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
Consolidated Revenue

- **3Q18 Revenue:** NT$56.36M
- **YoY:** Down 16.1%
- **QoQ:** Down 36.0%

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Revenue (NT$ thousands)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Q17</td>
<td>67,155</td>
</tr>
<tr>
<td>2Q18</td>
<td>88,087</td>
</tr>
<tr>
<td>3Q18</td>
<td>56,364</td>
</tr>
</tbody>
</table>
3Q18 Revenue Analysis by Payment Model

- License: 67%
- Royalty: 26%
- Maintenance and others: 7%
Royalty Analysis

YoY
+128.7%
QoQ
+61.2%

(NT$ thousands)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Royalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Q17</td>
<td>9,906</td>
</tr>
<tr>
<td>2Q18</td>
<td>14,053</td>
</tr>
<tr>
<td>3Q18</td>
<td>22,655</td>
</tr>
</tbody>
</table>
Royalty Analysis

(NT$ thousands)

: 2018 Q1~Q3 royalty collected

<table>
<thead>
<tr>
<th>Year</th>
<th>Royalty</th>
<th>Customer numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>445</td>
<td>1</td>
</tr>
<tr>
<td>2012</td>
<td>660</td>
<td>2</td>
</tr>
<tr>
<td>2013</td>
<td>1,285</td>
<td>5</td>
</tr>
<tr>
<td>2014</td>
<td>10,819</td>
<td>9</td>
</tr>
<tr>
<td>2015</td>
<td>12,232</td>
<td>15</td>
</tr>
<tr>
<td>2016</td>
<td>13,320</td>
<td>15</td>
</tr>
<tr>
<td>2017</td>
<td>38,287</td>
<td>25</td>
</tr>
<tr>
<td>2018</td>
<td>46,209</td>
<td></td>
</tr>
</tbody>
</table>

- 2018 Q1~Q3 royalty collected: $46,209
Consolidated Gross Margin

<table>
<thead>
<tr>
<th>(NT$ thousands)</th>
<th>3Q17</th>
<th>2Q18</th>
<th>3Q18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross Profit</td>
<td>66,912</td>
<td>88,001</td>
<td>56,217</td>
</tr>
<tr>
<td>Gross Margin</td>
<td>99.6%</td>
<td>99.9%</td>
<td>99.7%</td>
</tr>
</tbody>
</table>
Confidential

Consolidated Operating Expenses

<table>
<thead>
<tr>
<th></th>
<th>QoQ</th>
<th>YoY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-0.2%</td>
<td>+28.8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Selling expenses</th>
<th>Administration expenses</th>
<th>R&amp;D expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Q17</td>
<td>19,118</td>
<td>15,922</td>
<td>14,514</td>
</tr>
<tr>
<td>2Q18</td>
<td>21,129</td>
<td>17,567</td>
<td>25,270</td>
</tr>
<tr>
<td>3Q18</td>
<td>21,283</td>
<td>14,485</td>
<td>28,072</td>
</tr>
</tbody>
</table>

(NT$ thousands)
Consolidated Operating Margin

YoY
-39.3pt

QoQ
-40.8pt

25.8% 27.3%

-13.5%

3Q17 2Q18 3Q18
Consolidated Net Profit (Loss) Margin

- **YoY**
  - -38.3pt

- **QoQ**
  - -45.5pt

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Profit Margin</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Q17</td>
<td>26.4%</td>
</tr>
<tr>
<td>2Q18</td>
<td>33.6%</td>
</tr>
<tr>
<td>3Q18</td>
<td>-11.9%</td>
</tr>
</tbody>
</table>
Consolidated Earnings Per Share

YoY
-0.58

QoQ
-0.89

(NT$ dollars)

<table>
<thead>
<tr>
<th>Quarter</th>
<th>EPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>3Q17</td>
<td>0.42</td>
</tr>
<tr>
<td>2Q18</td>
<td>0.73</td>
</tr>
<tr>
<td>3Q18</td>
<td>(0.16)</td>
</tr>
</tbody>
</table>

YT3Q18: 0.04
YT3Q18 Revenue Analysis by Region

- Taiwan: 50%
- China: 31%
- Japan/Korea: 8%
- USA: 7%
- Europe: 4%
YT3Q18 Revenue Analysis by Product

- N25: 25%
- N10: 20%
- N9: 18%
- N8: 13%
- N7: 7%
- Platform IP, Others: 4%
- D10: 4%
- D15: 3%
- D15: 3%
- NX25: 2%
- AX25: 1%
- N25: 1%
YT3Q18 Customer Application Analysis

*Based on agreements number

- IoT: 33%
- Storage: 15%
- Artificial Intelligence: 15%
- Others: 15%
- Audio/Video: 15%
- Navigation: 8%
- Networking: 7%
- Others: 7%
YT3Q18 Design Win

