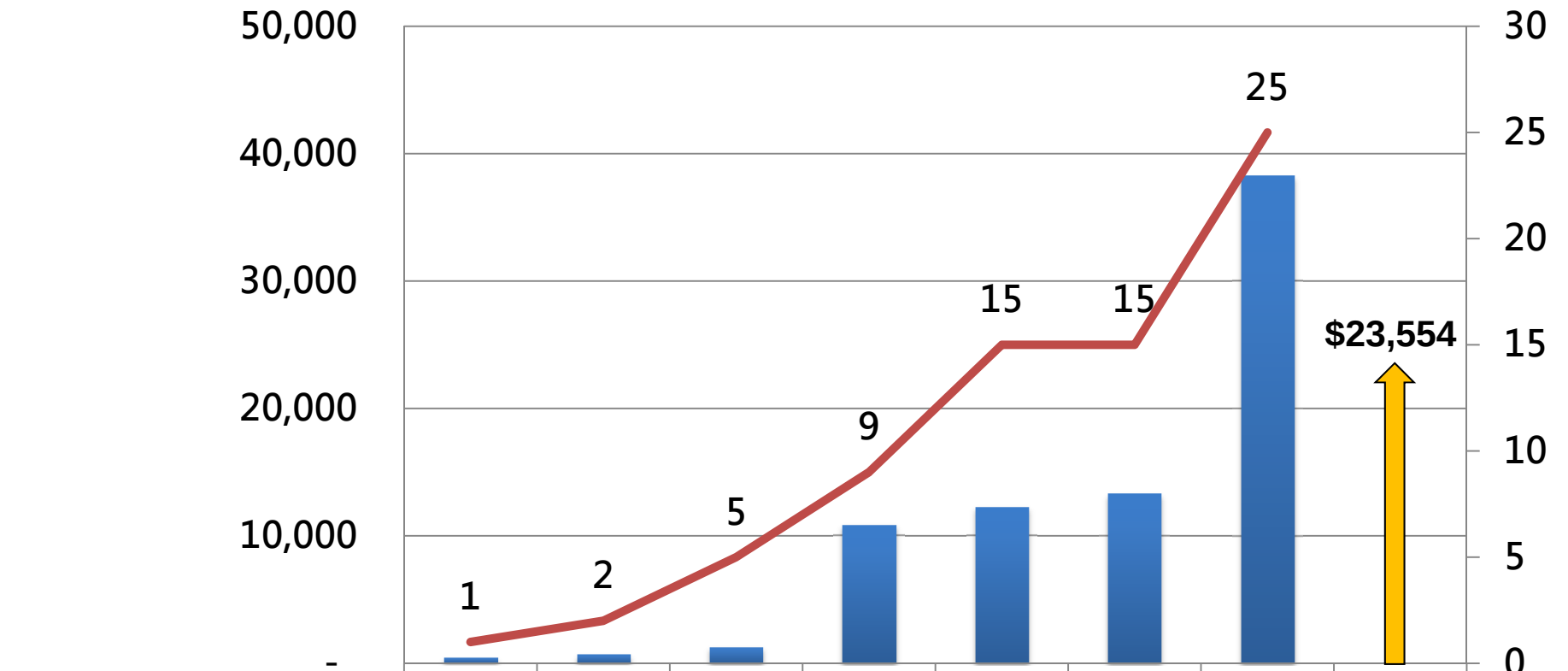
Royalty Analysis



Royalty Analysis

(NT$ thousands)

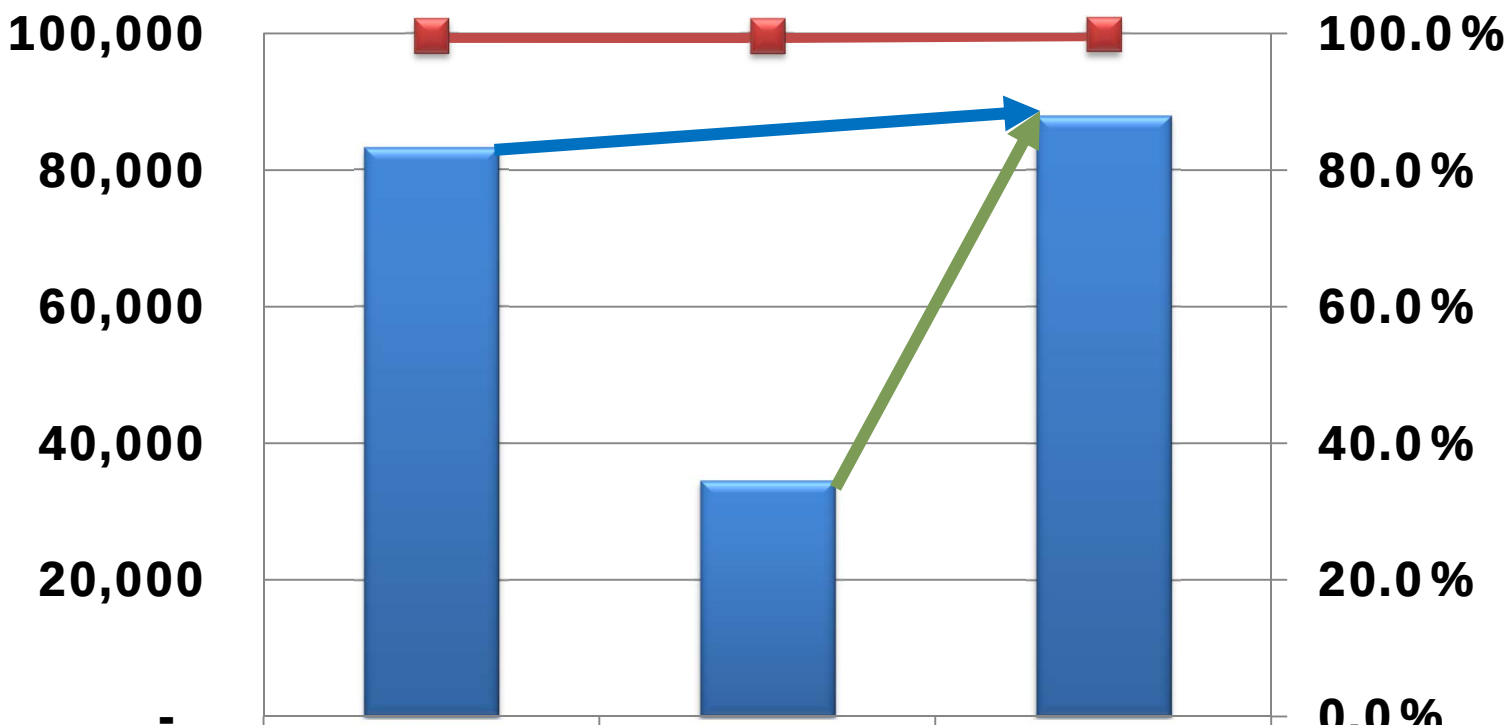
: 2018 H1 royalty collected



	2011	2012	2013	2014	2015	2016	2017	2018
Royalty	445	660	1,285	10,819	12,232	13,320	38,287	
Customer numbers	1	2	5	9	15	15	25	

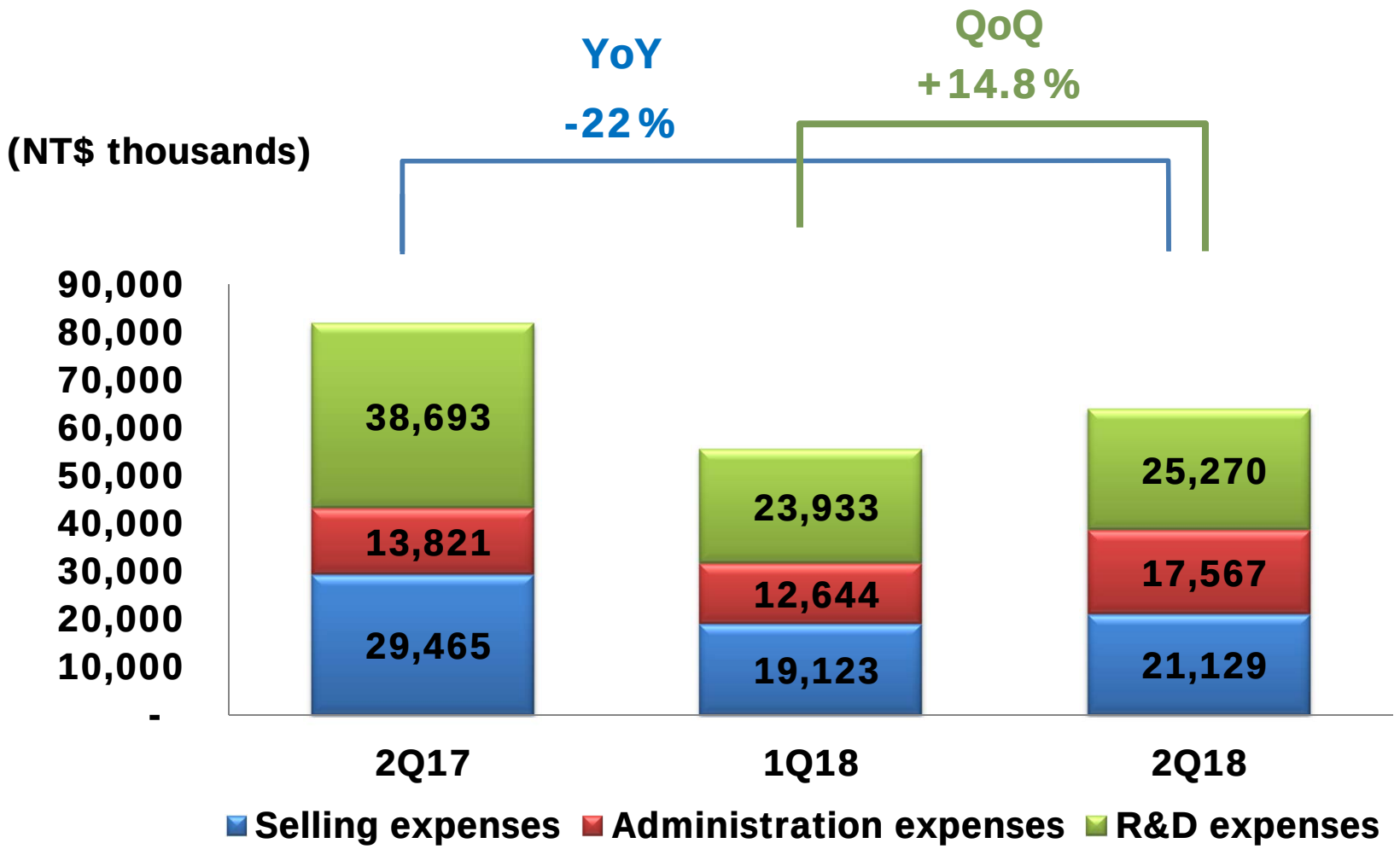
Consolidated Gross Margin

(NT$ thousands)

