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XploR, a Platform to Accelerate Silicon Transformation

Challenges for the system designers undergoing silicon transformation

- Vertically integrated products (AI / edge, automotive, wireless) are *highly specialized*

- Products are *more complex and multi-dimensional* (e.g., domain customization, software, hardware system design, semiconductor integration)

- Design industry evolved into different *pockets of excellence.* Within these, system designers are forced to choose and work with solutions from *best of breed*s.

- System companies engage in *human intensive tasks* of building teams and developing expertise to find, integrate, and support solutions from different vendors.
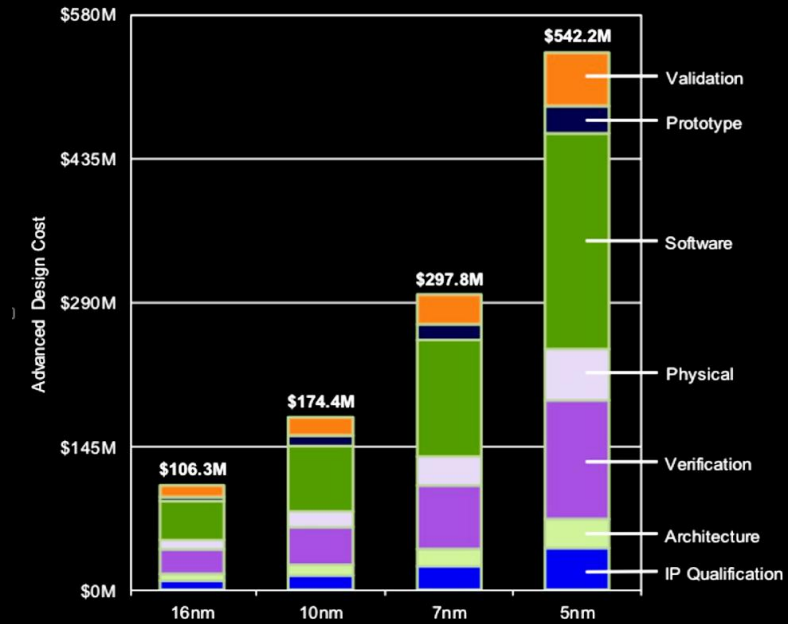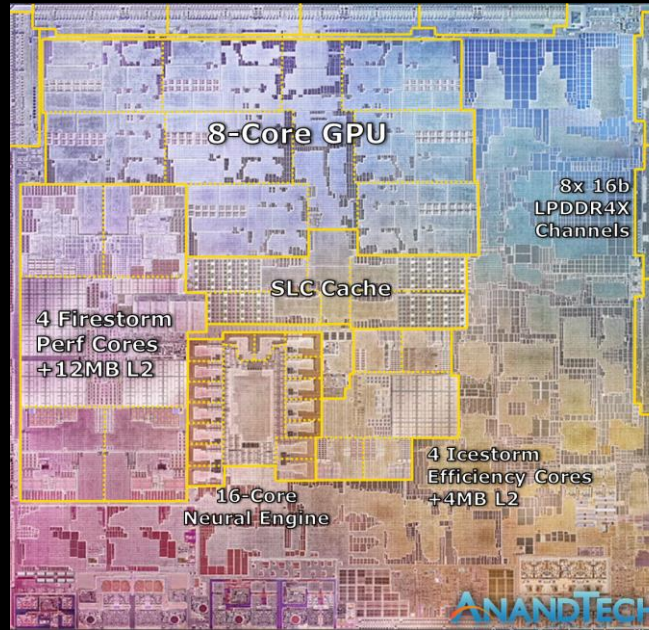
Typical development flow
System companies as solution integrators

- System companies use products / solutions from different vendors for different needs

- Even different solutions from the same vendor are not fully integrated

- Solution and product vendors operate in silos

- System companies forced to

Verification

Validation

Software Development

Prototyping

Architecture Exploration

IP Qualification

Consequences of solution silos

- *Higher costs, more risks, and longer development life cycle for system companies.*

- *Difficulty to scale ambidextrous work force capable of transitioning to and supporting different solutions at different stages of development.*

- *Less opportunities for solution vendors to show-case value-add, and for emerging, smaller vendors to gain market exposure.*

