

ADVANCING ENDPOINT INTELLIGENCE

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WHY ENDPOINT INTELLIGENCE?



REAL-TIME RESPONSE

- ❖ Transforming the data at source of collection minimizes latency
- ❖ Enables optimized processing for time-critical applications



SECURITY & DATA PRIVACY

- ❖ Minimized security concerns related to transfer & flow of data
- ❖ On-device data handling can be tightly linked to on-device root-of-trust



EFFICIENCY & LOW POWER

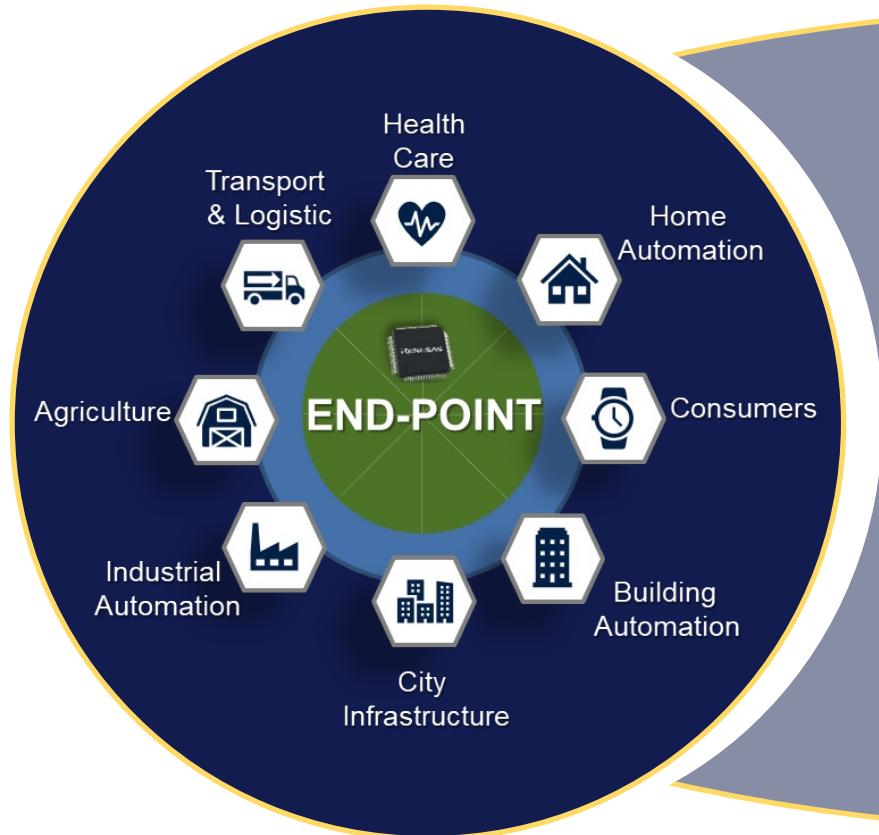
- ❖ Maximizing data gravity by operating on data at the source
- ❖ Analysis at source and reduced transport can result in significant efficiency gains



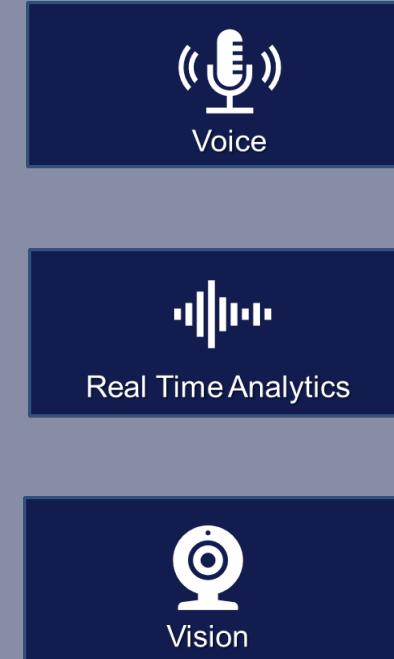
LOW COST

- ❖ Reduced transfer & flow of data can result in overall network transport cost savings

AI BRIDGES IOT TECHNOLOGIES & APPLICATIONS



AI/ML Pillars



KEY TECHNOLOGIES



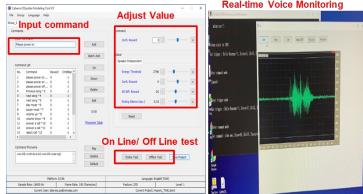
- Sensor Fusion
- Motor Control
- HMI
- Wireless Communication
- Capacitive Touch
- Cloud Connectivity
- Functional Safety
- Robotics
- IoT Security

AI @ ENDPOINT HAS ARRIVED!