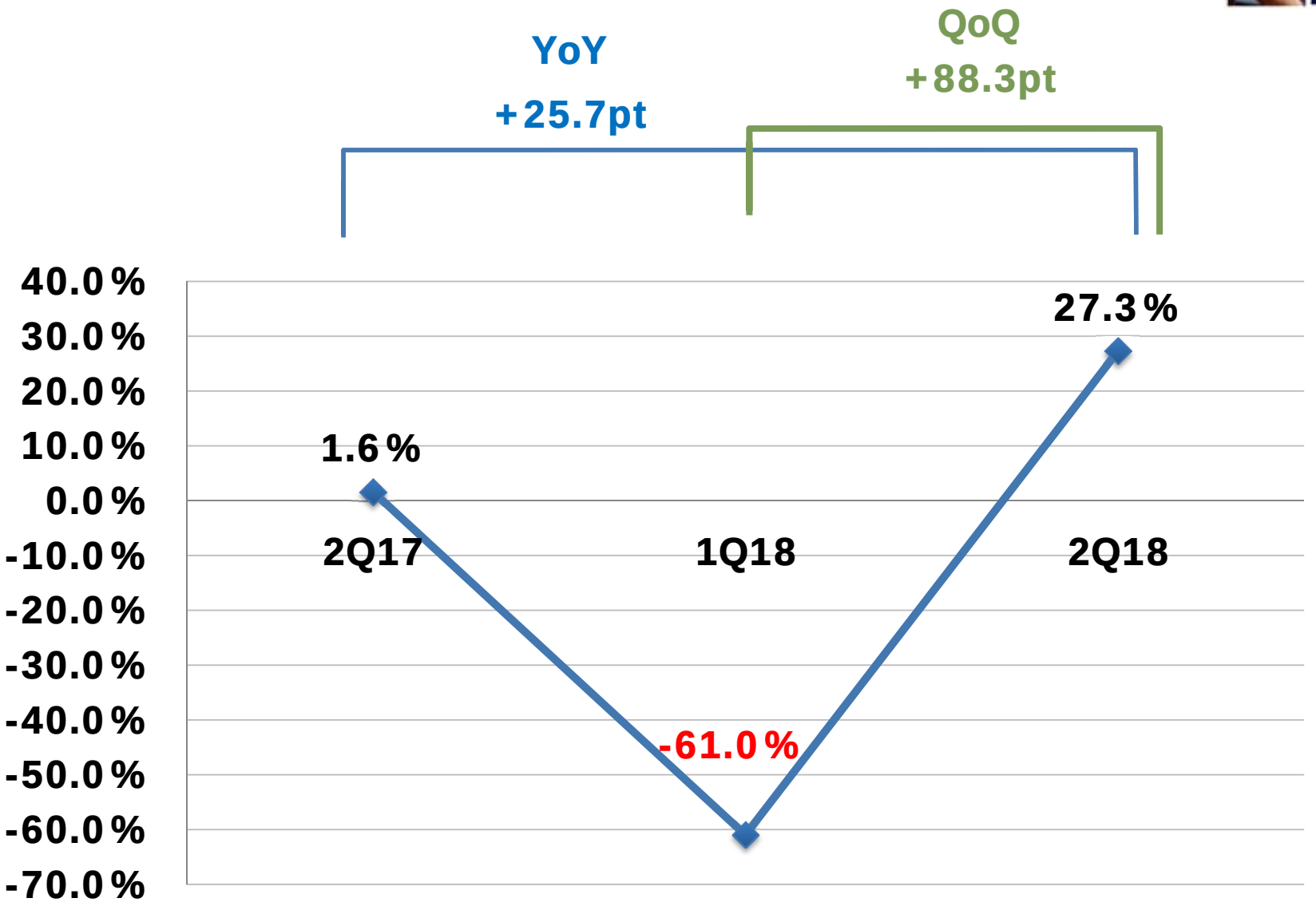


	2Q17	1Q18	2Q18
Gross Profit	83,341	34,548	88,001
Gross Margin	99.7%	99.6%	99.9%

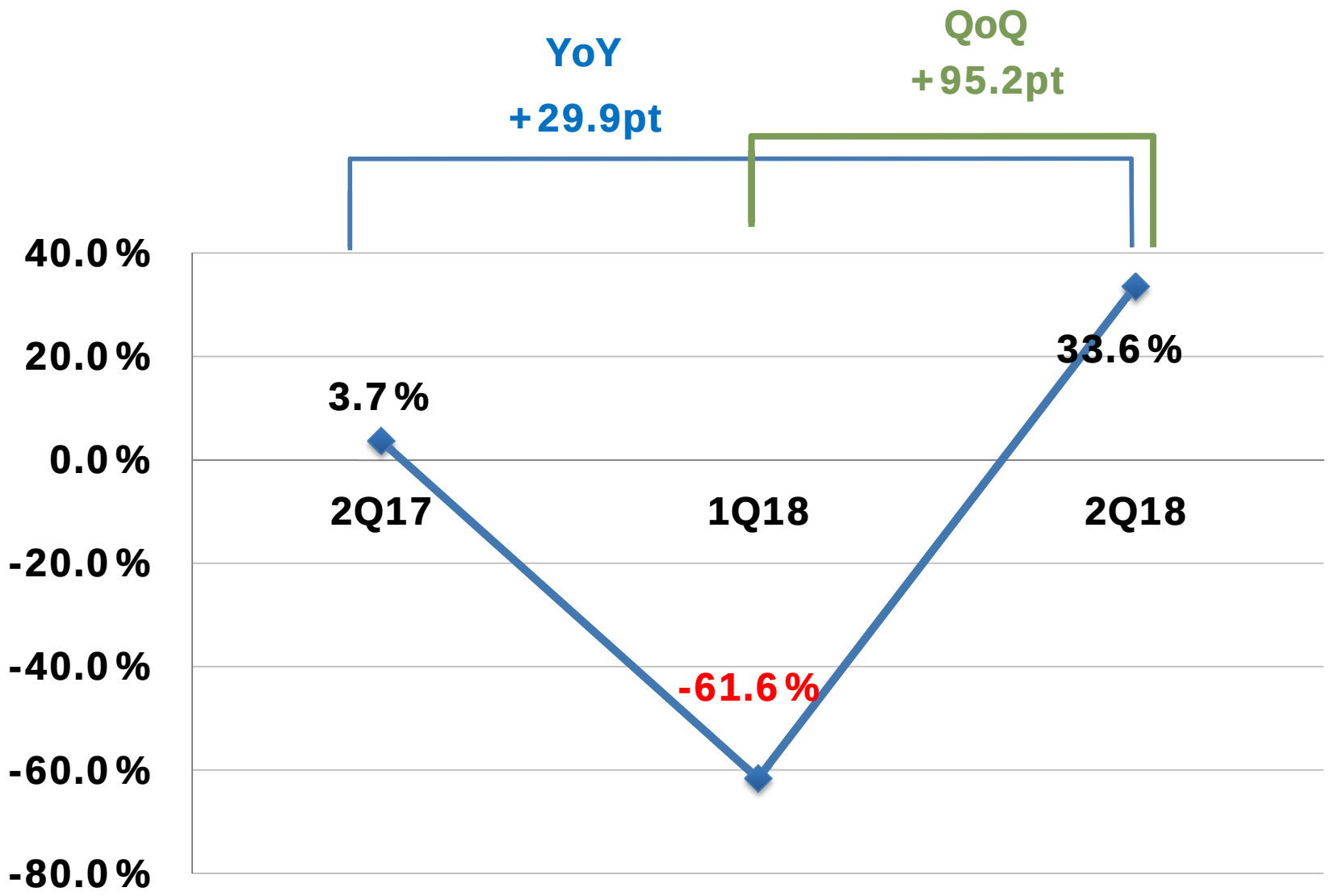
Consolidated Operating Expenses



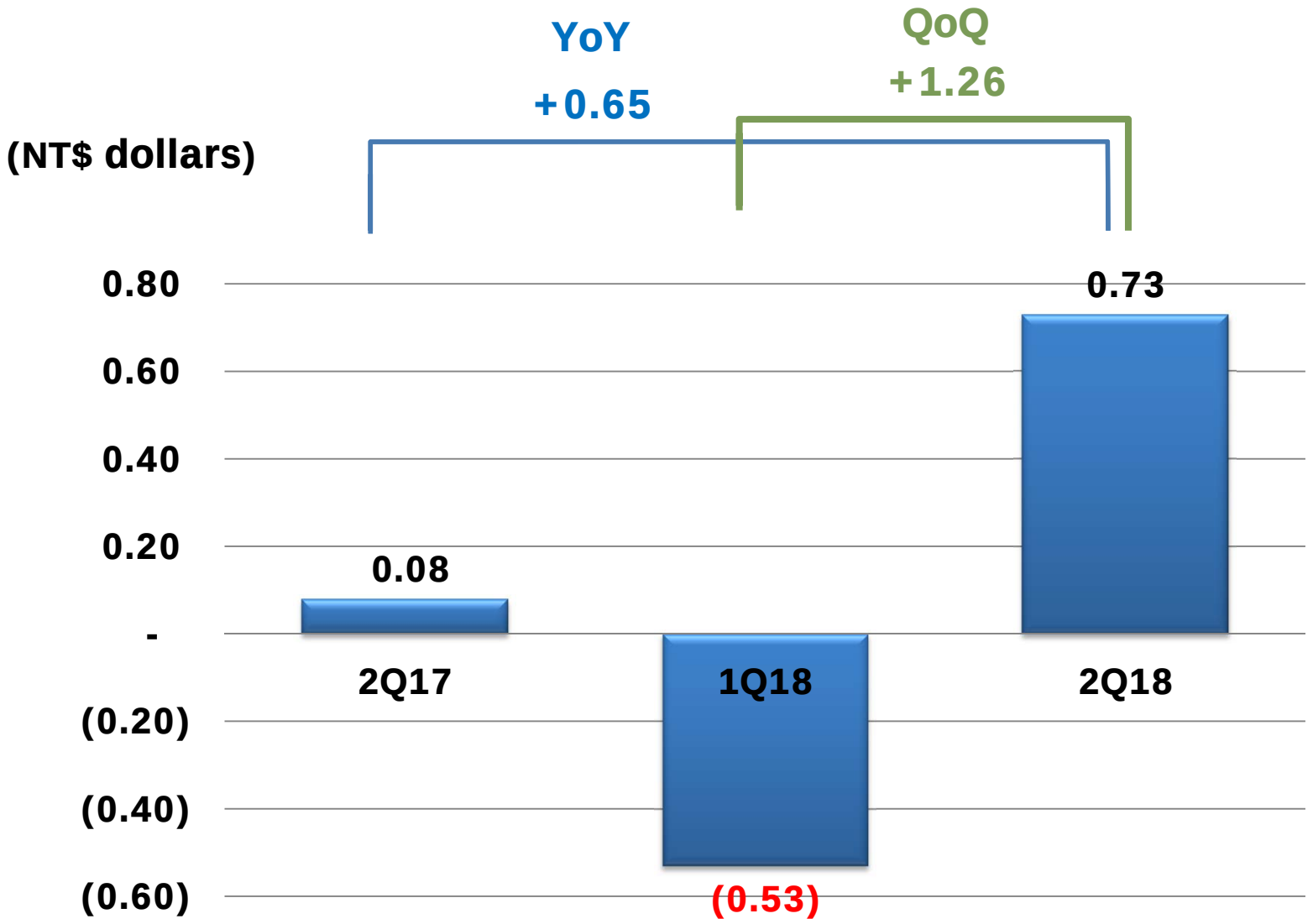
Consolidated Operating Margin



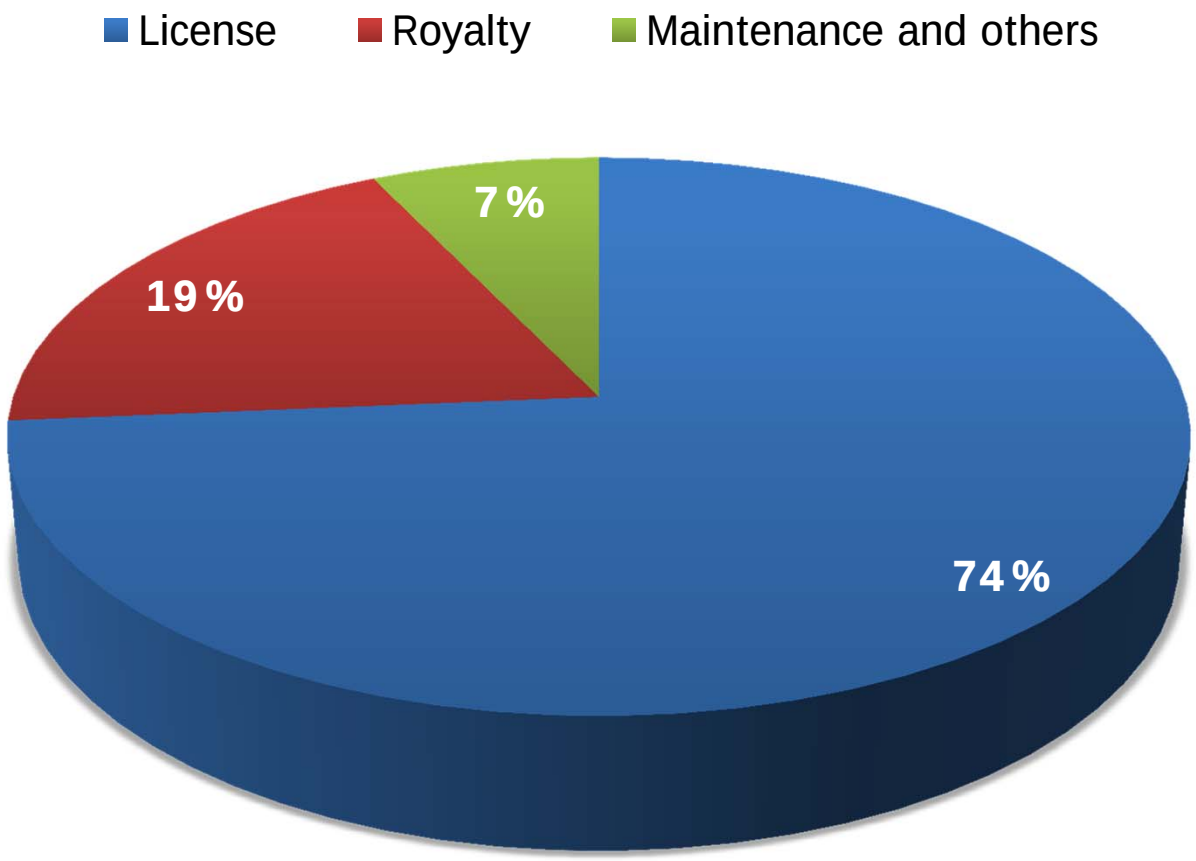
Consolidated Net Profit (Loss) Margin



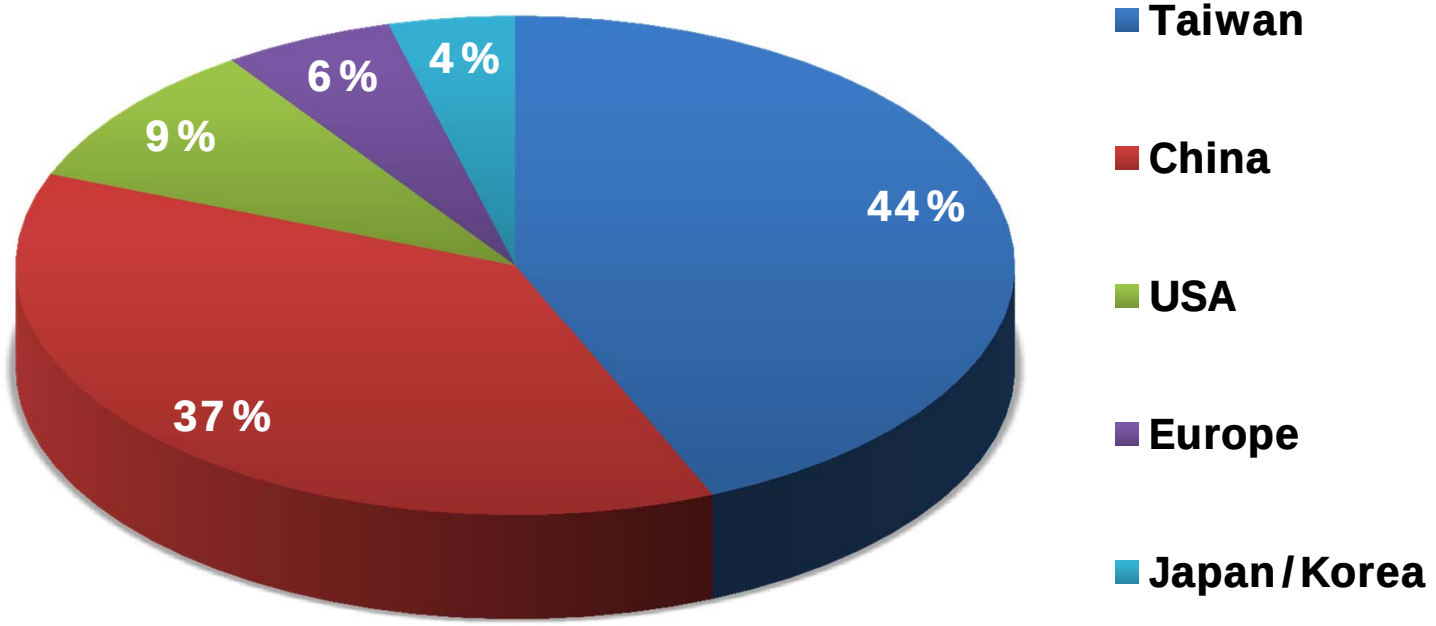
