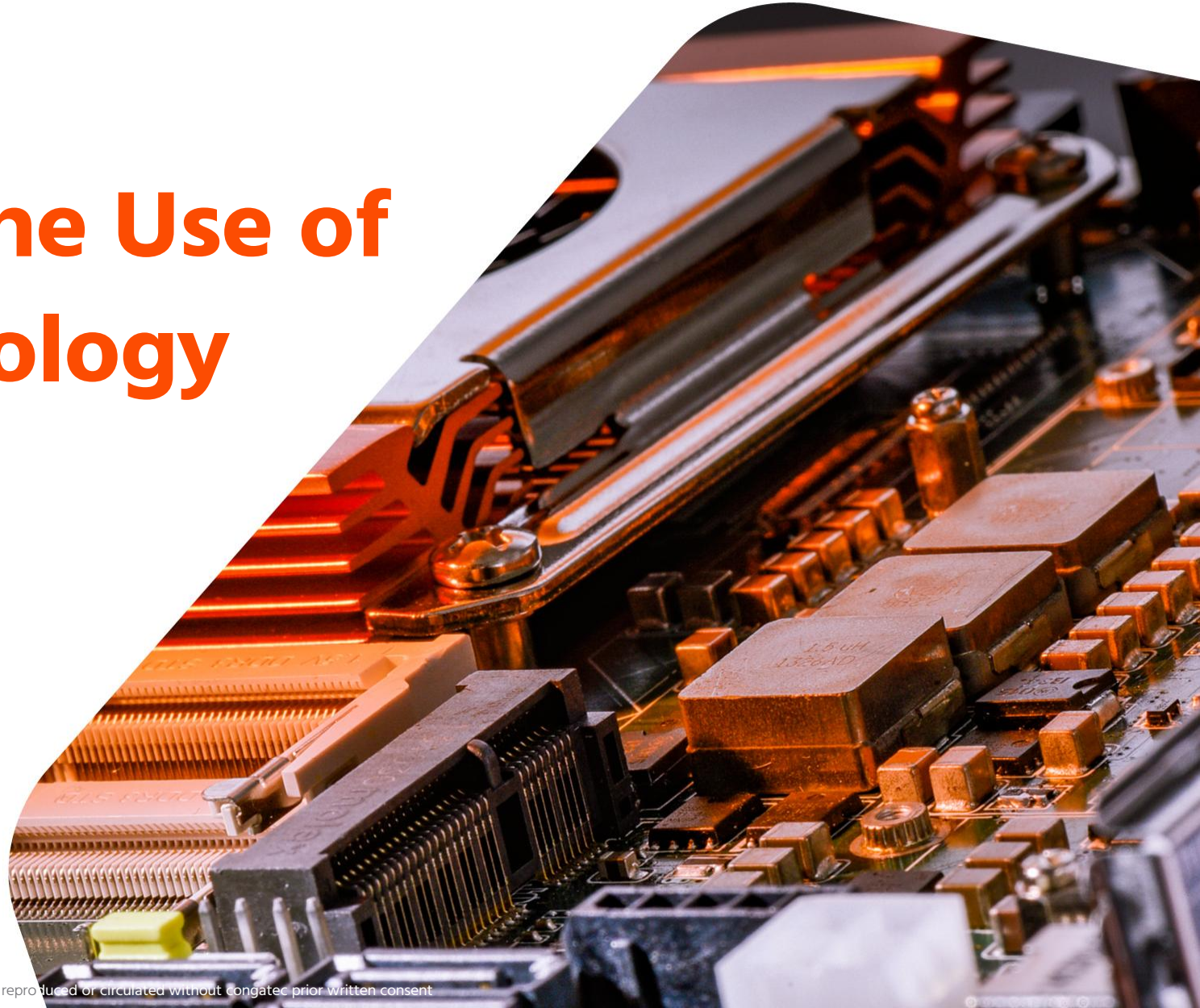
How to Simplify the Use of Embedded Technology

Embedded Conference Finland 2025

Timo Poikonen
Senior Business Development Manager EMEA

16.9.2025



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Agenda

1. congatec @ a glance
2. Innovation Leadership
3. Hardware building blocks
4. Software building blocks

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congatec @ a glance

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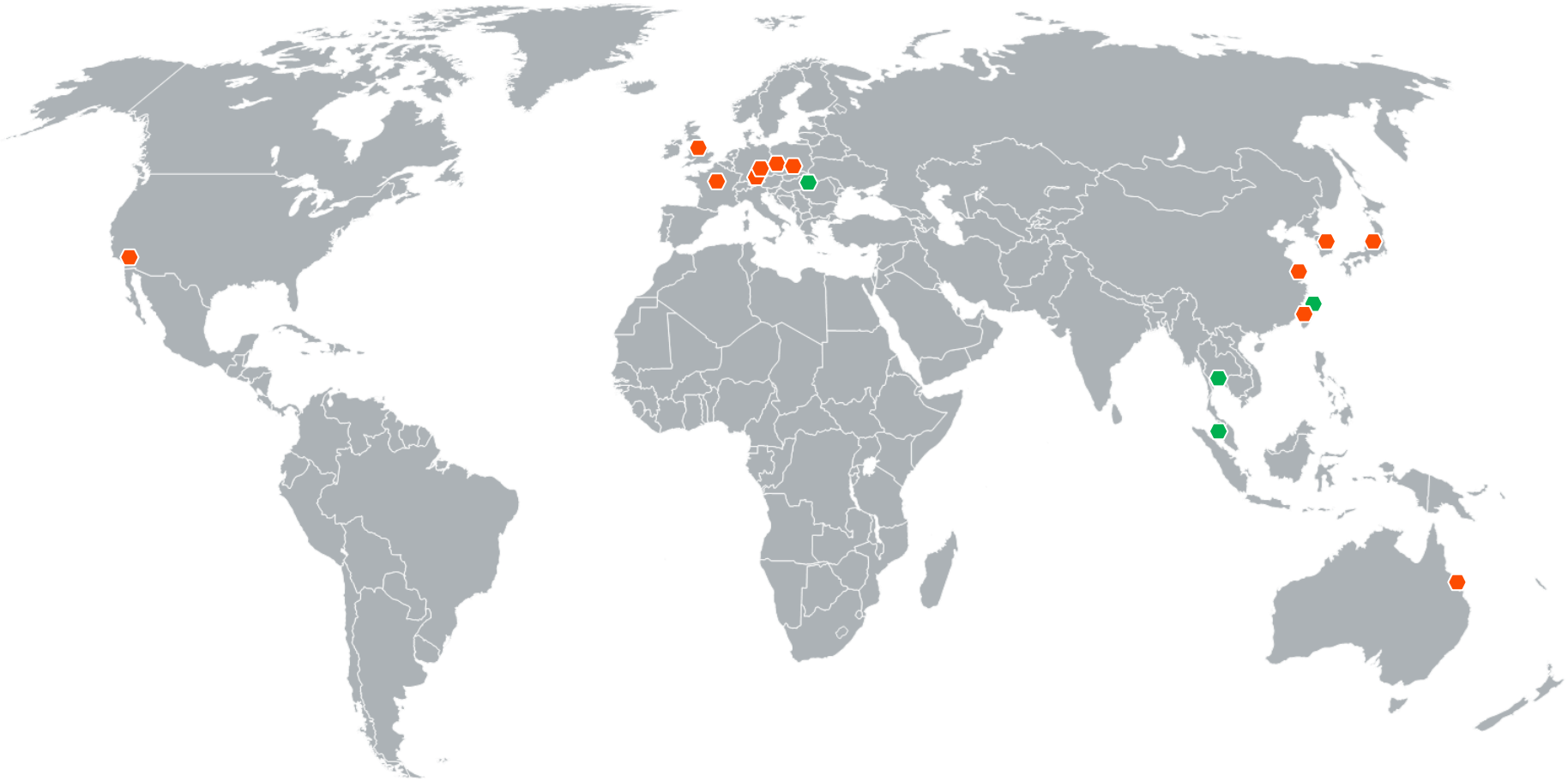
Global footprint



+400
Employees worldwide
(~ 25% in R&D and tech. Support)

+10Mio
Shipped embedded solutions

+1200
Customers from various industries

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Innovation leadership

Proven by customers and partners

Active Technology Leader

Active leader in setting new and innovative standards

Preferential Access Granted

Intensive technological partnership with leading global CPU providers resulting in early access to CPU roadmaps

Technological Edge

Acquired in 2018, RTS opens the door to new customers, enabling congatec to answer new application needs while also increasing margins

Congatec acquires stake in Kontron subsidiary JUMPtec

19. Juni 2025, 13:58 Uhr | Andreas Knoll

Konrad Garhammer, Congatec (right; left CEO Dr Dominik Ressing): "The manufacturing cooperation with Kontron is a natural step."