PRACTICAL APPLICATIONS OF AI & IOT @ ENDPOINT



ENABLE VOICE USER INTERFACE IN MINUTES



Comprehensive & Intuitive Toolchain
Support for 44+ Languages
Scalable + Smart Software Features
Runs on Cortex M23/ M33 Devices
License Free Development



Home Appliances, Wearables, IoT Devices



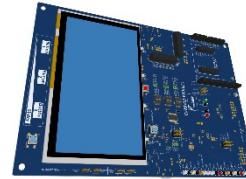
HVAC, Smart Appliances, Motor Control

Comprehensive ML Workflow
Sensorless Unbalanced Load Inferencing
Leverages MC H/W Reducing CPU Load
Runs on Cortex M33 Devices
Other Conditions Under Development

SENSORLESS PREDICTIVE MAINTENANCE

MULTI-MODAL MACHINE ACCESS/ PERSONALIZATION

Enhances User Safety or Personalizes Operation User
Facial & Voice Signatures for Authentication
Multi-modal Design Runs on M33 Devices



Smart Appliances, Factory Machines, etc.

REFERENCE SOLUTIONS

Logistics, Transportation, Asset Tracking



Intuitive ML Development Studio
Monitors Multiple Parameters
Multi-modal Design Runs on M33 Devices
License Free Development



MULTI-MODAL ASSET TRACKING/ MONITORING

AI @ ENDPOINT HAS ARRIVED!

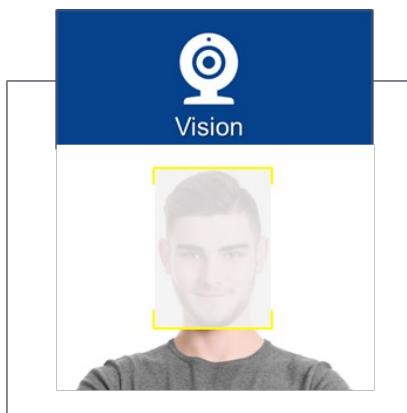
EXAMPLE: MULTIMODAL MACHINE ACCESS/ PERSONALIZATION

Renesas Integrated Intelligent Solutions

- Identify person and turn on system
- Recognize person for access permission
- Provide personalized intelligent services