Consolidated Earnings Per Share



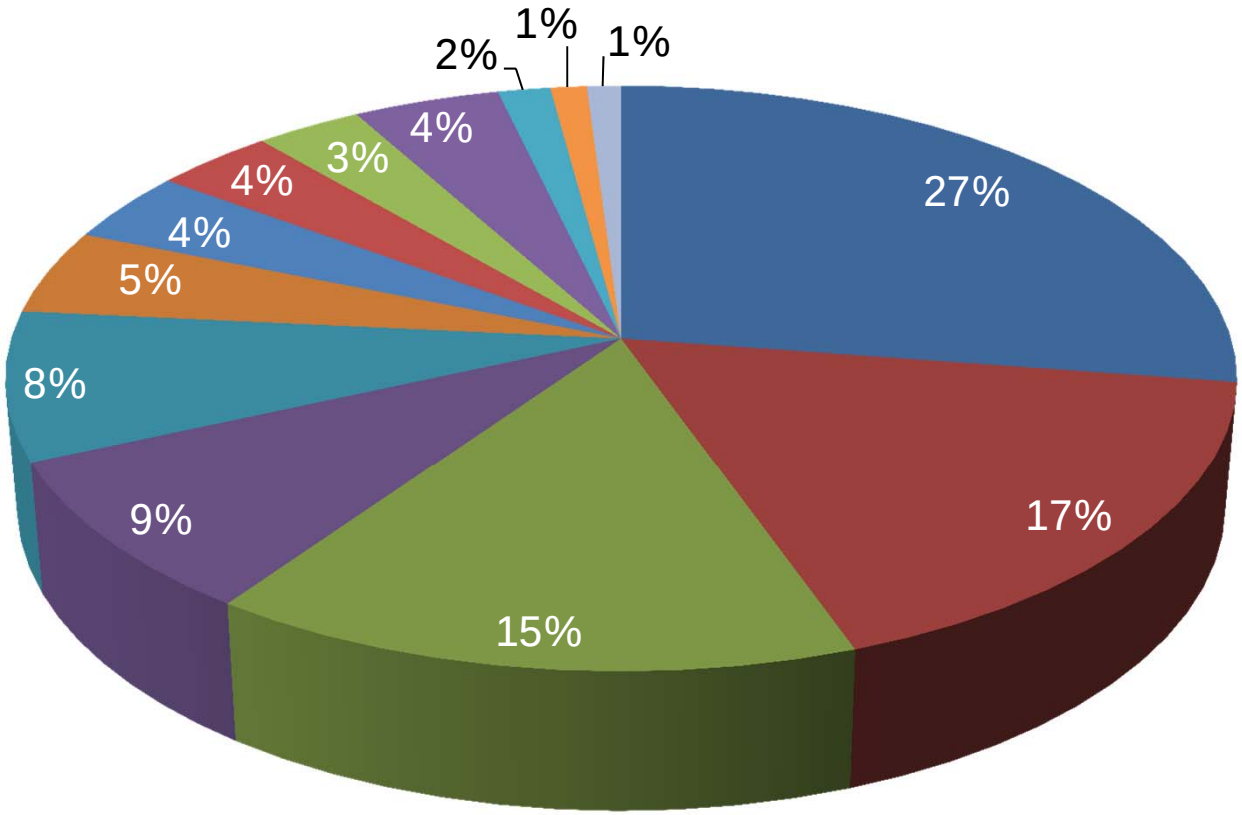
1H18 Revenue Analysis by Payment Model



1H18 Revenue Analysis by Region

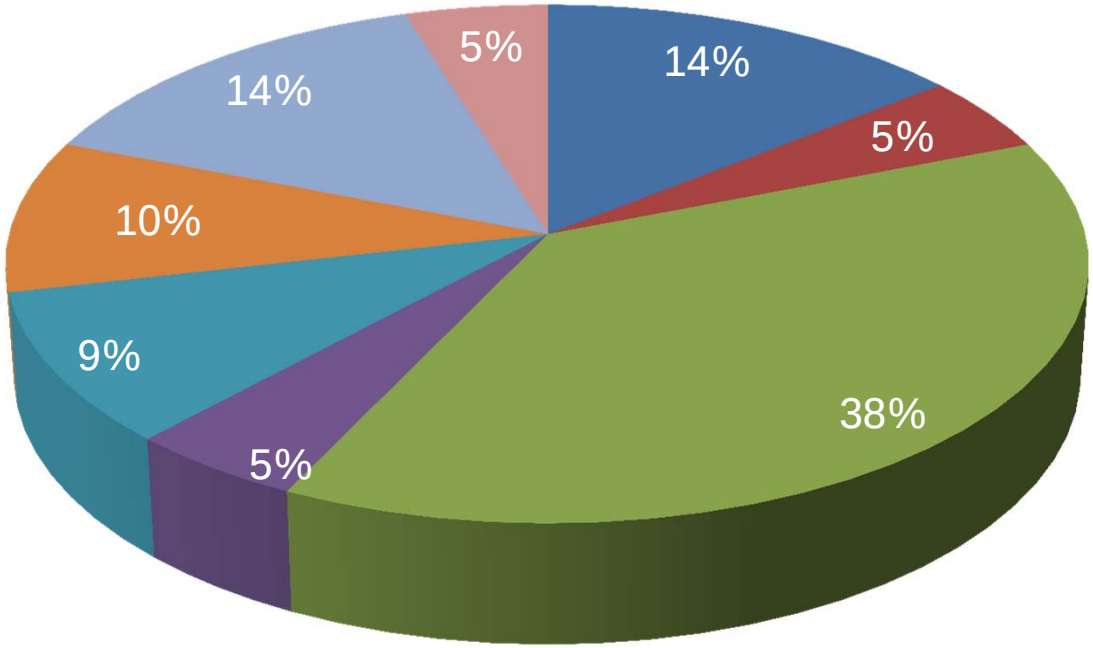


1H18 Revenue Analysis by Product



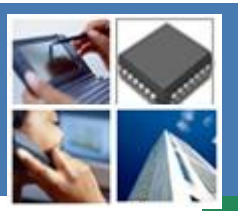
- N10
- N9
- N25
- N8
- N13
- D10
- D15
- NX25
- AX25
- Platform IP
- N7
- A25
- N6