Kontron and Congatec have signed a term sheet under which Congatec would acquire a majority stake in the Kontron subsidiary JUMPtec by means of a capital increase. Only a few months ago, Kontron bundled its business with plug-in Computer-on-Modules (CoMs) in the subsidiary JUMPtec GmbH.

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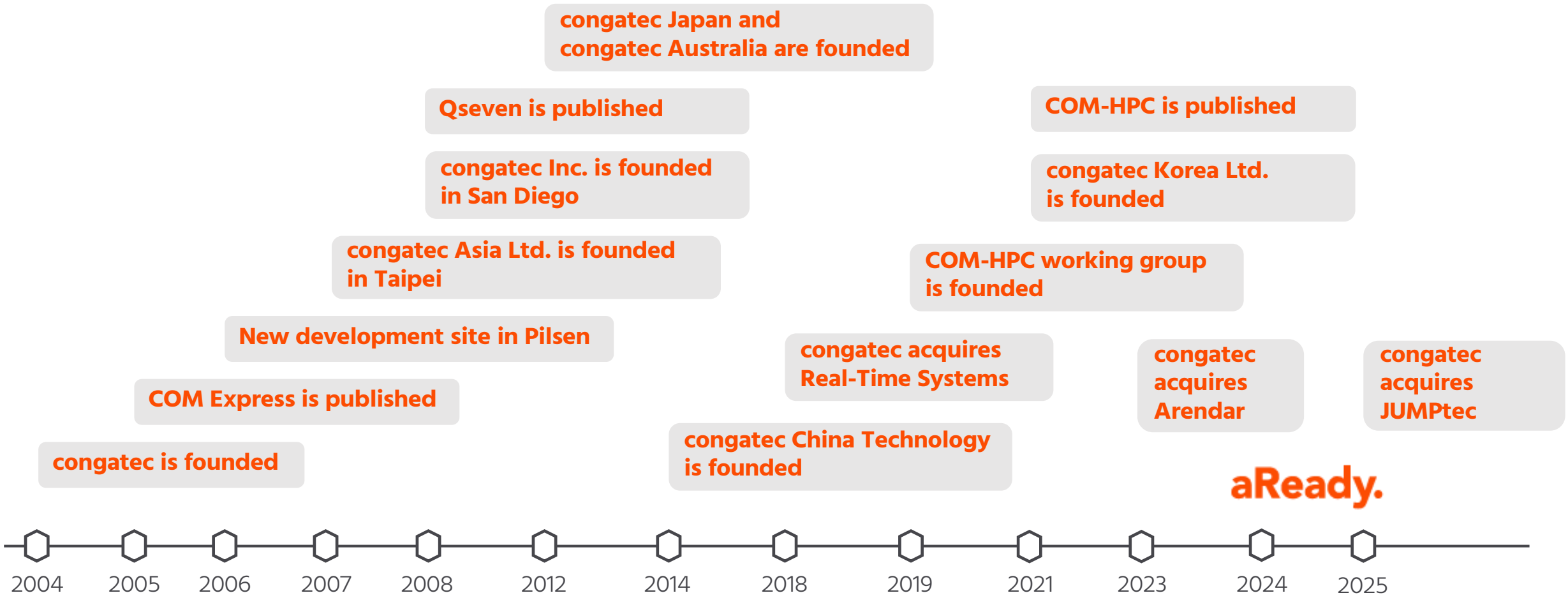
Our milestones shaping the industry



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Computer-on-Modules – Open Standards