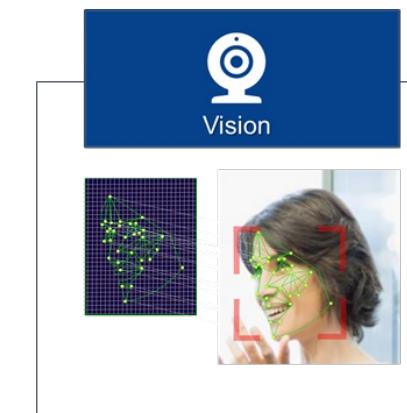
1 Person Detection



2 Face Recognition



3 Speaker Identification

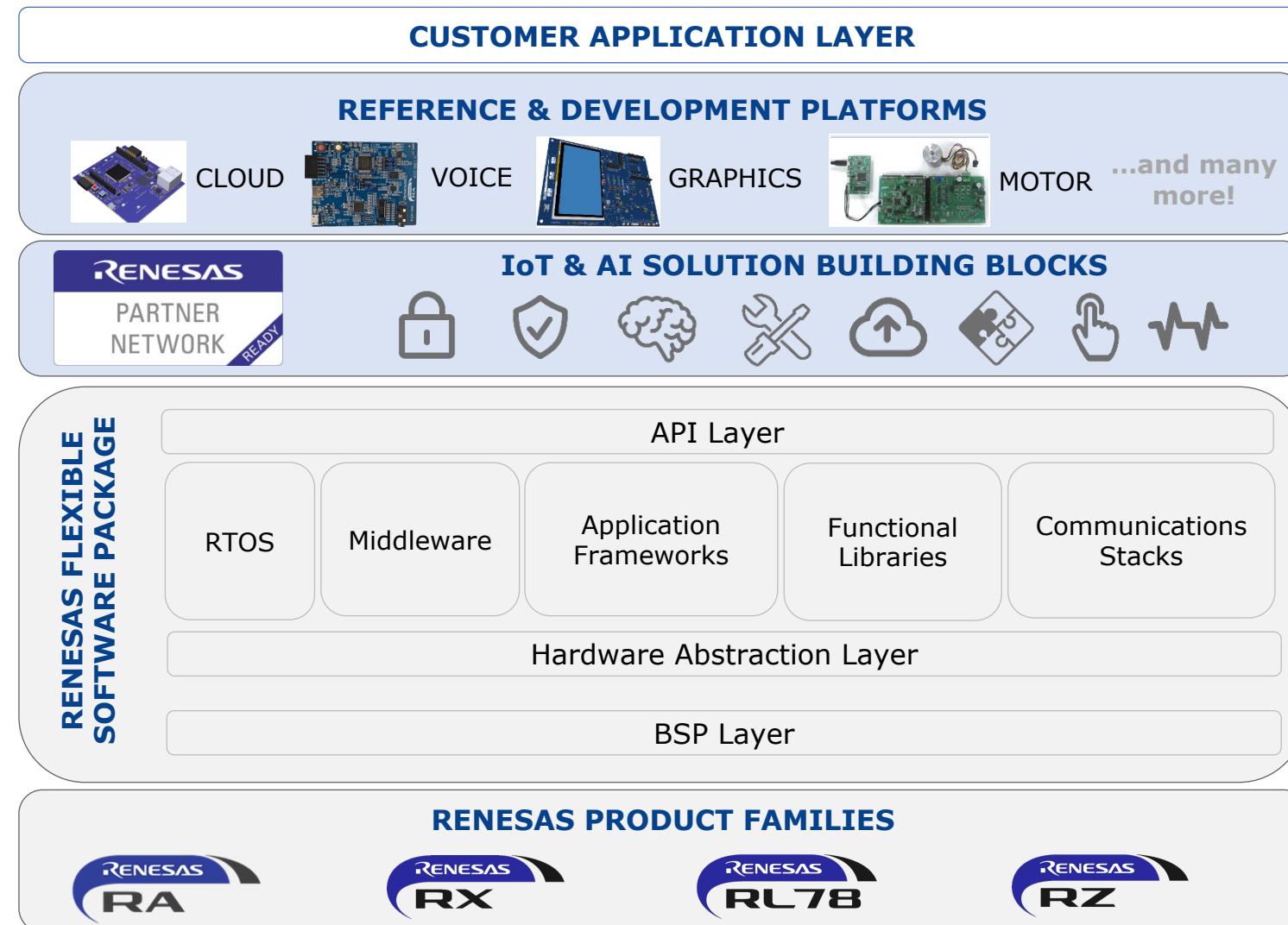


4 Face Identification

Multimodal AI/ML Building Block Solutions (NNMs*) in Renesas 32-Bit RA6 MCU (Cortex® ARM M4/M33 Core)

*NNMs – Neural Network Models

INDUSTRY's MOST COMPREHENSIVE AIOT SOLN STACK



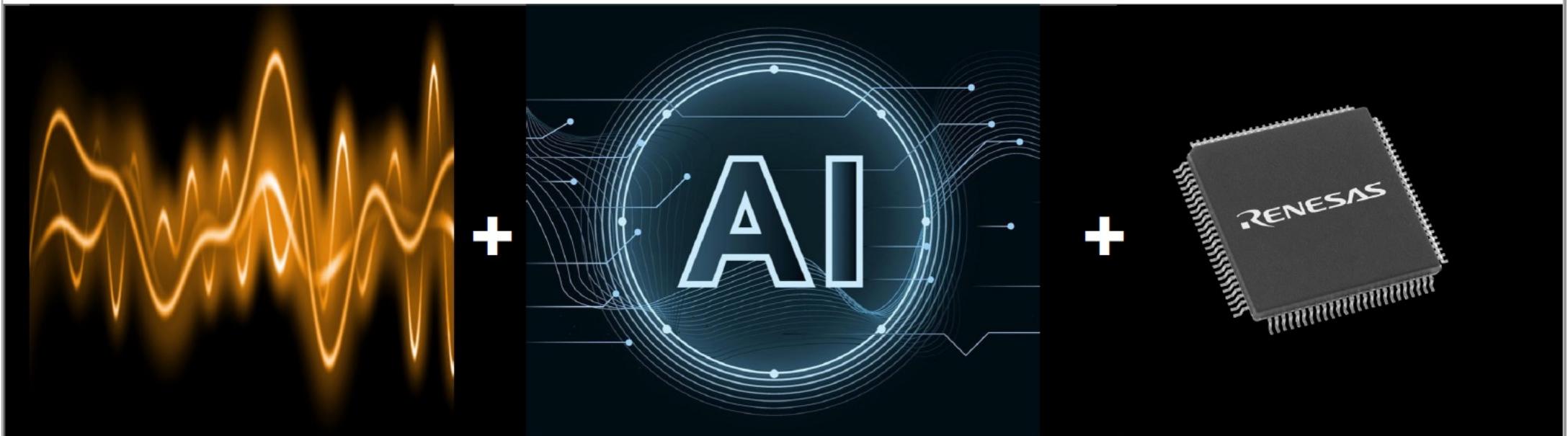
-
- ❖ Complete Stack to Accelerate TTM
 - ❖ 100+ Building Blocks & Growing
 - ❖ 7 Key Technology Areas Covered
 - ❖ Consistent Approach Across Products
-

AUTO-ML WORKFLOW FOR REAL-TIME ANALYTICS

ADVANCED SIGNAL PROCESSING + AI FOR ENDPOINTS



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Advanced signal processing

Reality AI uses an algorithmic search of a wide range of feature spaces to derive a custom transform based on time and frequency.