- Agreements signed for Q3: 6, total YT3Q18: 27

<table>
<thead>
<tr>
<th>Andes Core</th>
<th>3Q18</th>
<th>YT3Q18</th>
<th>Agreements Signed (Subtotal)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N7, N8, N9</td>
<td>Mainland x 1 (Car use wifi)</td>
<td>Mainland x 5, US x 2, Korea x 3, Taiwan x 1</td>
<td>11</td>
</tr>
<tr>
<td>N10, D10, N13, N15</td>
<td>Japan x 1 (FPGA)</td>
<td>Mainland x 4, US x 1, Taiwan x 1, Japan x 1</td>
<td>7</td>
</tr>
<tr>
<td>D15</td>
<td></td>
<td>Europe x 1</td>
<td>1</td>
</tr>
<tr>
<td>N25, NX25, AX25</td>
<td>Mainland x 1 (SSD), Japan x 1 (Storage), Taiwan x 2 (AI, Finger print)</td>
<td>Mainland x 3, US x 1, Taiwan x 3, Japan x 1</td>
<td>8</td>
</tr>
</tbody>
</table>

RISC-V
RI SC-V Revenue Share Ramping

<table>
<thead>
<tr>
<th>Quarter</th>
<th>V3 (NT$ thousands)</th>
<th>RI SC-V (NT$ thousands)</th>
<th>Share (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1Q18</td>
<td>30,305</td>
<td>4,376</td>
<td>12.6%</td>
</tr>
<tr>
<td>2Q18</td>
<td>23,857</td>
<td>27,100</td>
<td>27.1%</td>
</tr>
<tr>
<td>3Q18</td>
<td>30,199</td>
<td>26,166</td>
<td>46.4%</td>
</tr>
</tbody>
</table>
Product Application
Rich Customers’ Applications

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

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

Andes Core™

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

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

Communication & IoT

- Consumer

- Storage & Sensor

Industrial & Video

- and more.....
IoT Application - 2

Wearable devices

Drone

Portable Karaoke

WiFi/ GPS/ FM/ Bluetooth combo

GPS/ Beido in shared bikes

Contactless payment (NFC)
Andes Embedded in Smart Phones

1 in 5 Smart Phones are with Andes Embedded worldwide

- Sensor Hub
- NFC Controller
- Storage controller
- WiFi/ BT/ GPS/ FM (combo)
- Touch screen controller
Andes Embedded in Consumer Devices, Cars and Datacenters

- **Switch:** MXIC Flash Ctrl
- **Echo Dot2:** Mediatek WiFi IoT
- **Bike Sharing:** GPS Ctrl
- **X-Trail:** ADAS Ctrl

- In leading machine learning computers for datacenter
- In tier-one switch routers for datacenter

- Recent applications: Set-top Boxes, 802.11ax, machine learning processors (using Andes Custom Extension, ACE)
New Products and Ecosystems
Product Lines

◆ New Core released in Andes Embedded Forum 2018

A N D E S

RISC-V
AndeStar™ V5: New Generation of ISA Kernel

- RV32/ 64I MACFD+Andes Ext.
- Full Feature
  - Baseline
  - RISC-V Kernel
- Custom Ext.
  - DSP/FP Ext.
  - Security Ext.
- Compiler Opt.
  - >200 DSP Libraries
  - COPILLOT tools
  - Secure RTOS
- CoDense™
- StackSafe™
- PowerBrake
AndesCore™ V5 Families

Leading Performance

Virtual Memory Support

Modern Architecture

Next Gen.
V5 ISA, Advanced Micro-Architecture

CoDense™ StackSafe™ PowerBreak

A25
V5, 32-bit 5-stage, 1GHz MMU, FPU, ACE...

AX25
V5, 64-bit 5-stage, 1GHz MMU, FPU, ACE...

N25(F)
V5, 32-bit 5-stage, 1GHz PMP, FPU, ACE...

NX25(F)
V5, 64-bit 5-stage, 1GHz PMP, FPU, ACE...

I/D Local Memories

I/D Caches

Branch Prediction

ACE
64-bit AXI/AHB

ECC

◆ 28HPC RVT, SS, 0.81V, 0C, with I/O constraints.
V5 AndesCores: 25-series Baseline

- **N25: 32-bit, NX25: 64-bit**
  - From scratch for the best PPA
  - Very configurable
- **AndeStar V5 ISA**
- **5-stage pipeline**
- **Configurable multiplier**
- **Optional branch prediction**
- **Flexible memory subsystem**
  - I/D Local Memory (LM): to 16MB
  - I/D caches: up to 64KB, 4-way
  - Optional parity or ECC
  - Hit-under-miss caches
  - load/store: unaligned accesses
- **N25 sample configurations @TSMC 28HPC+ RVT:**
  - Small config: 37K gates, 1.0 GHz (worst case)
  - Large config: 130K gates, 1.2GHz (worst case)
  - Best-in-class Coremark: 3.58/ MHz
V5 AndesCores: New 25-series

- **N25/ NX25:**
  - Fast-n-small for control tasks in AR/VR, networking, storage, AI

- **N25F/ NX25F: +FPU**
  - +, −, x, x+, x−: pipelined 4 cycles
  - ÷, √: run in the background
    - 15 for SP, 29 for DP
  - FP load/store: support HP