QSeven

SMARC

Recommended for new designs

COM Express

Mini | Compact | Basic

COM-HPC

Mini

Client Size A | B | C

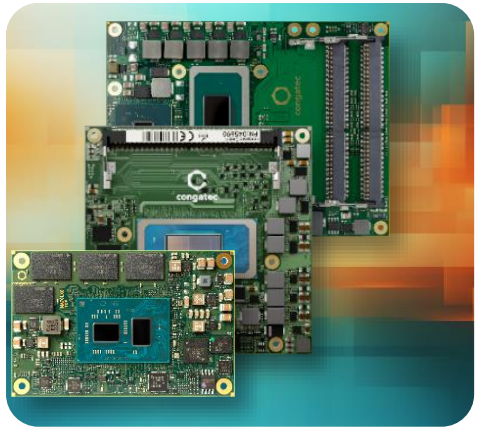
Recommended for new designs

COM-HPC Server

Server

Size D | E

Recommended for new designs



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The Big Bang of Innovations

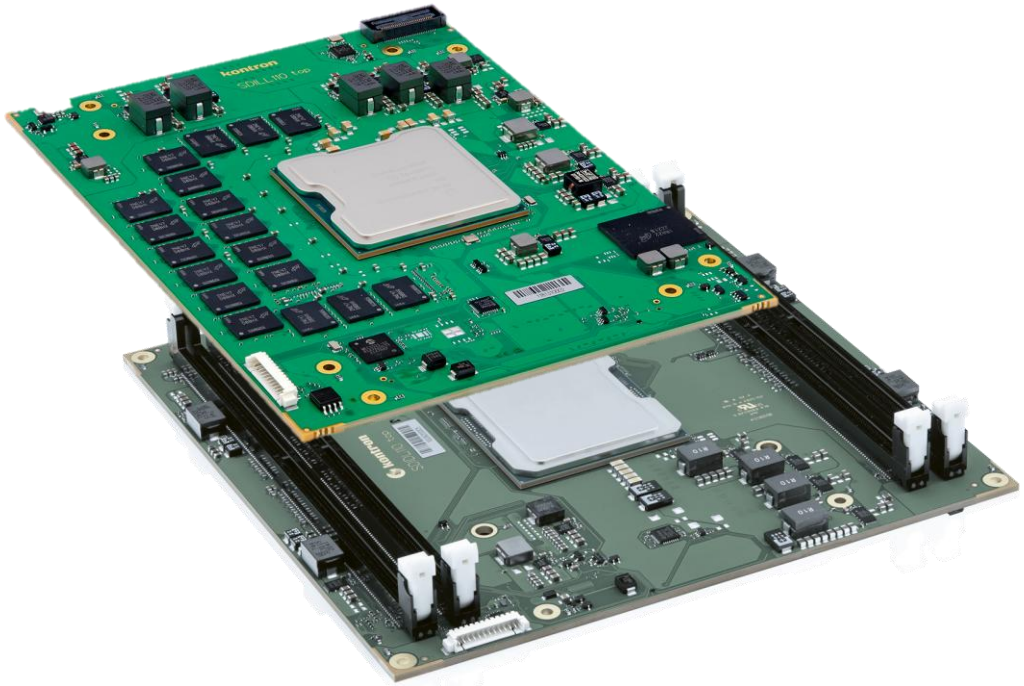
JUMPtec®

Computer-on-Modules Highlights

Deggendorf

COMh-sdIL (E2) - Feature Overview

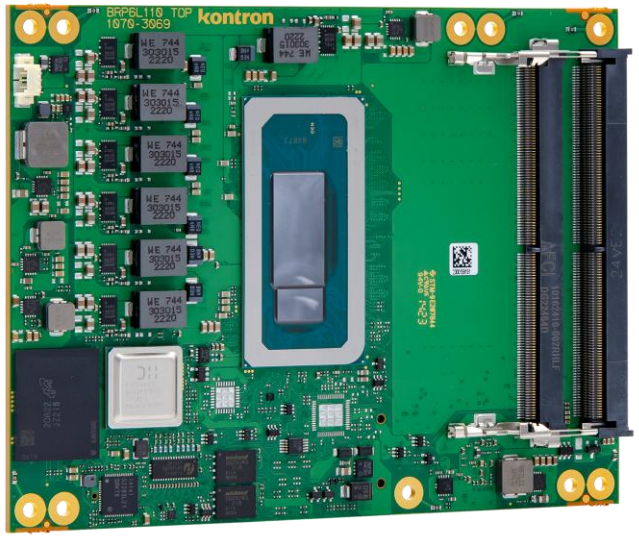
COMh-sdIL: 120 mm x 160 mm



COMh-sdID: 160 mm x 160 mm

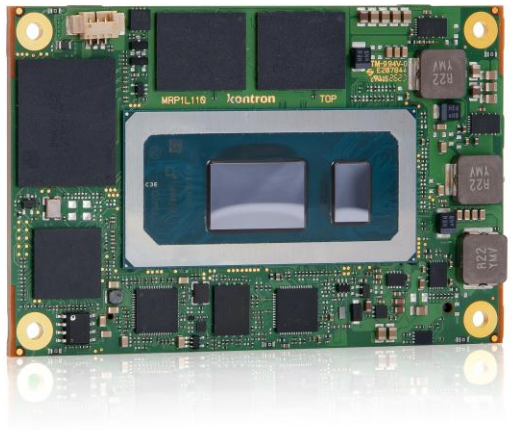
- Intel® **Xeon® D-1700 / D-1800** processor family
  - Commercial temp. and extended temp. SKUs – 2 Cores up to 10 Cores
  - Processor TDP up to 65W
- Memory down for max 64 DDR4-2667 MT/s
- LAN: 8x High-speed ports – various configurations possible + 1x 2.5GBASE-T
- QAT (Quick Assist Technology) support – depending on CPU-SKU
- 32x PCIe lanes: 16x PCIe Gen3 (2 x8, 4 x4, 8 x2) +
- 16x PCIe Gen4 (1 x16, 2 x8, 4 x4)
- 2x SATA Gen3, 4x USB 3.0 (USB 2.0)
- Optional onboard storage: up to 1TB NVMe
- Industrial grade versions
- AMI BIOS
- Windows 10 / Server 22, Linux

COMe-bRP6 (E2) – Feature Overview



- COM Express® basic form factor (Pin-out Type 6 compliant)
- Based on 13th Gen Intel® Core™ technology Raptor Lake-P, supporting up to 14 cores (up to 6 P-cores and up to 8 E-cores) with Intel® performance hybrid architecture
- Intel® Xe Graphics architecture with up to 96EUs (for dedicated SKUs)
- Up to 64GB DDR5 non-ECC memory via 2x SODIMM sockets; IBECC (on ind. SKUs)
- 3x DDI + LVDS/eDP; Quad independent display support; Optional USB-C support
- Up to 2.5Gb Ethernet with TSN support (ind. SKUs only)
- 5x PCIe 3.0 (On request: 6x without Ethernet, up to 8x without Ethernet & SATA or alternatively 8x with additional PCIe Switch) + 2x4 PCIe 4.0 on PEG Lanes #0-7, 1x8 PCIe 4.0 on PEG Lanes #8-15 (H-series only)
- SATA 6Gb/s & USB 3.2 Gen2 support
- Optional NVMe SSD onboard up to 1TByte
- E2 versions for industrial grade temp. range (-40°C up to +85°C) usage
- OS: Windows 10 & 11 LTSC, Yocto

COMe-mRP10 (E2) – Feature Overview



- COM Express® mini form factor (Pin-out Type 10 compliant)
- Based on 13th Gen Intel® Core™ technology Raptor Lake-P, supporting up to 14 cores (up to 6 P-cores and up to 8 E-cores) with Intel® performance hybrid architecture
- Intel® Xe Graphics architecture with up to 96EUs (for dedicated SKUs)
- Up to 32GB LPDDR5(x) non-ECC memory soldered down; IBECC (on dedicated SKUs)
- 1x DDI + LVDS/eDP; Dual independent display support
- Up to 2.5Gb Ethernet with TSN support (ind. SKUs only)
- 4x PCIe 3.0
- SATA 6Gb/s & USB 3.2 Gen2 support
- Optional NVMe SSD onboard up to 1TByte
- E2 versions for industrial grade temp. range (-40°C up to +85°C) usage
- OS: Windows 10 & 11 LTSC, Yocto

COMe-mAS10 (E2) – Feature Overview

- Based on Intel® Atom® x7xxxE/x7xxxRE, supporting up to 8 cores
- Up to 16GB LPDDR5(x) 4800MT/s non-ECC memory soldered down; IBECC
- Graphics: Gen12 GPU, up to 32EUs on dedicated SKUs
- Dual independent display support:
  - 1x DDI + LVDS (optional eDP)
- Up to 2.5Gb Ethernet with TSN support, WOL support
- TPM support (integrated)
- Optional eMMC onboard up to 256GB TLC
- E2 versions for industrial grade temp. range (-40°C up to +85°C) usage

- OS: Windows 10 & 11 LTSC, Linux based on Yocto
- Boot Firmware: UEFI/BIOS (AMI), Slim Bootloader

conga-TC750

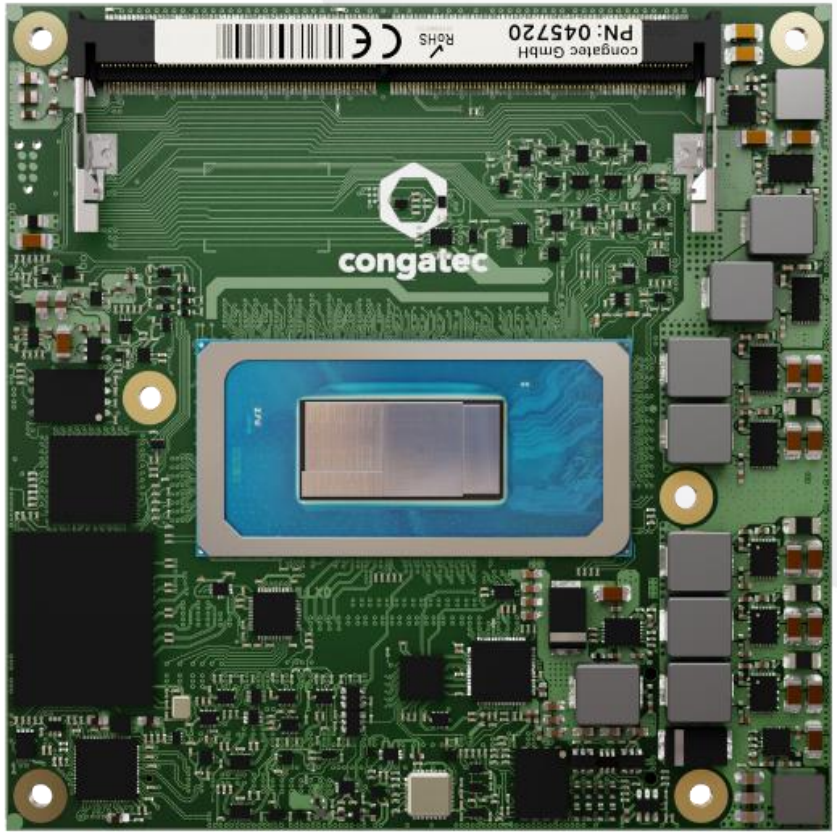
congatec

VIRTUALIZATION READY

Drop-In Compatible Upgrade
Arrow Lake with conga-TC750 is a drop-in upgrade to conga-TC700 with upgraded performance

Next Gen Cores
New Lion Cove and Skymont P- and E-Cores with even more CPU Performance compared to Meteor Lake

Scalability
Design can scale from 15W now up to 45W



Powerful Integrated Graphics
Next gen Intel Arc Graphics with up to 128 EUs

The AI Era is here
Up to 99 TOPS total Edge AI performance enabled by XMX Systolic Array GPU design

Support for even more RAM
Utilize the full capacity of up to 128GB of total system memory with in-band ECC

intel CORE ULTRA 9 intel CORE ULTRA 7 intel CORE ULTRA 5

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COM-HPC Client Size C modules based on Intel Core 2xx series Bartlett Lake-S (preliminary)