1H18 Customer Application Analysis



*Based on agreements number

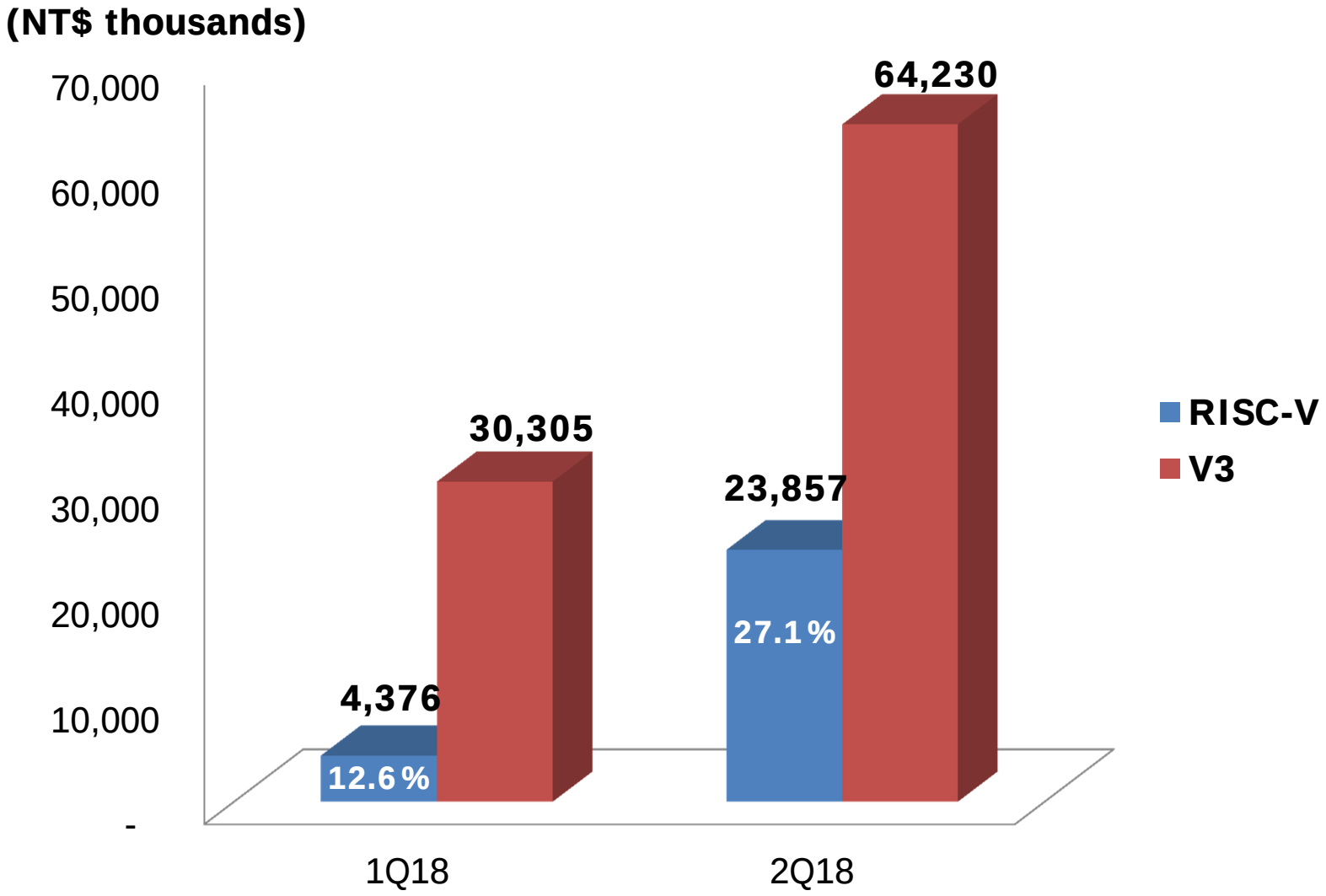
1H18 Design Win



- Agreements may sign for H1: 20 ~ 23 reported, now 21

	Jan - June	Subtotal
N7, N8, N9	Mainland x 4, US x 2, Korea x 3, Taiwan x 1	10
N10, D10, N13	Mainland x 4, US x 1, Taiwan x 1	6
D15	Europe x 1	1
N25, NX25, AX25	Mainland x 2, US x 1, Taiwan x 1	4