8-Core GPU

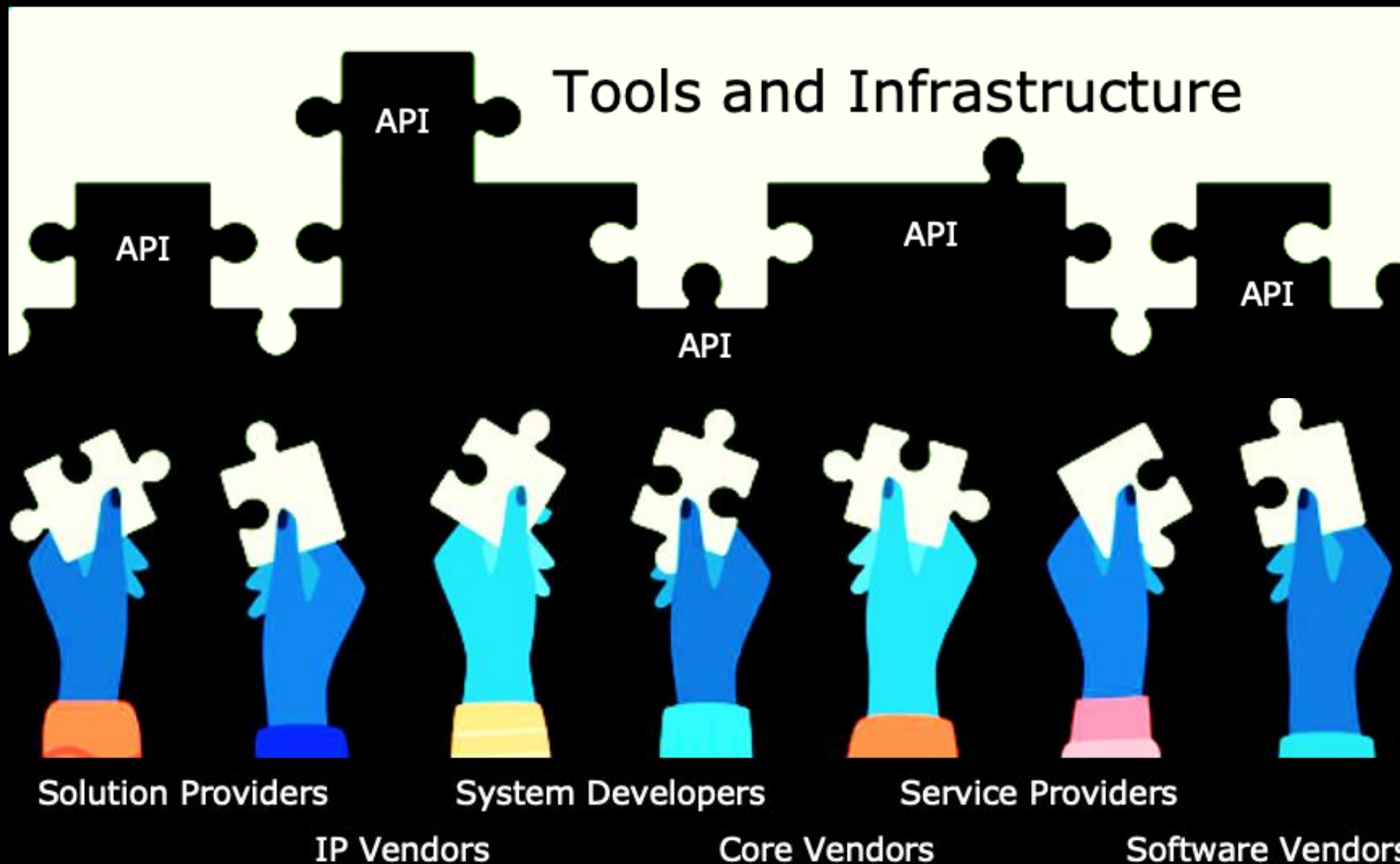8x 16b LPDDR4X Channels

SLC Cache

4 Firestorm Perf Cores +12MB L2

4 Icestorm Efficiency Cores +4MB L2

16-Core Neural Engine

ANANDTECH

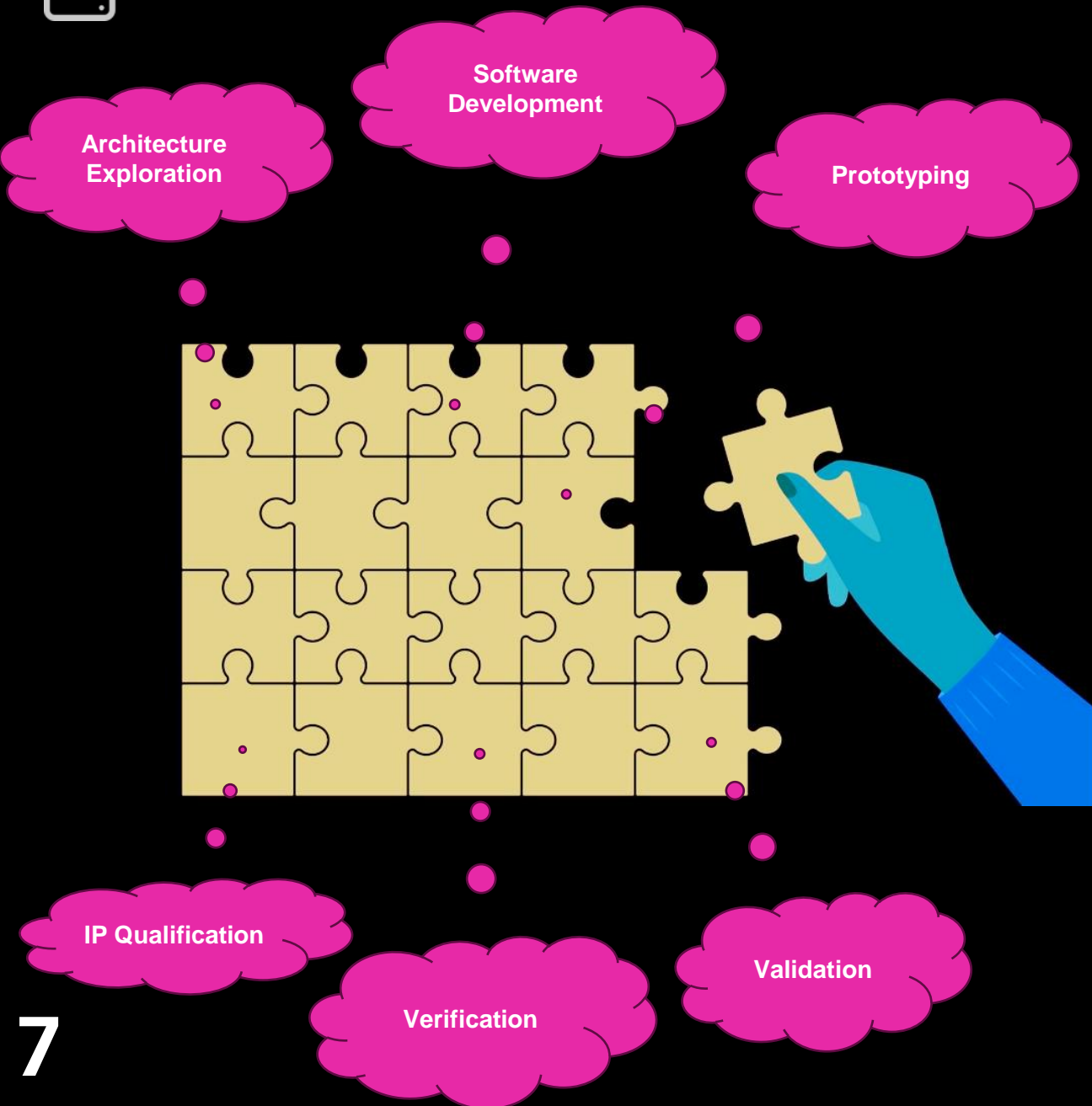Complex Designs   +   Higher Costs

=   Smaller window to "get it right"

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Introducing XploR

A platform to democratize system designs and accelerate silicon transformation

XploR brings EDA providers, tools, and infrastructure together

Software Development

Architecture Exploration

Prototyping

IP Qualification

Validation

Verification

Platform-driven development flow

Platform is pre-integrated

- XploR is an integrated ecosystem of products and solutions

- EDA providers to proactively integrate products and solutions

- EDA solution providers and product vendors to collaborate on XploR

- Customers and system companies to onboard at the highest level of integration

Participants access and integrate with XploR through API(s)