– conga-HPC/cBLS

Up to **8 P-Cores and 16 E-cores** on Intel Hybrid Architecture

Up to **12 P-Cores** on Intel P-Core Only architecture

Intel® UHD Graphics 730/770 driven by **Xᵉ Architecture**

Processor Socket FCLGA 1700

VIRTUALIZATION READY

4x **DDR5 SO-DIMM** sockets

1x **PCIe Gen5** x16 |
3x **PCIe Gen4** x4 |
up to 3x PCIe Gen3 x4

4x **USB 3.2 Gen2x**

AI Acceleration with Intel® Deep Learning Boost

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conga-TCR8

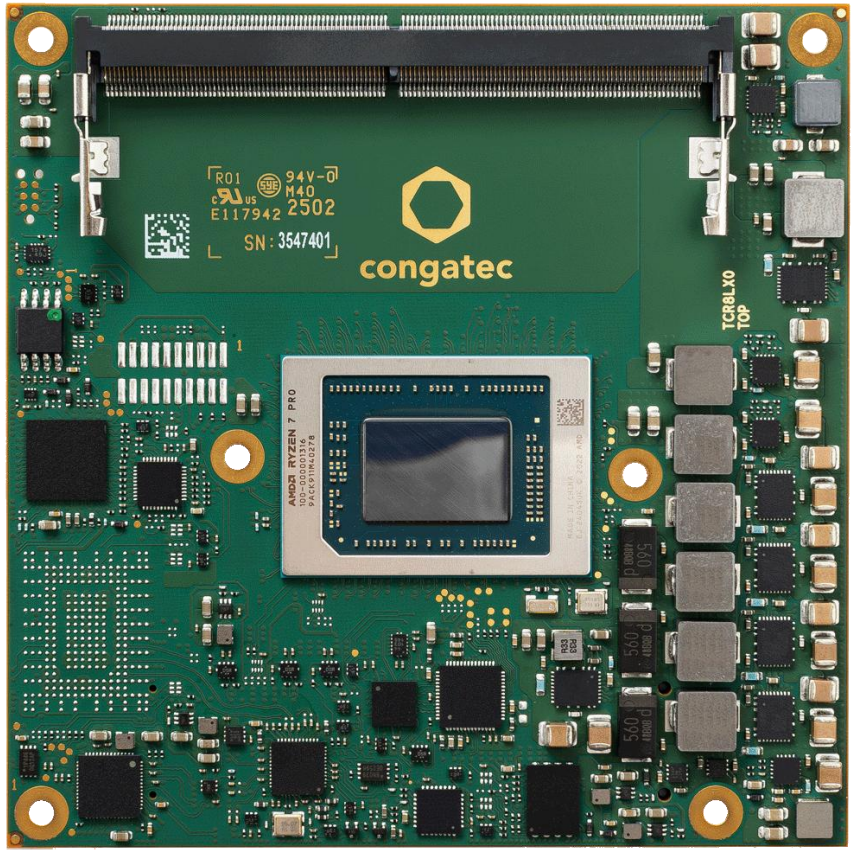
Up to 39 TOPS AI performance on a compact x86 module

High-performance architecture with **integrated CPU**, **GPU**, and **NPU**

Exceptional multipurpose computing with **up to 39 TOPS**

Highly efficient x86 computing with up to 8 Zen 4 cores (4nm)

Superior single thread **performance** with up to **5.1GHz**



VIRTUALIZATION READY

16 TOPS of dedicated AI performance with AMD **XDNA™ NPU**

Immersive graphics with **Radeon RDNA 3™** and up to 12 compute units (CUs)

Easy design-in thanks to wide TDP range from **15W to 54W**

For **memory intensive applications** with up to **96GB** DDR5-5600 (ECC optional)

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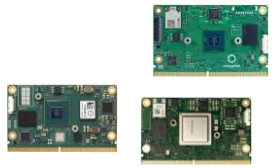
Broad Portfolio



i.MX 95, i.MX 8M Plus, i.MX 8M Mini, TDA4VM, DRA829J	Amston Lake Alder Lake-N Twin Lake	Raptor Lake	Meteor Lake	Arrow Lake	Ryzen Embedded 8000
ARM	x86				
NXP, TI	Intel Atom, Intel Core	Intel Core i3/i5/i7/i9	Intel Core Ultra 5/7	Intel Core Ultra 5/7/9	AMD
Industrial Temp.			Commercial Temp.		
div.	2035	2033	2034	2029	2034
VIRTUALIZATION READY					
NPU	Intel VNNI, Int8 support		Integrated NPU		
Low power and cost effective	Industrial 8C Intel Atom	Best industrial scalability	Dedicated NPU	Best integrated GPU	Homogeneous core design

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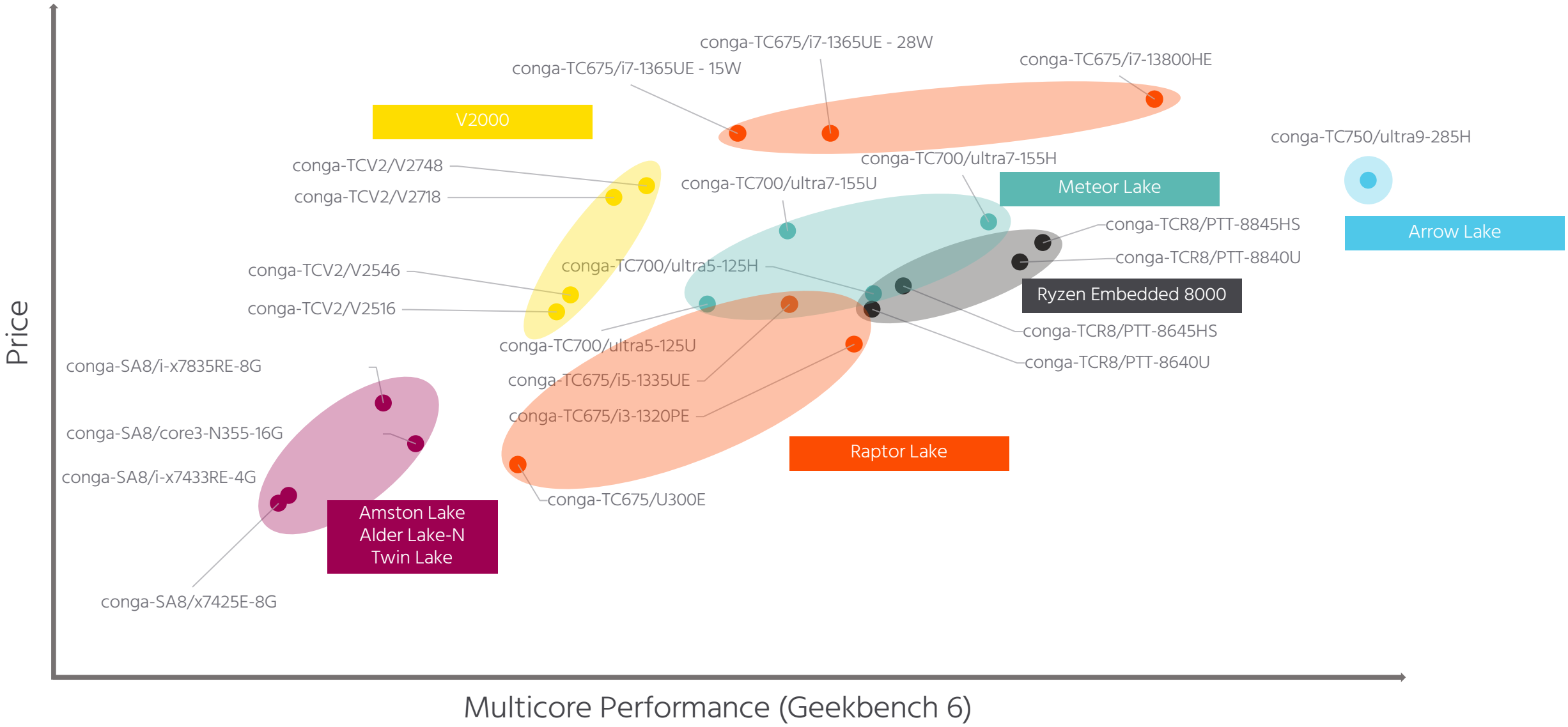
Multicore Performance Landscape