RISC-V Revenue Share Ramping



Product Application

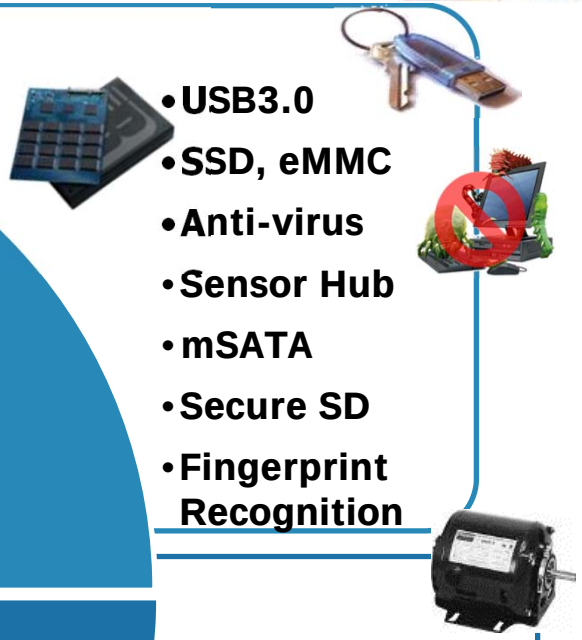
Rich Customers' Applications

Consumer

- Touch Screen
- eBook / eDictionary
- Power management
- Bio-medical device
- CMMB
- MCU
- TCON

Storage & Sensor

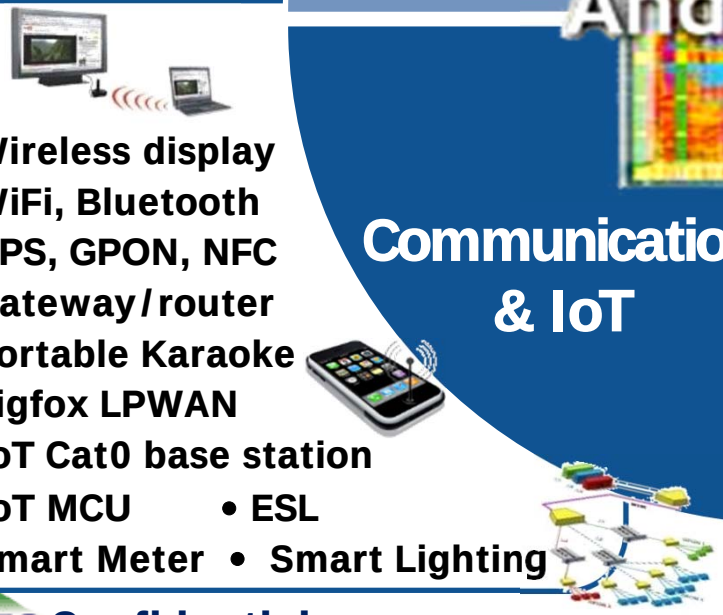
- USB3.0
- SSD, eMMC
- Anti-virus
- Sensor Hub
- mSATA
- Secure SD
- Fingerprint Recognition



Andes Core™

Communication & IoT

- Wireless display
- WiFi, Bluetooth
- GPS, GPON, NFC
- Gateway / router
- Portable Karaoke
- Sigfox LPWAN
- IoT Cat0 base station
- IoT MCU
- ESL
- Smart Meter
- Smart Lighting



Industrial & Video

- Motor Control
- Wireless Charger
- Surveillance
- Barcode scanner
- ADAS
- VEDR
- 4K2K CODEC
- 8K4K CODEC

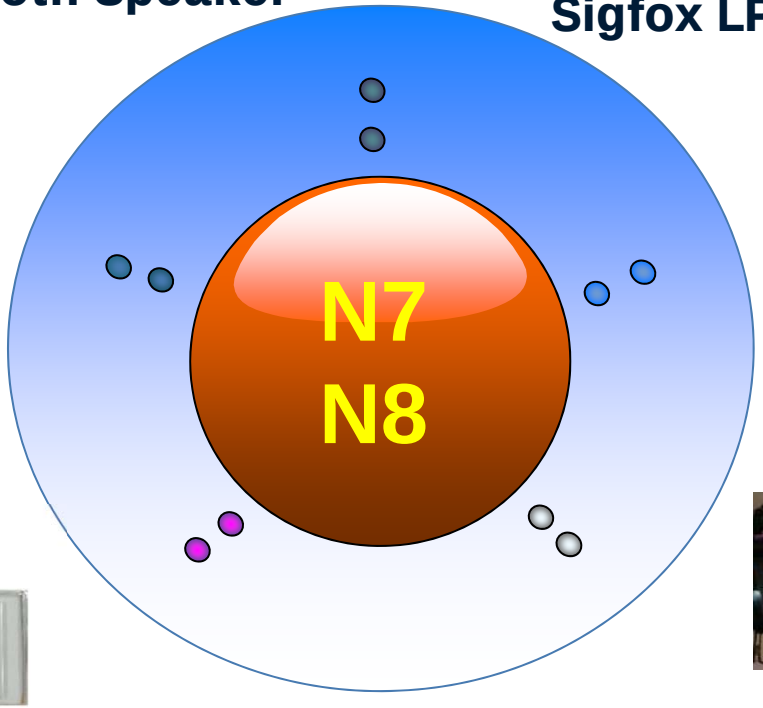
and more.....

IoT Application -1

Bluetooth Speaker

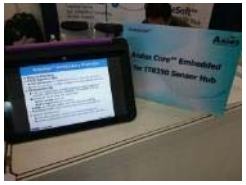
Sigfox LPWAN

Healthcare device



Wearable device

Electronic price tags

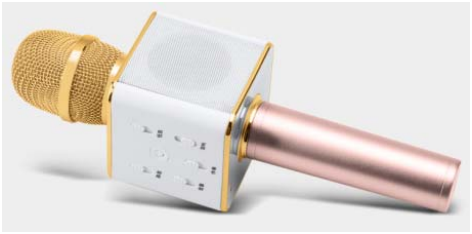


Sensor Hub

IoT Application -2

Wearable devices

Drone



Portable Karaoke

N9
D10

WiFi / GPS / FM / Bluetooth combo

GPS / Beido in shared bikes

Contactless payment (NFC)

Automotive Applications

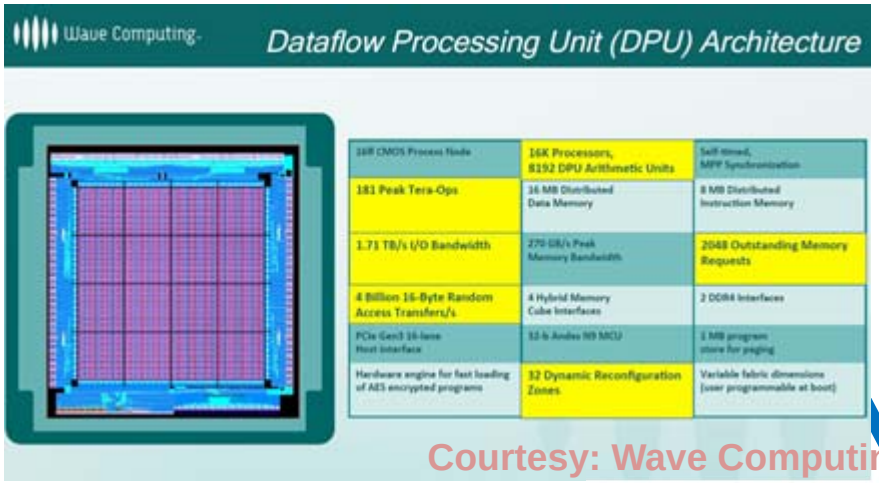
- **N13**
  - Calibration of AVM (Around View Monitoring) in NISSAN New X-Trial