- **A25/ AX25: +FP +Linux**
  - Support RISC-V MMU and S-mode
  - 4 or 8-entry ITLB and DTLB
  - 4-way 32~128-entry Shared-TLB

- **Whetstone/ MHz:**

![Bar chart comparing N25F, Competitor Core 1, and Competitor Core 2](chart.png)
ACE: Andes Custom Extension

COPILOT
Custom-OPtimized Instruction deveLOpment Tools

- Extended Tools
- Extended ISS
- Extended RTL

- Compiler
  - Asm/Disasm
  - Debugger
  - IDE

- CPU ISS
  - (near-cycle accurate)

- CPU RTL

AutomatedEnv. For Cross Checking
Test Case Generator

- Extended RTL
- Extended ISS

Concise RTL
semantics, operands, test-case spec

Verilog user.v
script user.ace

Executable or library
Source file
Aggressive in RISC-V Community

Foundation Working Groups (partial list)
RISC-V Hardware Infrastructure: Andes Contribution

- **Contributing architecture extensions too**
  - Chair of the P-ext (Packed SIMD/DSP) Task Group
  - Co-chair of Fast Interrupt Task Group
  - Closely reviewing activities of other Task Groups
Andes Helps Strengthen RISC-V Ecosystem

- More choices for customers are good
- Andes works closely with partners to grow RISC-V ecosystem
GCC, binutils: May, 2017
Newlib: Aug, 2017
Glibc (rv64i): Feb, 2018
GDB: Mar, 2018
OpenOCD: July, 2018
Glibc (rv32i):
- Submitted in July 2018 (by Andes)
- Review in progress
RISC-V Software Ecosystem: LLVM Compilation

- **LLVM:**
  - RV32IMAFDC: June, 2018
  - Relaxation: May, 2018 (by Andes)
  - 64b support: review in progress since Oct, 2018
  - Missing hard-float calling convention

- **compiler-rt:** Mar, 2018

- **LLD:** Aug, 2018 (by Andes)
  - Initial port (relocation and TLS) in Oct. 2017
  - Dynamic linking review in progress since Oct, 2017
  - Missing link-time relaxation
- **U-boot**: Jan, 2018 (by Andes)
- **Kernel (rv64i)**: Jan, 2018
- **Key utilities**: (by Andes)
  - Perf: Feb, 2018
  - Kernel Module: May, 2018
  - Ftrace: May, 2018
- **Kernel (rv32i)**: Jun, 2018 (by Andes)
- **Kernel with no FPU**: Oct, 2018
Andes Position in RISC-V

Complete product portfolio

Reliable RISC-V core IP provider

RISC-V cores that run Linux

Extreme low power consumption, high computing efficiency

World’s leading Customer-Extension Capable RISC-V Core
YTD RISC-V Design Win

- Ten design win for Andes RISC-V Core IPS:
  - NX25: Enterprise SSD (Taiwan)
  - N25: AI (China - with ACE), Blockchain (China), HD-PLC (Japan), SSD (China), Fingerprint (Taiwan), AI (Taiwan), Research/Academic (Taiwan)
  - N25/AX25: FPGA for AI (US)
  - AX25: FPGA for AI (China)

- Eleven design service providers joined Andes RISC-V Easy Start Program:
  - US x 3, Europe x 1, Korea x 1, China x 2, Taiwan x 4
## Summary of AndesCores vs. Competitors

<table>
<thead>
<tr>
<th>AndesCore™</th>
<th>AndesCore/ Competitor Power Efficiency(^1) (DMI PS/ mW)</th>
<th>Competitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>N7</td>
<td>+42%</td>
<td>Cortex-M0+</td>
</tr>
<tr>
<td>N8</td>
<td>+43%</td>
<td>Cortex-M3</td>
</tr>
<tr>
<td>N9</td>
<td>+43%</td>
<td>Cortex-M3</td>
</tr>
<tr>
<td>D10</td>
<td>+48%</td>
<td>Cortex-M4</td>
</tr>
<tr>
<td>N13</td>
<td>+185%</td>
<td>Cortex-A5</td>
</tr>
<tr>
<td>N13</td>
<td>+45%</td>
<td>Cortex-R4</td>
</tr>
<tr>
<td>D15F</td>
<td>+121%</td>
<td>Cortex-M7</td>
</tr>
</tbody>
</table>

1. Power Efficiency is DMI PS/ MHz divided by power consumption (mW/ MHz) when running Dhrystone.
64 Bit Infrastructure and Eco-System

Processor IP's
AndesCore™

Processor Architecture
AndeStar™

AndeStar™ V5

Development Tools
AndeSight™

Development Platforms
AndeShape™

SW Stacks
AndeSoft™

Andes Embedded™
Two Ecosystems: Andes and Knect.me
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
Andes Awarded
Leader of the Emerging Technology

“2018 Top25 emerging tech solutions provider”
— CIO Advisor Magazine
Concluding Remarks
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 eleven 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
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.
- M² Communication
- Weltrend
- Wave Computing.