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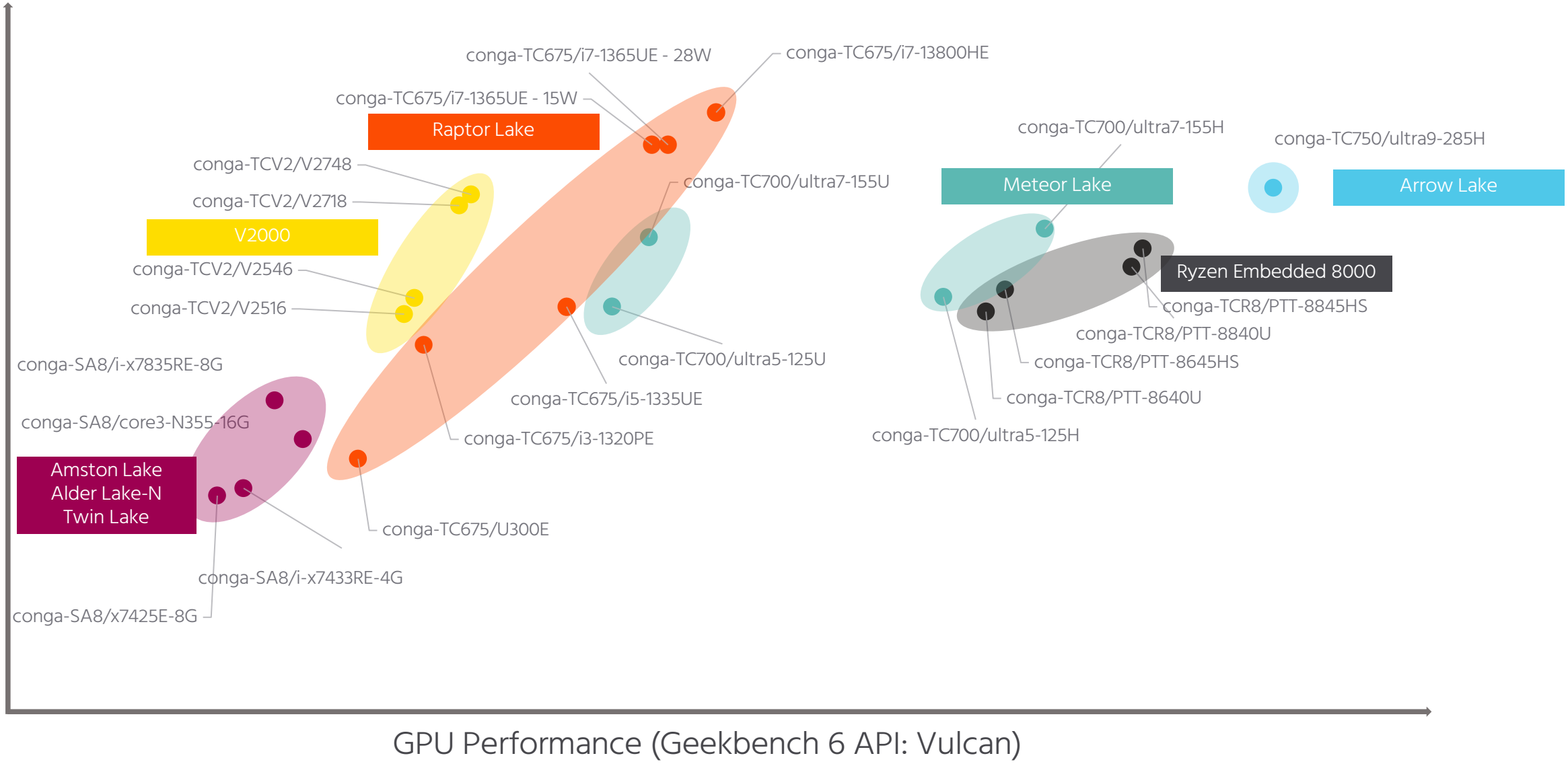
GPU Performance Landscape



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Artificial Intelligence

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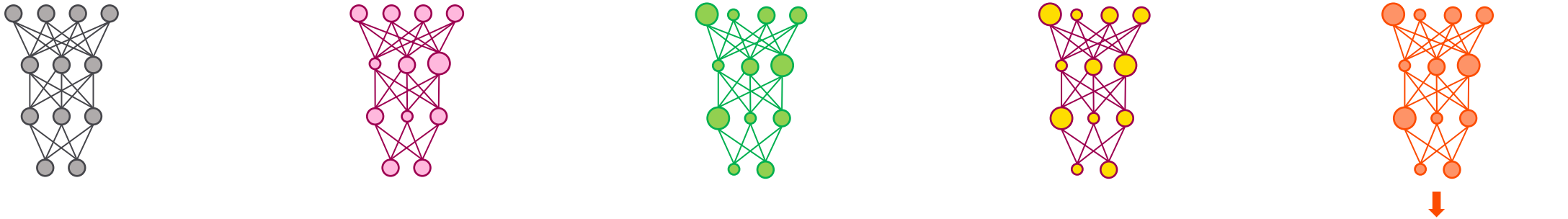
Training or Inference?

Untrained Model → Train model on specific dataset → Trained Model → Optimize Model for specific HW → Use Model as intended



Training is mostly done on large scale servers

Inference can be done on low power edge devices

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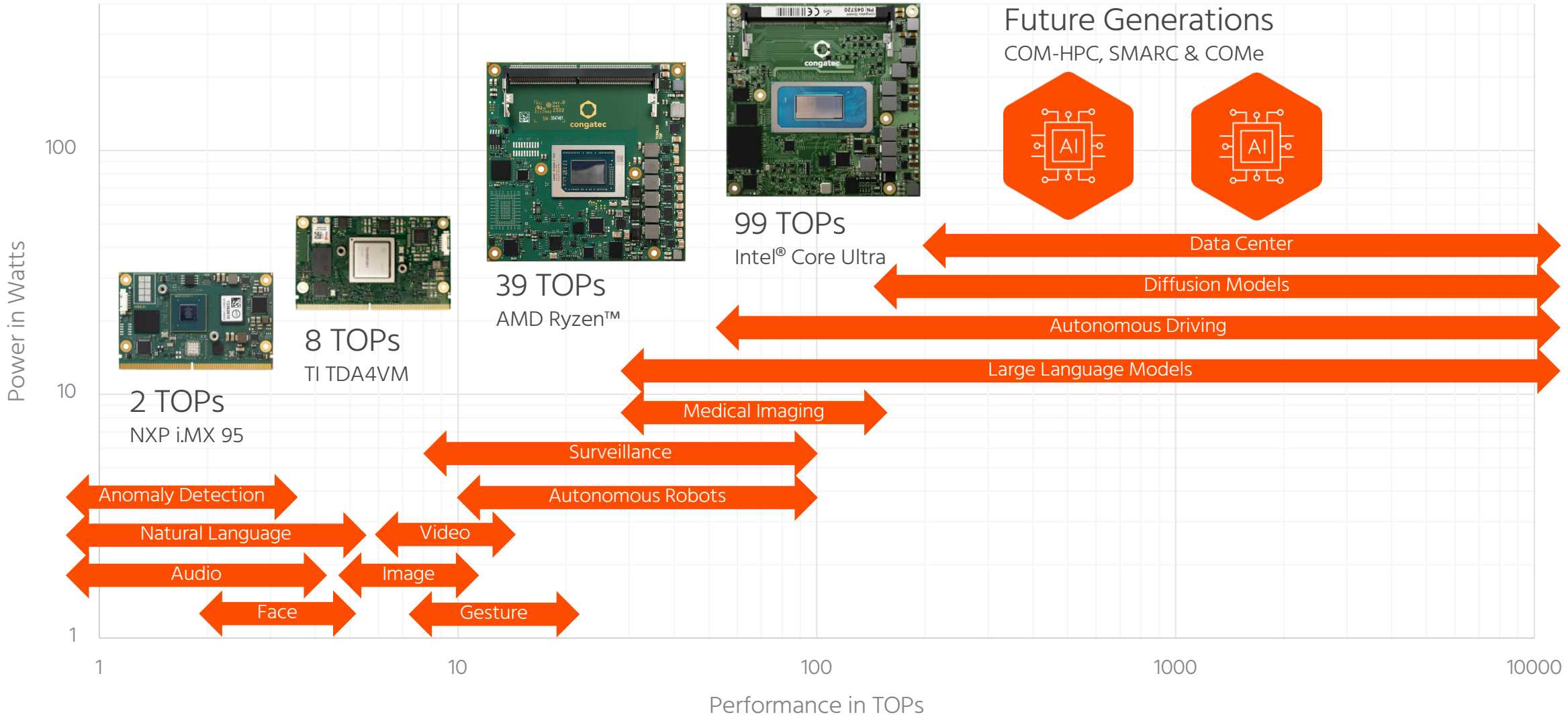
Training or Inferencing?



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aReady. COM

Application-ready Computer-on-Modules from congatec

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aReady.COM by congatec

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- IoT building blocks by subscriptions models
- IoT building blocks by license
- ctrlX apps bundled with ctrlX OS

Software

Fleet Manager

Cloud Connector

Application Manager

COM Manager

Model Connect

ctrlX

...

- Image by customer license
- Image by congatec license

OS

Real-Time LINUX

Windows 11

ctrlX OS

THE OPERATING SYSTEM FOR AUTOMATION

ubuntu

Supported by Canonical

...