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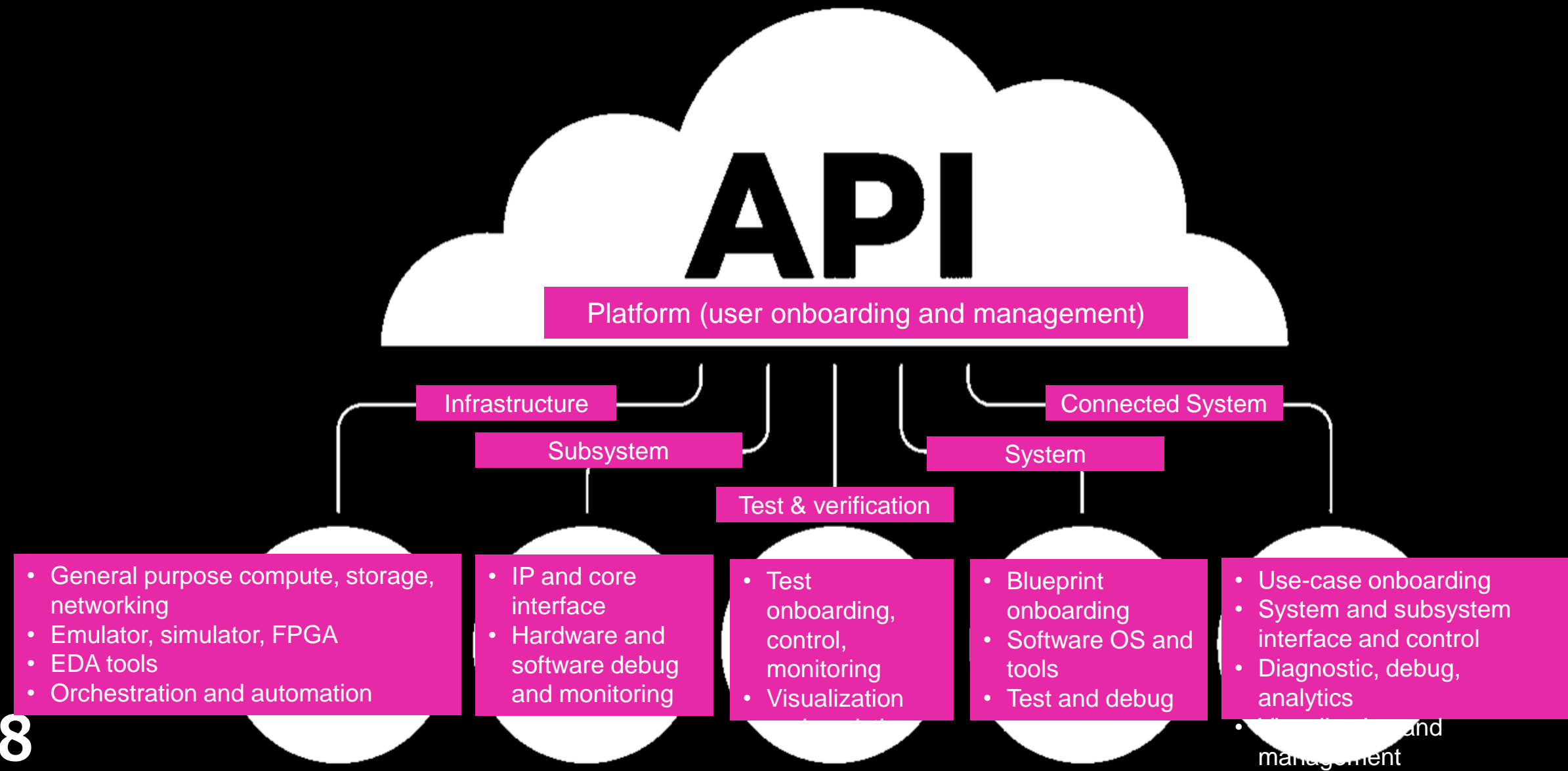
Feature: Availability of tools, IP(s) and designs at different level of abstraction

Modular building blocks from EDA infrastructure to application-centric reference designs
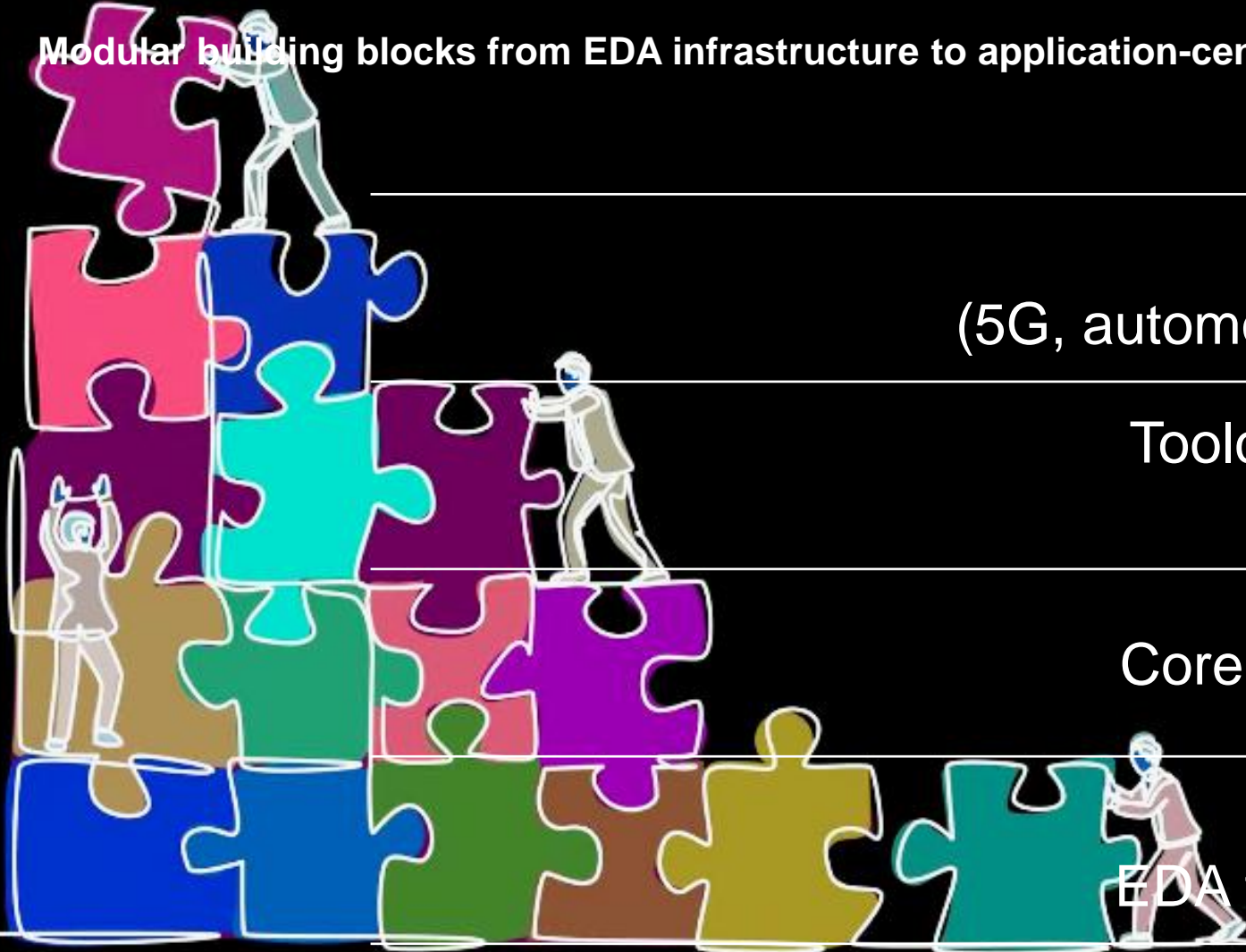
Connected systems, digital twins