Andes Core™

- **N10**
  - CAR Event Recorder
  - ADAS

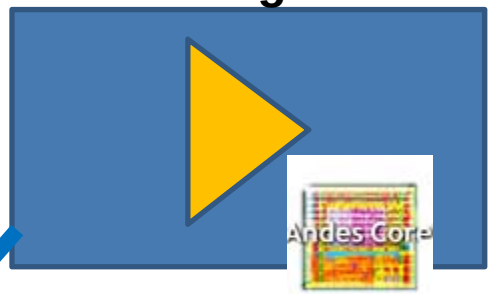
- **D10**
  - ADAS

AI Applications



Courtesy: Wave Computing

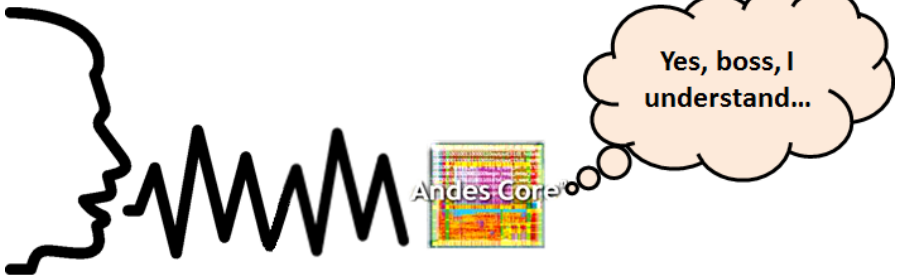
◆ **D15F**
Video recognition



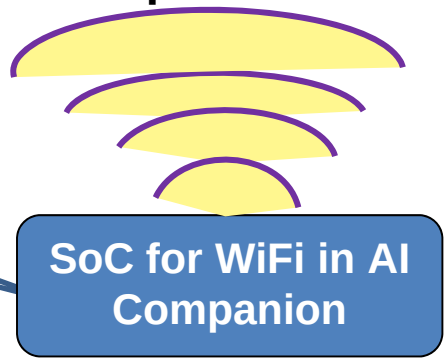
◆ **N9**
Dataflow Processing

Andes Embedded™

◆ **D10**
Voice Recognition



◆ **N9**
AI companion

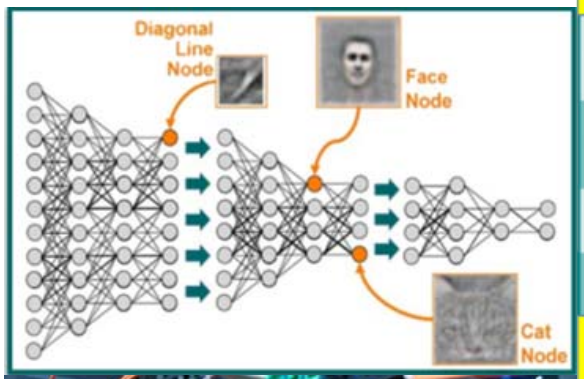


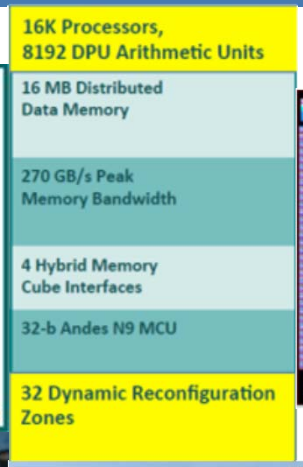
ANDES TECHNOLOGY

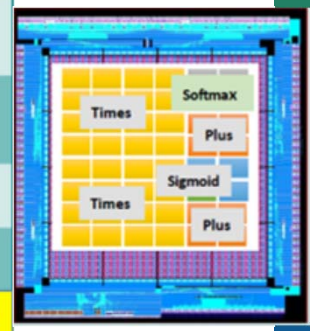
SoC for WiFi in AI Companion

Emerging Applications

- AI
  - Deep Learning
- Next generation TV
- Network Engine
  - Router
- Drone
- Robot
- ...
- Many new applications are emerging







New Products and Ecosystems

Product Lines

- New Core released in Andes Embedded Forum 2018

ANDES

RISC-V

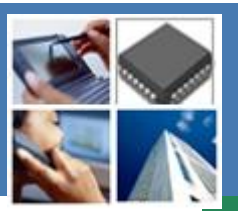
V5 AndesCore™ Processors

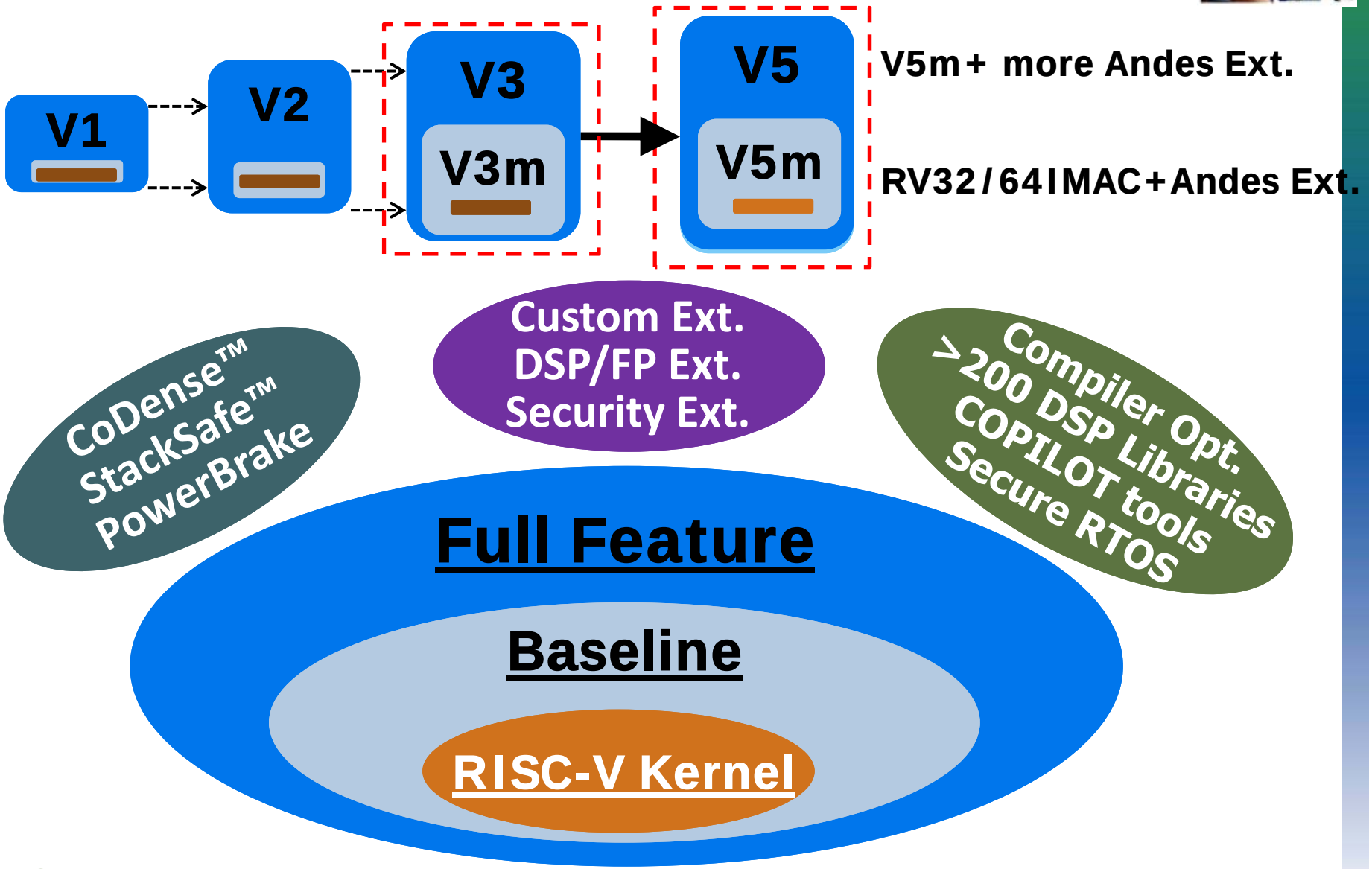
N25/NX25

N25F/NX25F

A25/AX25

AndeStar™ V5: New Generation of ISA Kernel





AndesCore™ V5 families

RISC-V

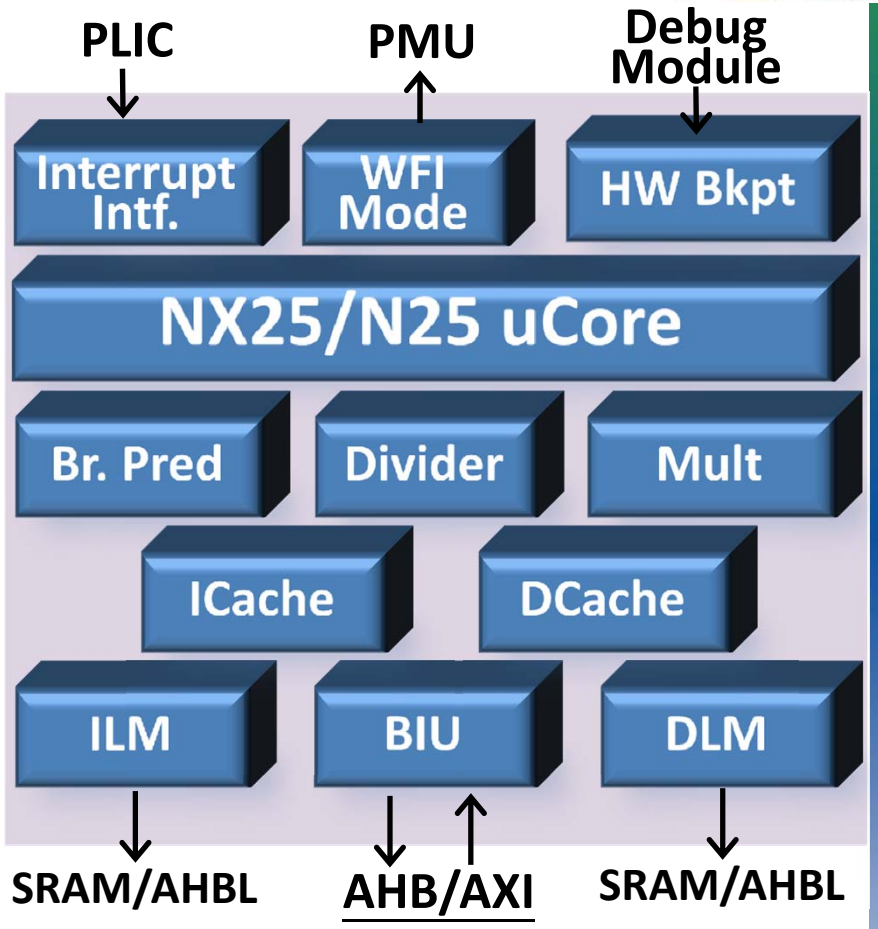
Ultra Performance	CoDense™ StackSafe™ PowerBrake	Next Generation V5 (V5m with adv. features)	
Enhanced Features	A25* V5m, 32-bit 5-stage, 1GHz, MMU/MPU, PMP, FPU, ACE...	AX25* V5m, 64-bit 5-stage, 1GHz, MMU/MPU, PMP, FPU, ACE...	I/D Local Memories
	N25F* V5m, 32-bit 5-stage, 1GHz PMP, FPU, ACE...	NX25F* V5m, 64-bit 5-stage, 1GHz PMP, FPU, ACE...	I/D Caches
			Branch Prediction
Modern Architecture	N25 V5m, 32-bit 5-stage, 1GHz Compact	NX25 V5m, 64-bit, 5-stage, 1GHz Compact	64-bit AXI/AHB
			ECC

◆ 28HPC RVT, SS, 0.81V, 0C, with I/O constraints. * Available now

Baseline V5 AndesCore™: N25/NX25

➔ **Fast-n-small cores for control tasks** in storage, networking, AI, and more.