- Preinstalled/configured
- Trial License on Board
- Free demo OS images
- Enabling full license

Virtualization / Consolidation

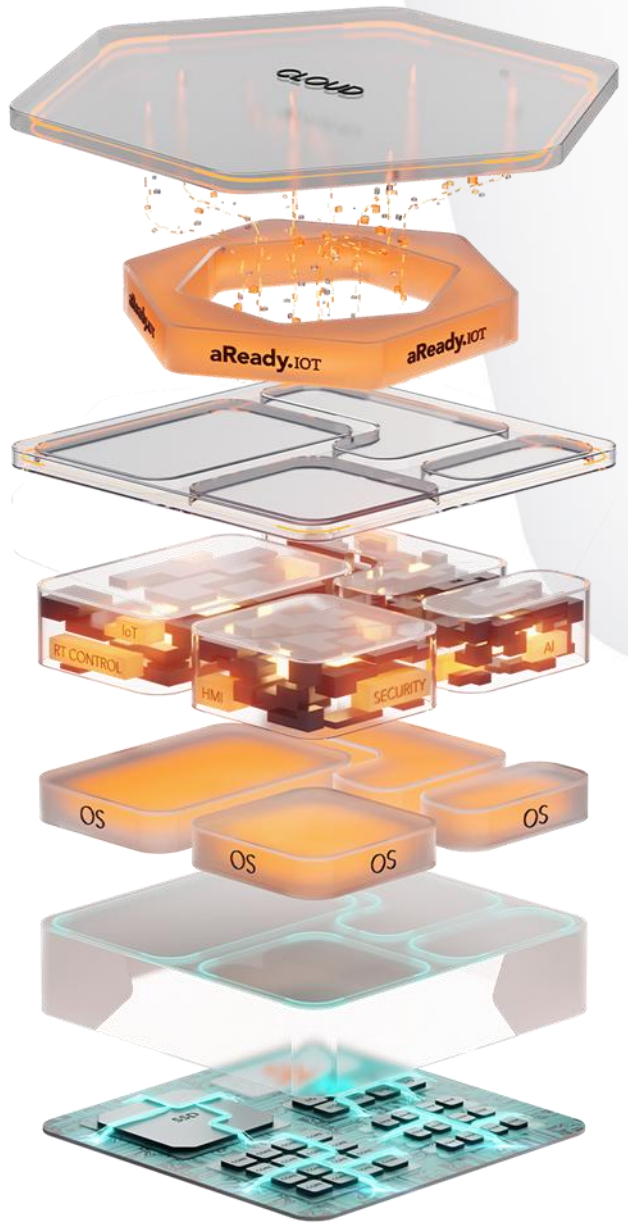
...

Module

COM Express®

COM HPC®

SMARC module



aReady. | Don t be just ready. Be application ready.

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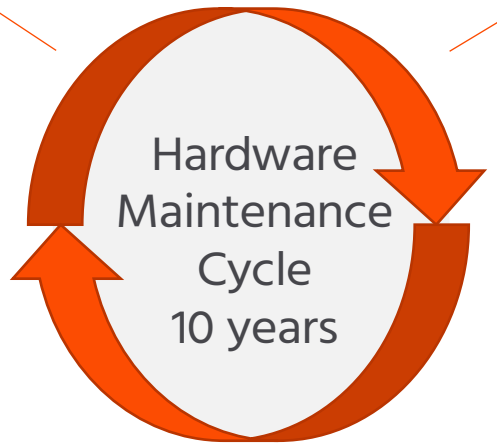
aReady.COM – Ubuntu Pro LTS

Ubuntu Certified Hardware

Canonical offers to certify hardware for the usage of Ubuntu software.
➔ Certified Devices are tested every 2 weeks against new Ubuntu updates

Update
Automatic/manual push updates images

Patches
Bug fixes are integrated into kernel



Regression Test
Run updated images on all certified hardware

congatec modules will be Ubuntu certified as a standard offering. **In addition to this we offer the certification of the customer system! (congatec module + customer carrier)**

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aReady. IOT

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The past

- Standalone devices in the nowhere
- No stock information
- Slow response to failures
- Traveltime of technicians
- No health status

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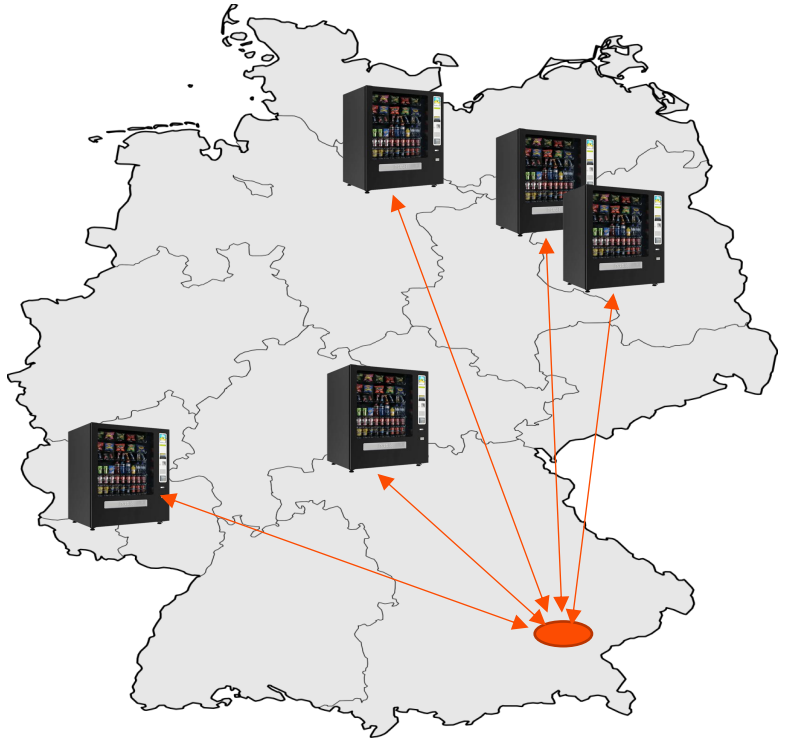
concept of building blocks

COM Manager

Application Manager

Fleet Manager



From centric to holistic: Main differentiator between the packages

- COM Manager is able to manage the COM itself.
- Application Manager offers the possibility to manage the whole application, including carrier and peripherals.
- The Fleet Manager is identical to the Application Manager and offers additional the grouping of devices and mass deployments of actions.

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product offering

	COM Manager	Application Manager	Fleet Manager
COM Hardware information	✓	✓	✓
Remote control of COM	✓	✓	✓
Dashboard	✓	✓	✓
Software Maintenance	✓	✓	✓
Remote Management of carrier and peripheral devices		✓	✓
Rule engine framework		✓	✓
Notification engine		✓	✓
Mass deployments of configurations and Updates			✓
Cloud Connector	Allows to export all device data to an external Cloud, e.g. MS Azure IoT, AWS, Telekom Cloud		

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Description COM Manager

Remote Management of COM

- Restart or shutdown: Remote start, stop or reboot.
- Software updates: Installing or updating operating systems and applications.
- Access to logs: Reading system logs for error analysis.

COM Manager

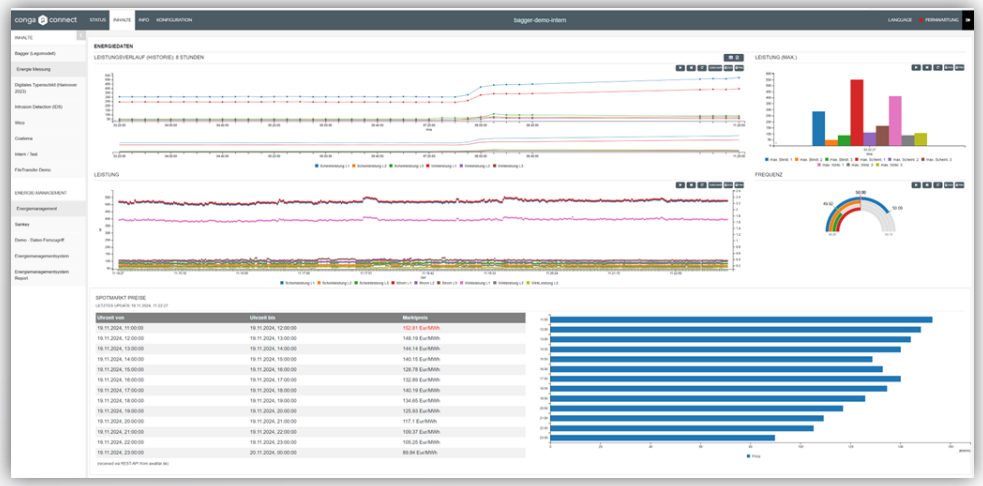
- Remote Control
- Hardware Information
- Dashboard
- Software Maintenance

