Advanced Debugging and Analysis with Latest AndeSight™ IDE

Niraj Dengale
Solution Architecture Division

2021/11/30
Andes at a Glance

Who We Are

- **CPU**
  - Pure-play CPU IP Company

- **Hammer Icon**
  - Major Open-Source Contributor/Maintainer

- **RISC-V Icon**
  - RISC-V Founding Premier Member

- **Stock Exchange Icon**
  - Stock Exchange Listed

Quick Facts

- **16 years old company**
- **80% Engineers**
- **9B+ accumulated Andes-embedded SoC shipped**
- **250+ Licensees Worldwide**
- **20K+ AndeSight IDE installation**

Taking RISC-V® Mainstream
Agenda

- AndeSight™ Overview
- Major Features in AndeSight™
- Demo of the Advanced Debugging with AndeSight™
- Demo of the Advanced Analyzing with AndeSight™
- Summary
AndeSight™ 5.0 Overview

**AndeSight™**
IDE and AndeSoft™ BSP inside

- GCC/LLVM toolchains and debuggers
- Optimized C library
- Optimized compute library: DSP, Vector
- Fast and near cycle-accurate simulators
- Rich RTOSes and Linux (LTP verified)
- Peripheral drivers for AndeShape™ platform
- Arduino support for Andes Corvette-F1 EVB
- Abundant demos for boosting your development
  - Startup code for AndeCore™ feature
  - Linux demos
  - Vector demos
    - In-line assembly
    - Vector Intrinsic
  - Benchmark programs
  - NN reference models

**AndesClarity™**
Processor Pipeline Analyzer

**AndeSoft™**
NN Library for RVP/RVV
Optimized libraries for RISC-V DSP/SIMD and Vector extensions

**AndeSoft™**
LLVM for RVV
LLVM compiler infrastructure for RISC-V Vector extensions

Copyright © 2021 Andes Technology Corp.
SoC SW Development Environment

**AndeSight™ IDE**
- Eclipse-Based IDE
- Streamlined GUI
- Feature-rich Editor
- Managed Build System
- Optimized Toolchains
- Source Level Debugger
- Profiling Analysis
- Extensive Demo Projects
- Flash ISP

**AndeSoft™ BSP**
- Application Layers
- Middleware
- Drivers
- App Drivers
- OS/Kernel
- Libraries

**AndeShape™ AICE**
- Andes Partners
- Customer

**AndeSim™ & AndeSysC™ Virtual Platform**
- AndesCore™
- Bus Controller
- AHB to APB Bridge
- SDRAM Controller
- DMA Controller
- SRAM Controller

**AndeShape™ EVB**
- AICE

**Build executables**
**Debug interactively**
**Execute programs**
**Configure platforms**
**Profiling/tracing/debugging data**
Agenda

- AndeSight™ Overview
- Major Features in AndeSight™
- Demo of the Advanced Debugging with AndeSight™
- Demo of the Advanced Analyzing with AndeSight™
- Summary
AndeSight™ Major New Features

- Multicore Debugging Enhancement
- FreeRTOS Timeline Analyzer
- AndeSight™ Scripting
- Document Window
- AndesClarity™
- Vector Intrinsic Support
AndeSight™: Professional IDE

- Eclipse-based IDE, enriched from 16-year continuous development

**Bit-field display**

**Function profiling**

**Meta linker script editor**

**RTOS awareness**

**General Exception Handling**

**Function code size**
Multicore Debugging Enhancement

- Grouping Cores for Efficient Debugging
  - Debug commands can be sent to a specific set of cores at the same time
  - Configure debug settings for each core
  - Can run different projects on each core
FreeRTOS Timeline Analyzer

- Visualize the insights into runtime behaviors
  - Execution of tasks, interrupts and events within the specified time period
AndeSight™ Scripting

- Record and replay UI operations with Python script
  - Test automations
  - Issue reproductions
AndesClarity™

- A powerful plug-in for AndeSight™
  - Additional license is required
- Visualize performance and resource bottleneck
  - Pipeline view of instructions and functional units
  - Resource view corresponding to instruction usage
  - Stall bubbles with different colors for data dependency
Vector Intrinsic Support

- 3 vector demo with vector intrinsic
- 4 vector demo with in-line assembly
Agenda

- AndeSight™ Overview
- Major Features in AndeSight™
- Demo of the Advanced Debugging with AndeSight™
- Demo of the Advanced Analyzing with AndeSight™
- Summary
Demo of the Advanced Debugging with AndeSight™

- Use AI Relu function as example

\[ F(x) = \max(0, x) \]
Agenda

● AndeSight™ Overview
● Major Features in AndeSight™
● Demo of the Advanced Debugging with AndeSight™
● Demo of the Advanced Analyzing with AndeSight™
● Summary
Demo of the Advanced Analyzing with AndeSight™

- Use sgemm (Single precision GEneral Matrix Multiply) as an example
Agenda

- AndeSight™ Overview
- Major Features in AndeSight™
- Demo of the advanced debugging with AndeSight™
- Demo of the advanced Analyzing with AndeSight™
- Summary
Summary

• AndeSight™ is user-friendly and easy-to-use IDE
• Powerful debugging tool
• Virtualized analysis to help you ultimately optimize your software
• Accelerate your RISC-V software development with the comprehensive development environment
• Periodic releases to support latest Andes RISC-V Cores
AndeSight™ IDE Free Download

- AndeSight™ version for evaluation
- Three-month time limit
Thank you!