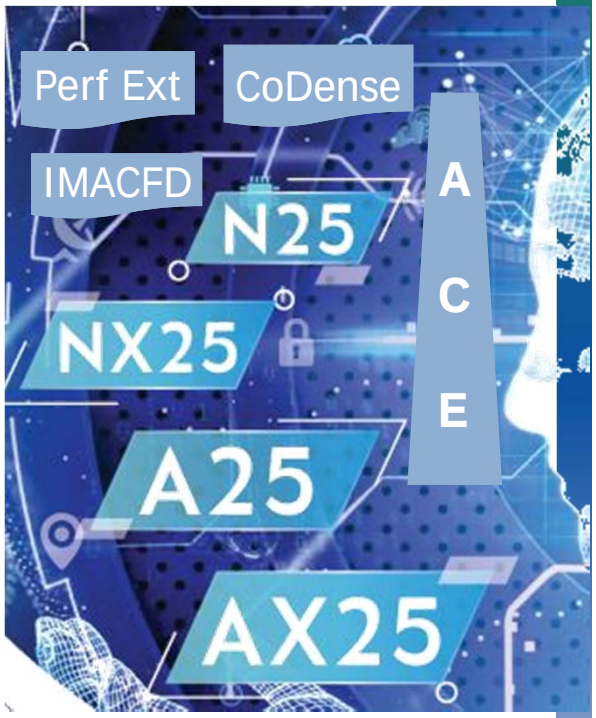
- **N25: 32-bit, NX25: 64-bit**
  - From scratch for the best PPA
- **AndeStar V5m ISA**
  - Superset of RV-IMAC
- **5-stage pipeline**
- **Configurable multiplier**
  - Sequential or parallel
- **Optional branch prediction**
- **Flexible memory subsystem**
  - I/D Local Memory (LM): to 16MB
  - I/D caches: to 64KB
  - Optional parity or ECC
- **Bus interface**
- **JTAG debug module**



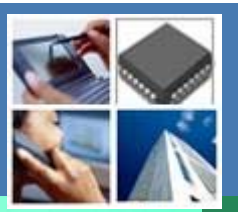
- **N25 sample config. @ 28HPC:**
  - Small: 37K gates, 1GHz (worst)
  - Large: 159K gates, 1.15GHz (worst)

New V5 AndesCores Coming this Summer

- **4 New 25-series:** maintain the frequency
  - **N25F/NX25F**: N25/NX25 + FP support
  - **A25/AX25:** N25F/NX25F + MMU + S-mode
- **High-performance FP support:**
  - IEEE754-compliant single/double precisions
  - Multiply, add/sub, multiply-accumulate:
    - 1-cycle issue rate, 4-cycle latency
  - Divide/sqrt: 15 cycles for SP, 29 cycles for DP
    - Run in the background
  - **Half-precision** load/store for machine learning
- **MMU support:**
  - Supporting SV{32, 39, 48}
  - Page size: {Kilo, Mega, Giga, Tera} page
  - 4- or 8-entry microTLBs (ITLB,DTLB)
  - 4-way 32~128-entry Shared-TLB (STLB)



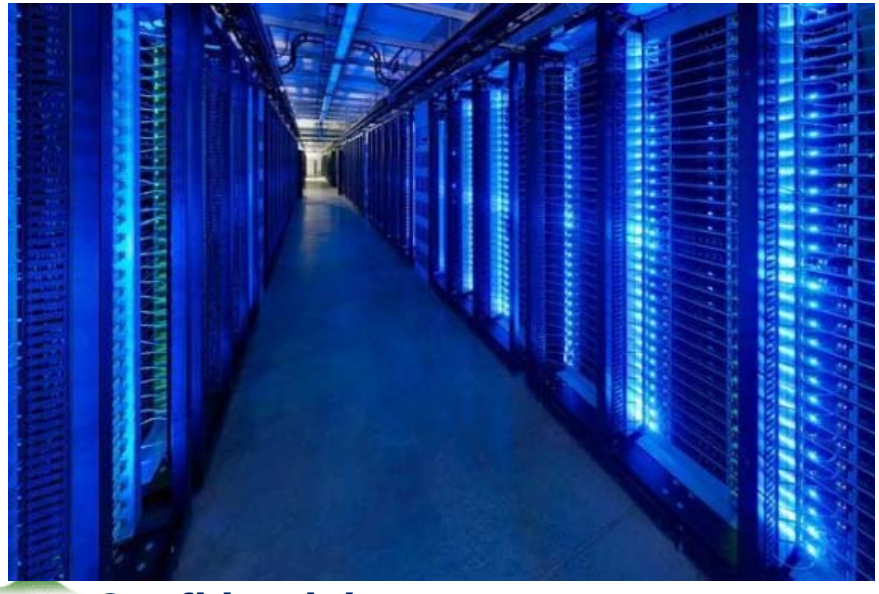
Andes Position in RISC-V

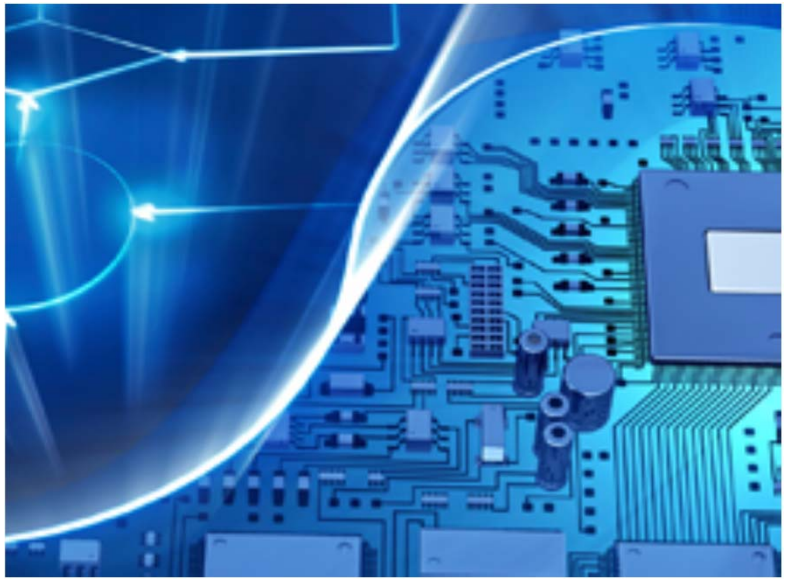


- Complete product portfolio
- Reliable RISC-V core IP business partner
- RISC-V core that runs Linux
- Extreme low power consumption, high computing efficiency
- World's only Customer-Extension Capable RISC-V Core

YTD RISC-V Design Win

- NX25: Enterprise SSD (Taiwan)
- N25, AX25: FPGA for AI (US)
- N25: AI (China)
- AX25: FPGA for AI (China)
- Six design service providers joined Andes RISC-V Easy Start Program: US x 2, Korea x 1, China x 1, Taiwan x 2





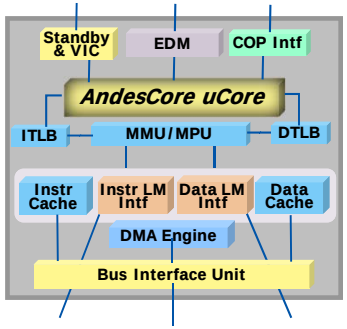
Summary of AndesCores vs. Competitors

AndesCore™	AndesCore / Competitor Power Efficiency[1] (DMIPS/mW)	Competitors
N7	+42%	Cortex-M0+
N8	+43%	Cortex-M3
N9	+43%	Cortex-M3
D10	+48%	Cortex-M4
N13	+185%	Cortex-A5
N13	+45%	Cortex-R4
D15F	+121%	Cortex-M7