App-centric blueprints
(5G, automotive, cybersecurity / networking)

Toolchain, SDK, runtime environment
(Linux, Zephyr, FreeRTOS)

Core / peripheral IPs and subsystems

Simulator, emulator, FPGA,
EDA tools, test & verification solutions

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Feature: Toolchain & IDE (XploR.studio)

Out-of-box development tools for heterogeneous SoC system

Software toolchain & runtime environment

- GCC / LLVM

- Standalone C/C++ libraries

- Optimized and secure embedded Linux

Integrated development environment

- Eclipse (now) and Visual Code (coming) based

- Advanced debugging with support for:

    - RTOS awareness (FreeRTOS, Zephyr, Embedded Linux)

    - Trace, complex breakpoint
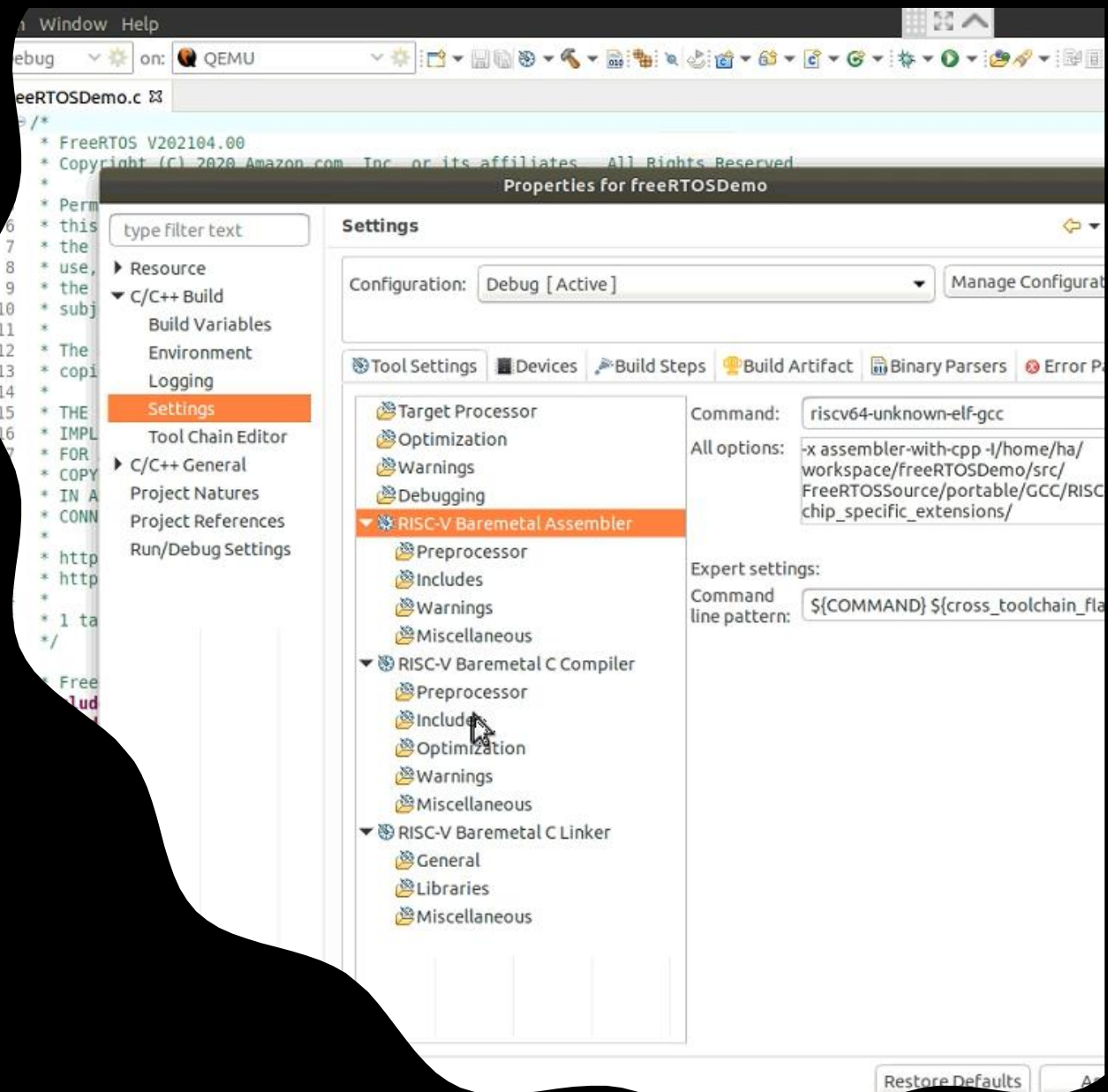
Feature: Integration with Siemens EDA tools