Software Maintenance

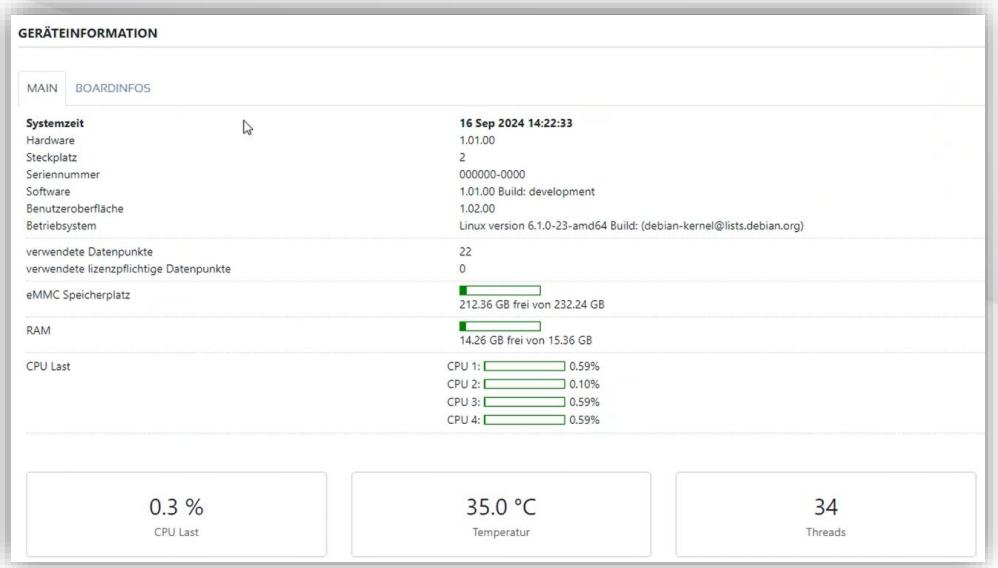
Remote Updates

- BIOS
- Firmware
- IoT Software Stack
- Hypervisor

HMI



Hardware Information



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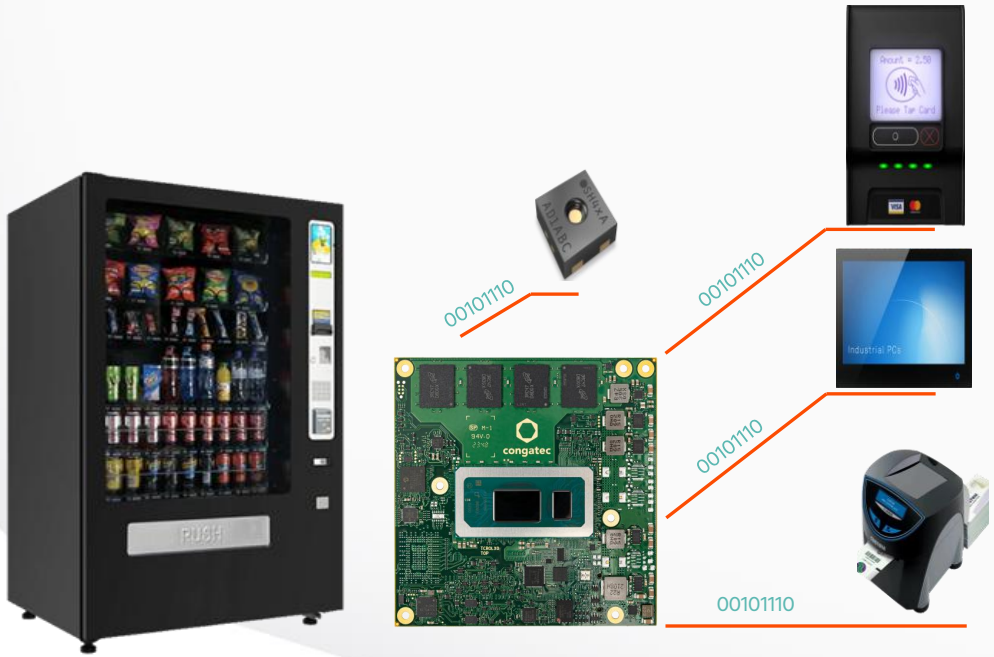
Description application manager

Notification Engine

- Notifications by email
- API to integrate 3rd party vendors and usage of messengers, SMS service and similar.

Industry standard communication protocols for connecting peripheral devices

- API to allow customer to add own hardware
- OPC UA Client and Server
- MQTT Broker and Client connection
- PLC Client: S7 / S5
- REST Client API
- Modbus Client
- Cloud IoT Service (Azure IoT, Telekom, AWS)
- Database (InfluxDB, SQLite), Connector Client (InfluxDB, MySQL)
- RFC 1006
- Notifications (SMTP Client)
- AAS Connector



Application Manager

- Remote Management of COM + Peripherals
- Industry standard communication protocols
- Rule Engine Framework
- Notification Engine
- Software Maintenance OTA

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Description fleet manager

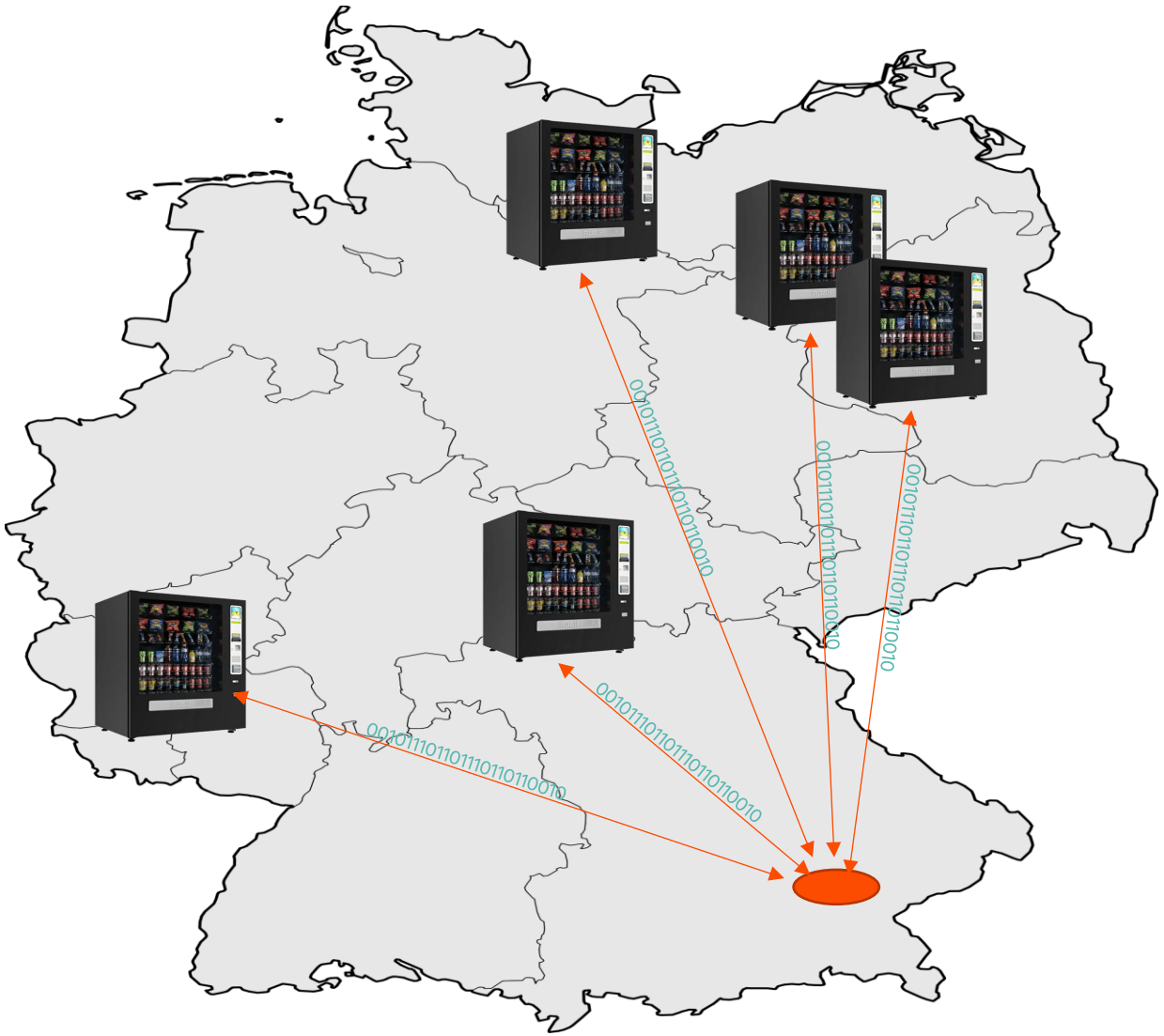
Definition of Device Groups

- Group Devices by different criteria
- Deploy actions to a group at devices at one time