Artificial Intelligence and Anomaly Detection

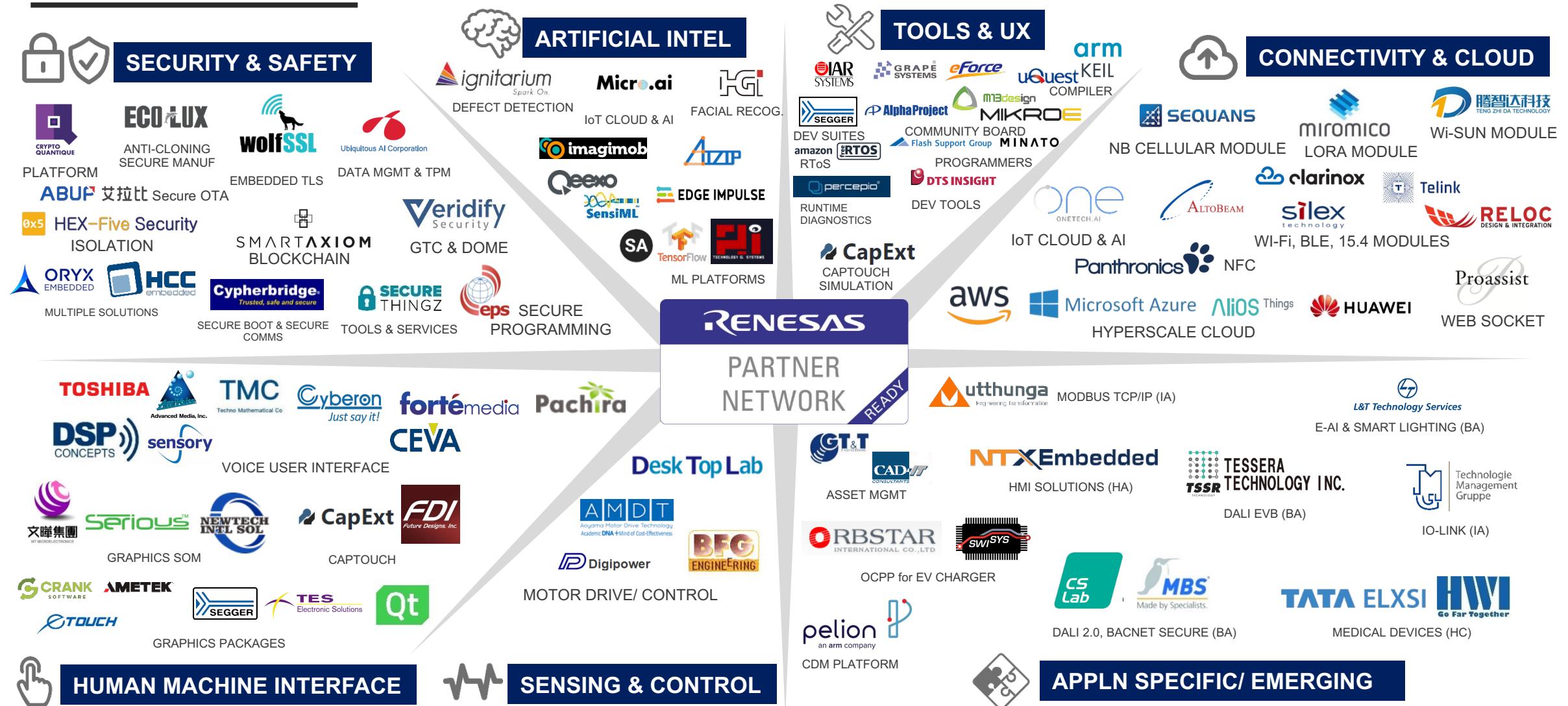
Reality AI can automatically generate machine learning models, explanatory visualizations, and a variety of hardware analytics

Inexpensive Edge Nodes

Reality AI code will run on constrained edge nodes including the full range of Renesas MCUs

SCALABLE FROM 16-BIT TO 64-BIT CORES

BROAD IOT & AI ECOSYSTEM



SUMMARY & KEY TAKEAWAYS

- ❖ The convergence of AI & IOT is a megatrend that cannot be ignored
- ❖ The acquisition of Reality AI will bring Advanced Signal Processing & AI to Endpoints for Real-time Analytics Applications
- ❖ Renesas with it's comprehensive offering of hardware, software, tools & ecosystem provides all the building blocks for you to unleash your creativity
- ❖ Come talk to us about your next AloT challenge!



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Assemble all the pieces needed
for AI at the edge of IoT



THANK YOU.

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BIG IDEAS FOR EVERY SPACE