Graduate design through different stages of development

Applications (Automotive, 5G, edge, IoT)
SW stack (toolchain, OS, debugger)
Core IPs (RISC-V, ARM)
Peripheral IPs

Higher order blueprints for growth verticals incorporating different architecture and IP:

- 5G ORAN 7.2x ODU
- Cybersecurity and high-speed networking
- AI / Edge inferencing

Simulators (Hycon)

Emulation (Strato)

Prototyping (proFPGA, Primo)

ASIC

Architectural simulators (Hycon, QEMU, Spike), and RTL simulators (QuestaSim)

RISC-V as well as heterogeneous ASIC with ARM and RISC-V

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Feature: Integration with Siemens Automotive Digital Twin

Enable functional verification of software development for complex automotive designs

- Automotive digital twins for functional verification and software development at different stages of development.

- High-fidelity in-the-loop integration of compute and peripheral IP(s) (ADAS, sensors, AI / ML).

- Mixed-reality deployment of virtual models, FPGA, and emulator execution engines.

Available Variations:

- Vehicle(s) to vehicle(s) communication with base station

- Vehicle(s) to phone communication over LTE infrastructure

- Infrastructure (streetlight) to vehicle(s) communication

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Feature: Seamless migrate from individual to cloud to on-prem

Cloud-elastic, flexible environment for development and collaboration

On Prem
+ Private hosted

- Simulator – QEMU, QuestaSim

- Prototyping – Siemens Primo

- Emulator – Siemens Veloce

- Digital Twin – Siemens Pave360