1. Power Efficiency is DMIPS/MHz divided by power consumption (mW/MHz) when running Dhrystone.

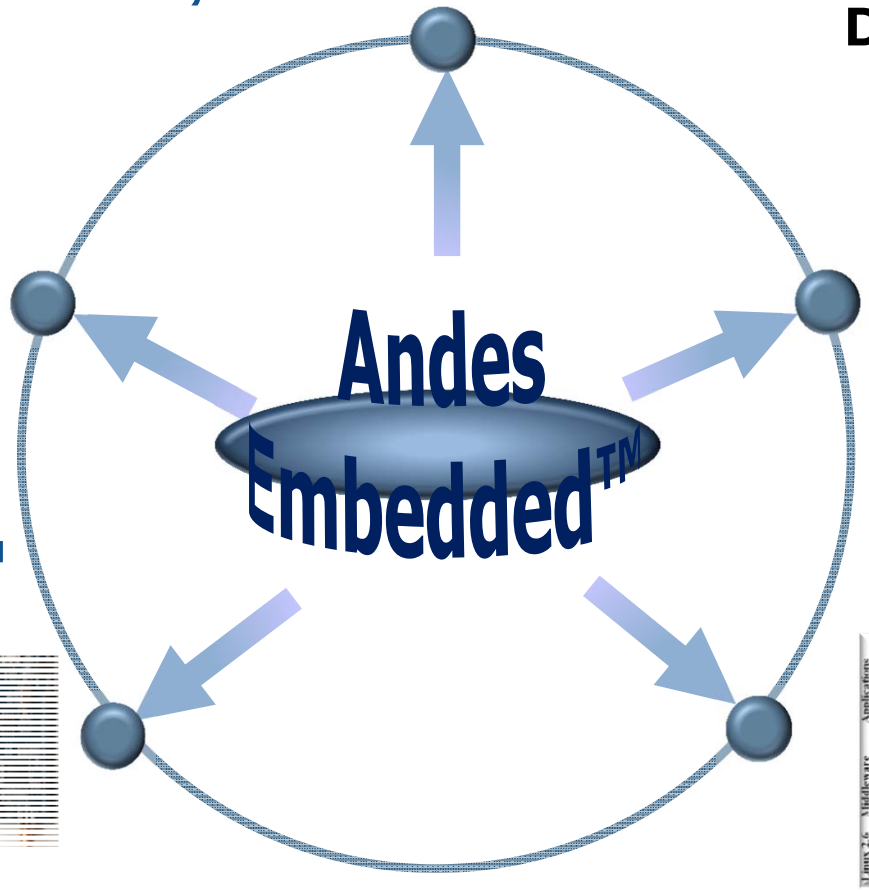
64 Bit Infrastructure and Eco-System

Processor IP's
AndesCore™
NX25

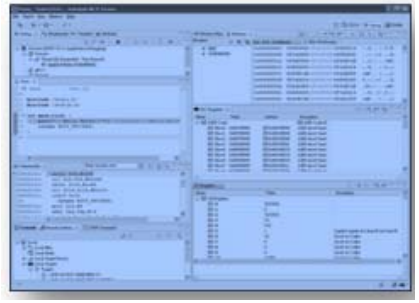


Processor Architecture
AndeStar™
V5, V5m

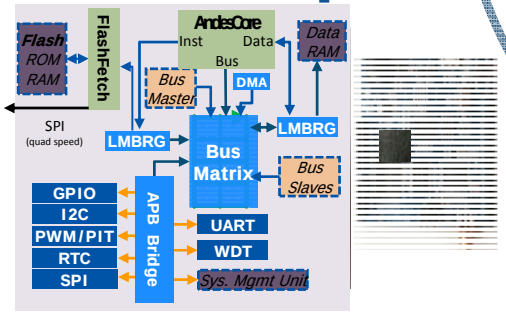
```
smw.adm  $r1,[$sp],$r5,0x0
smw.adm  $sp,[$sp],$sp,0x2
addi     $sp,$sp,-8
sethi    $r1,0x50a
lwi      $r1,[$r1+#0x98]
mov55    $r2,$r0
mov55    $r0,$r1
lwi      $r1,[$r1+#0x8]
addi     $r3,$sp,12
```



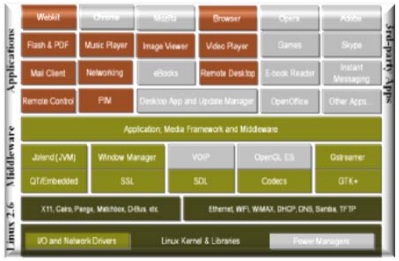
Development Tools
AndeSight™



Development Platforms
AndeShape™



SW Stacks
AndeSoft™



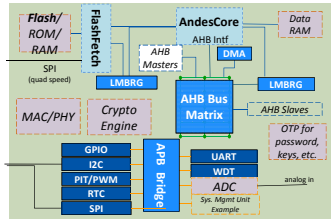
Two Ecosystems: Andes and Knect.me

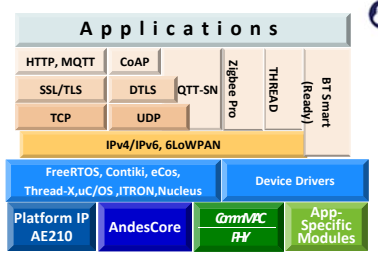
ANDES TECHNOLOGY

knectme™

Knect.me Ecosystem

- **Built up Ecosystem *knect.me* to help IoT Developing**
  - to **knect** solutions - Silicon IP's, SW stacks, tools, applications, systems and products
- **Includes:**
  - SoC IP Platforms
  - Software Stack
  - Development Boards
  - Development Tools

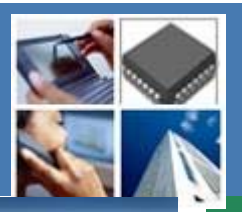


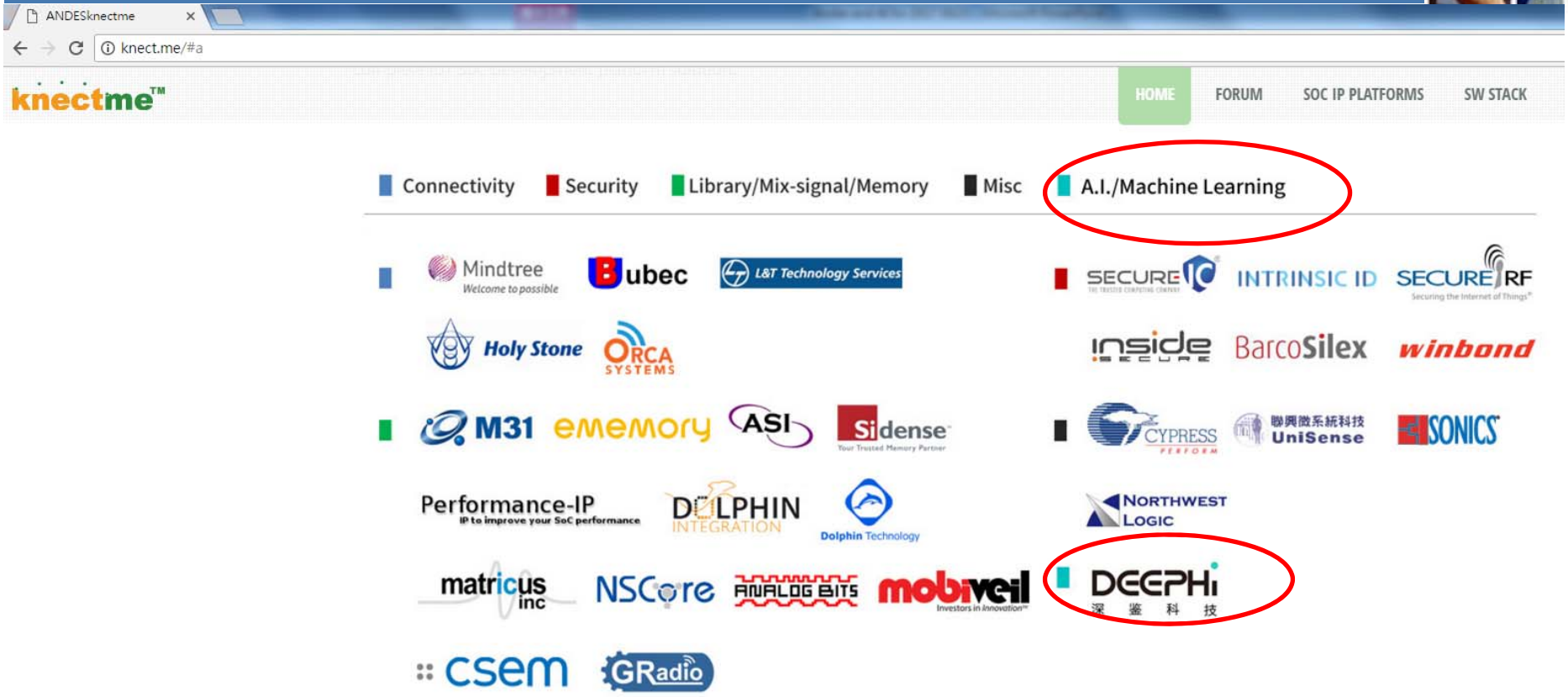


- **To Form a IoT League**
  - to **knect** chip vendors, partners, application developers, system vendors

knectme™

Added A.I. to Knect.me Ecosystem





What is "IoT League"? We invite Andes' customers to provide products information which contains AndesCore. IoT League can enhance exposure and reputation in IoT domain. Various applications can help Andes' customers to attract more and more users to adopt their IoT products.

Companies in alphabetical order

AIROHA

HYCON TECHNOLOGY

ITE TECH.INC.

M²Communication

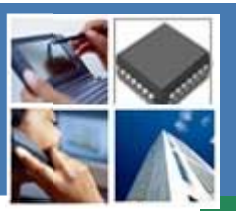
Weltrend

Waue Computing.

Andes Awarded

ANDES TECHNOLOGY

Leader of the Emerging Technology



- **"2018 Top25 emerging tech solutions provider"**

— CIO Advisor Magazine

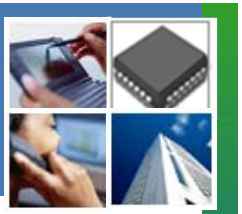
Concluding Remarks

ANDES TECHNOLOGY

Andes: Even Better Value in Future

- Andes aggressively involved in RISC-V Foundation new technology and clusters development, contributing and leveraging RISC-V eco-system. For example, GCC compiler, LLVM compiler, fast interrupt, vector instructions, etc. Andes now leads RISC-V DSP instruction set working group in developing RISC-V P-extension specification discussion and future releasing.
- Andes has successively signed six contracts with design service houses to authorize ASIC design to embed RISC-V core (Andes RISC-V Easy Start Program). Such alliance program will continue, Andes targets to sign up 20 design service houses worldwide in a few months. These contracts will create a win-win situation for Andes, the design service houses and the end customers.

Thank You!



www.andestech.com

Q&A