Mass Deployments

Remote Updates

- Configuration files
- BIOS
- Firmware
- IoT Software Stack
- Hypervisor



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description cloud connector

Allows to export all device data to an external Cloud, e.g. MS Azure IoT, AWS, Telekom Cloud

- Data Analysis and Visualization
- Alerts and Notifications
- Optimization and Control
- Data Integration
- Long-Term Storage
- Machine Learning and AI
- Security and Access Management

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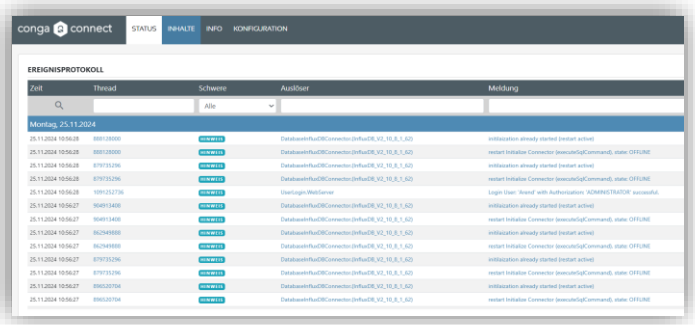
The circle closes

The past

- Standalone devices in the nowhere
- No stock information
- Slow response to failures

Today

- Connected devices
- Available health status and business figures
- Fast maintenance response



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aReady. VT

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aReady. VT

20 YEARS congatec

Virtualization Technology

- Hypervisor-on-Modules
- Easier access to VT
- Demonstrate software competence

VIRTUALIZATION READY

- RTS Hypervisor
- Secure Bootloader
- Coming Soon
  - Secure Hypervisor (IEC 62443 Certified)

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aReady.VT

OS Support

- Compatible:

On Time REAL-TIME AND SYSTEM SOFTWARE RTOS-32

MICROWARE OS-9

Windows Embedded Compact

- Featured:

BlackBerry | QNX Neutrino

WNDRVR VxWorks

Real-Time LINUX

Ubuntu

tenAsys Embedded Virtualization Solutions INtime

Windows

Microsoft Hyper-V

XENOMAI

debian

- Next:

ctrlX OS THE OPERATING SYSTEM FOR AUTOMATION

https://www.real-time-systems.com/products/os-compatibility/

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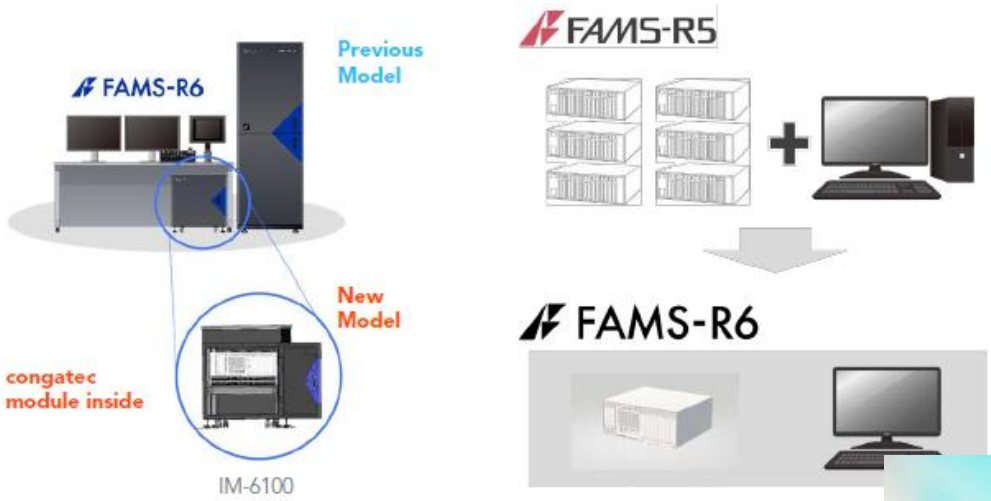
Customer Reference: Ono Sokki

Real-Time Hypervisor Success Case | IM-6100 (FAMS Unit)



System consolidation enabled Ono Sokki to reduce the number of PC systems necessary for any test installation from as many as seven to only one.

CASE STUDY

Cutting complexity with a single module design

See system consolidation in action! Ono Sokki reduced hardware requirements for its test and measurement solution by going from seven systems down to just one with congatec's Computer-on-Modules and real-time hypervisor.

Download Now

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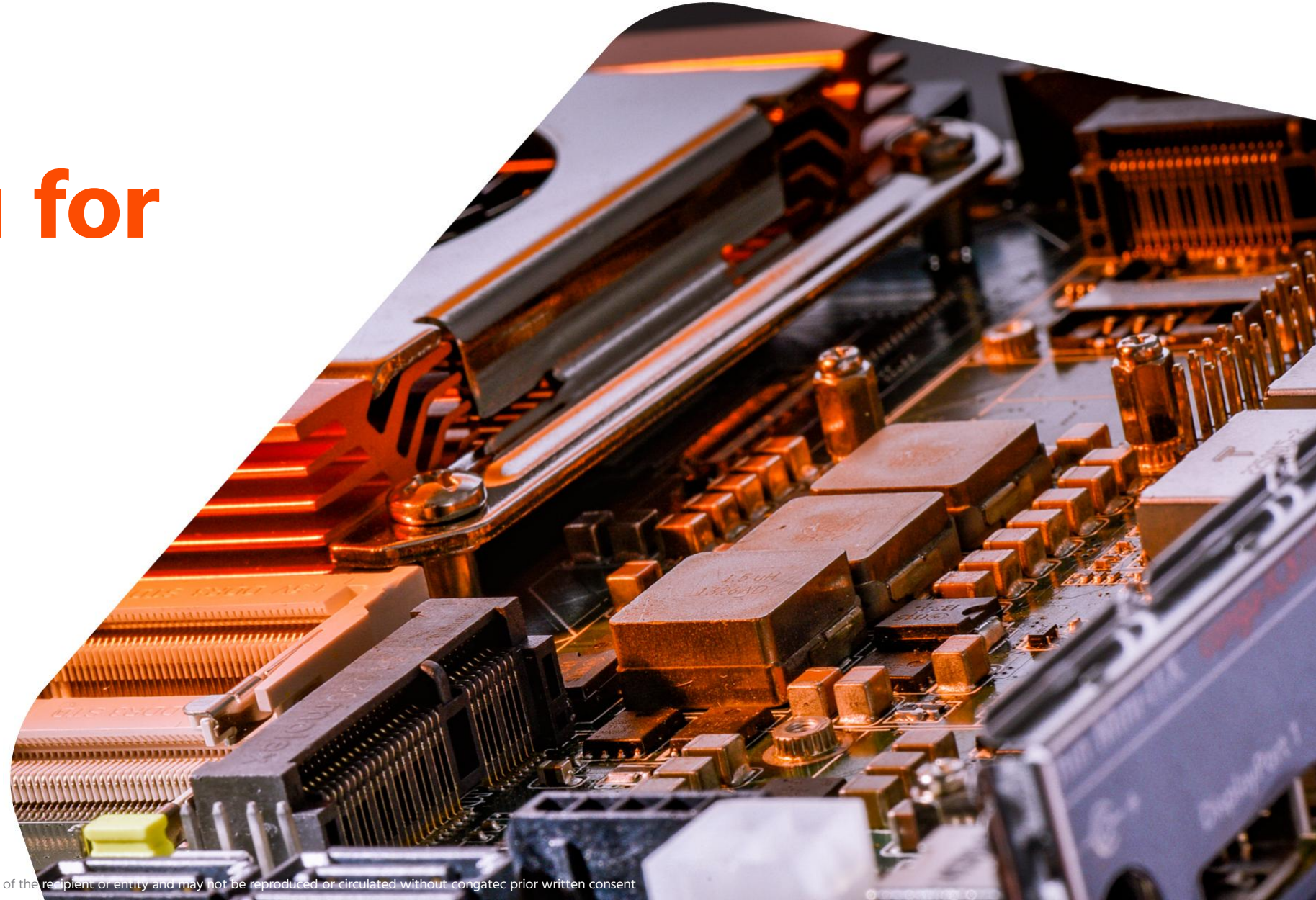
Thank you for your time.

Questions?



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