Cloud
+ Verification / validation / digital twin

- Simulator – QEMU, QuestaSim

- Prototyping – Siemens Primo

- Emulator – Siemens Veloce

- Digital Twin – Siemens Pave360

- AMD / Intel FPGA

Developers
IP qualification / prototyping / software dev

- Simulator – QEMU, Spike

- AMD FPGA – UltraScale / UltraScale+
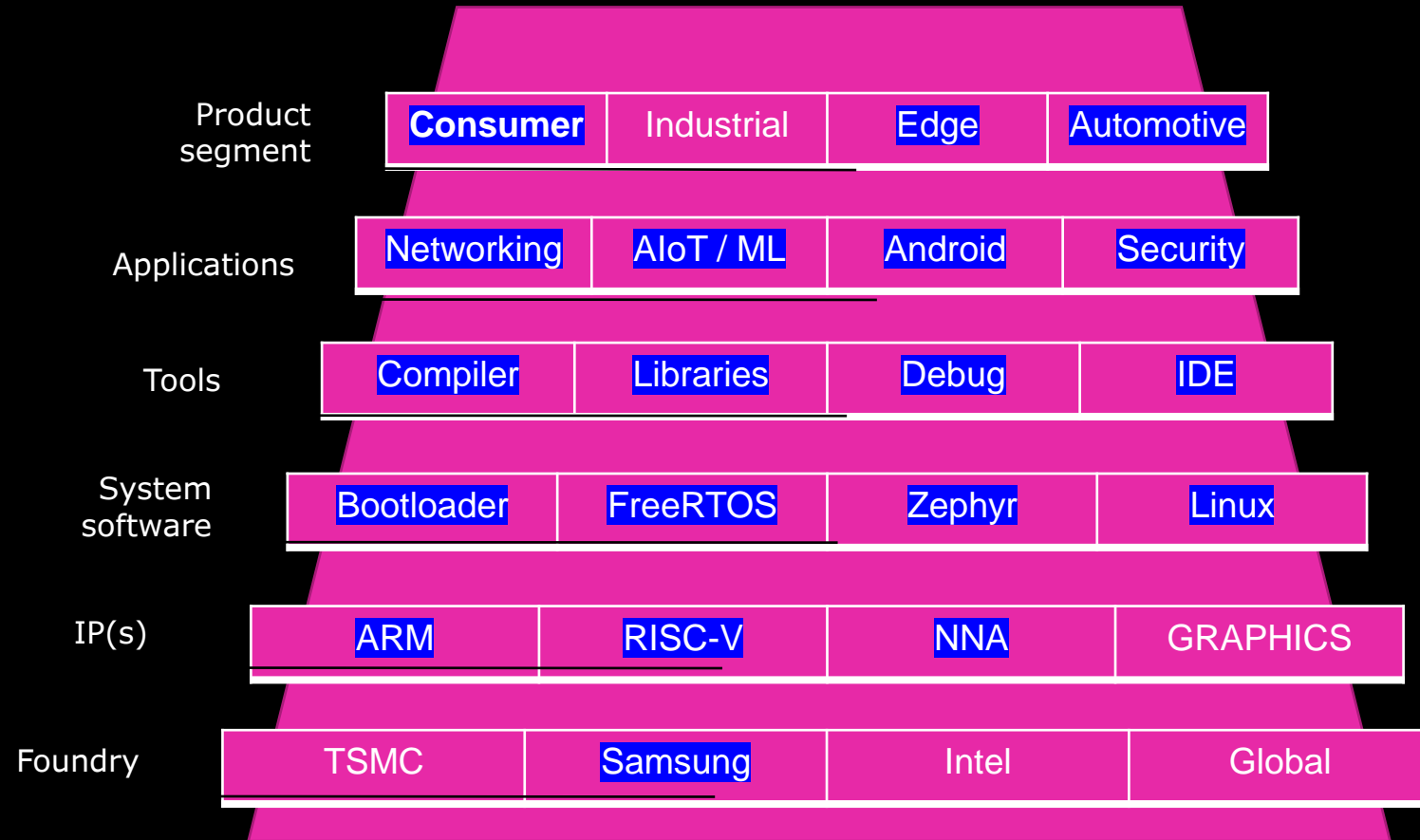
- Intel FPGA – Cyclone, Stratix, Agilex

Benefit: reduce and manage complexity of designs

Ready-made domain-specific design enables system companies to focus on their specific needs

IC-XploR lets developers onboard and execute blueprints (pre-packaged, pre-built core and IP(s), operating systems, apps, and dev) on hardware-assisted verification, and prototyping platforms.

XploR has customized and integrated these layers and packaged them in blueprints to help organizations:
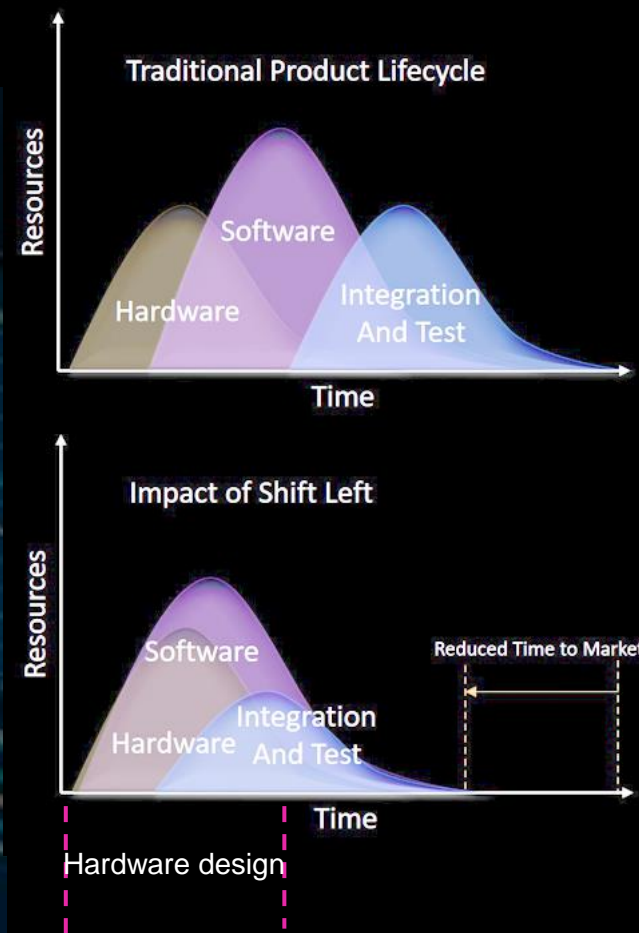
- Reduce complexity with consistent tools and processes, and

- Manage complexity with encapsulation and abstraction

Layer				
Product segment	**Consumer**	Industrial	Edge	Automotive
Applications	Networking	AIoT / ML	Android	Security
Tools	Compiler	Libraries	Debug	IDE
System software	Bootloader	FreeRTOS	Zephyr	Linux
IP(s)	ARM	RISC-V	NNA	GRAPHICS
Foundry	TSMC	Samsung	Intel	Global

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# Benefit: accelerate software development

Shift left development and re-use tools and methodology horizontally

- Domain-driven designs and integration with Siemens EDA Automotive Digital Twin Platform to help contain and abstract complex subsystems.

- Consistent system software and tools to reduce DevOps variation at different stages of development.

- Access long-term impact in compatibility and performance of different cores and IPs to avoid surprises.

Traditional Product Lifecycle

Resources / Time

Software

Hardware

Integration And Test

Impact of Shift Left

Resources / Time

Software

Hardware

Integration And Test

Reduced Time to Market

Hardware design

Simulation → FPGA → Emulation → ASIC

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Example: multi-site, mix-mode collaborate development

A design consisting of different IPs, tools, and software environment from different development sites
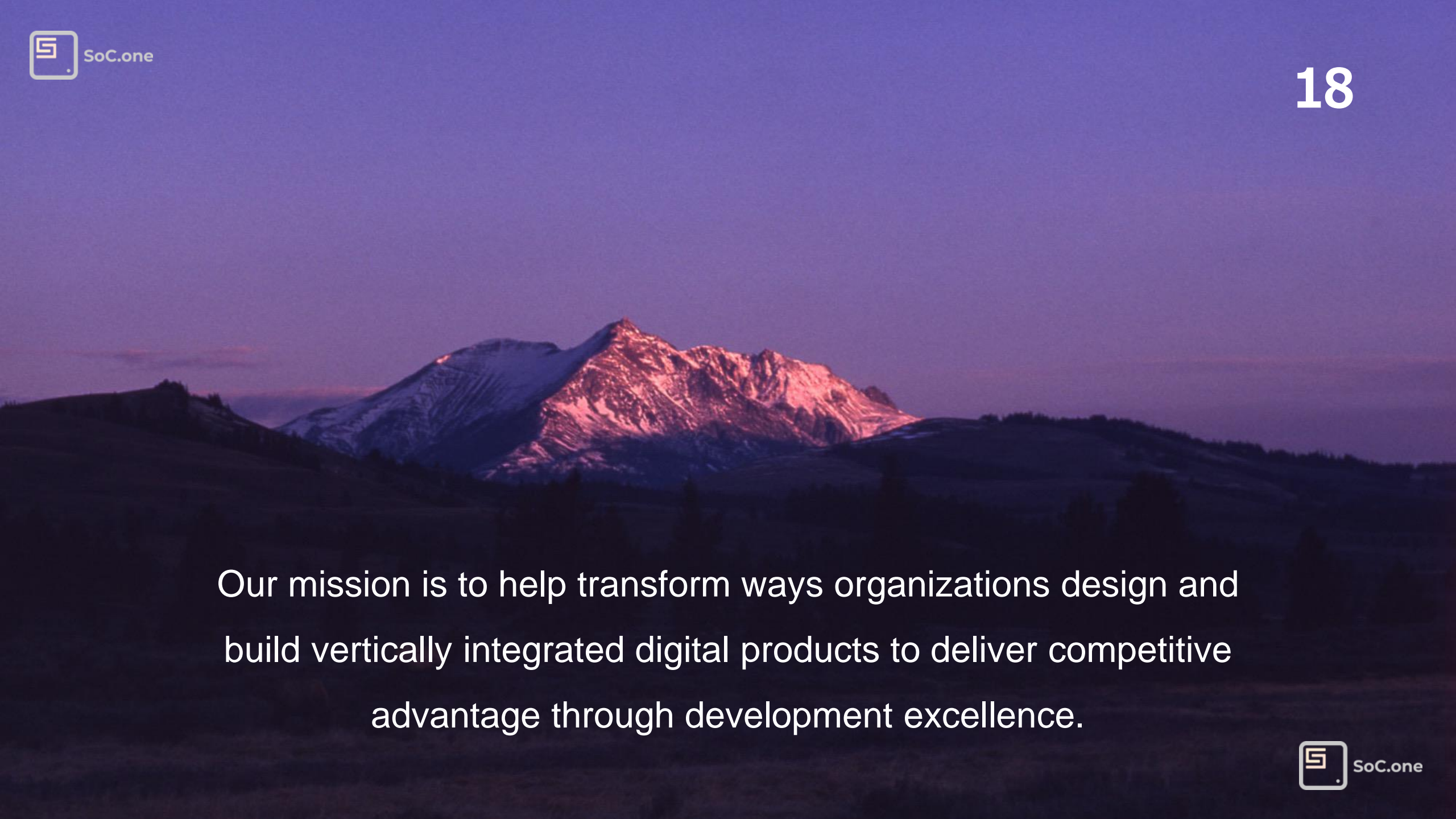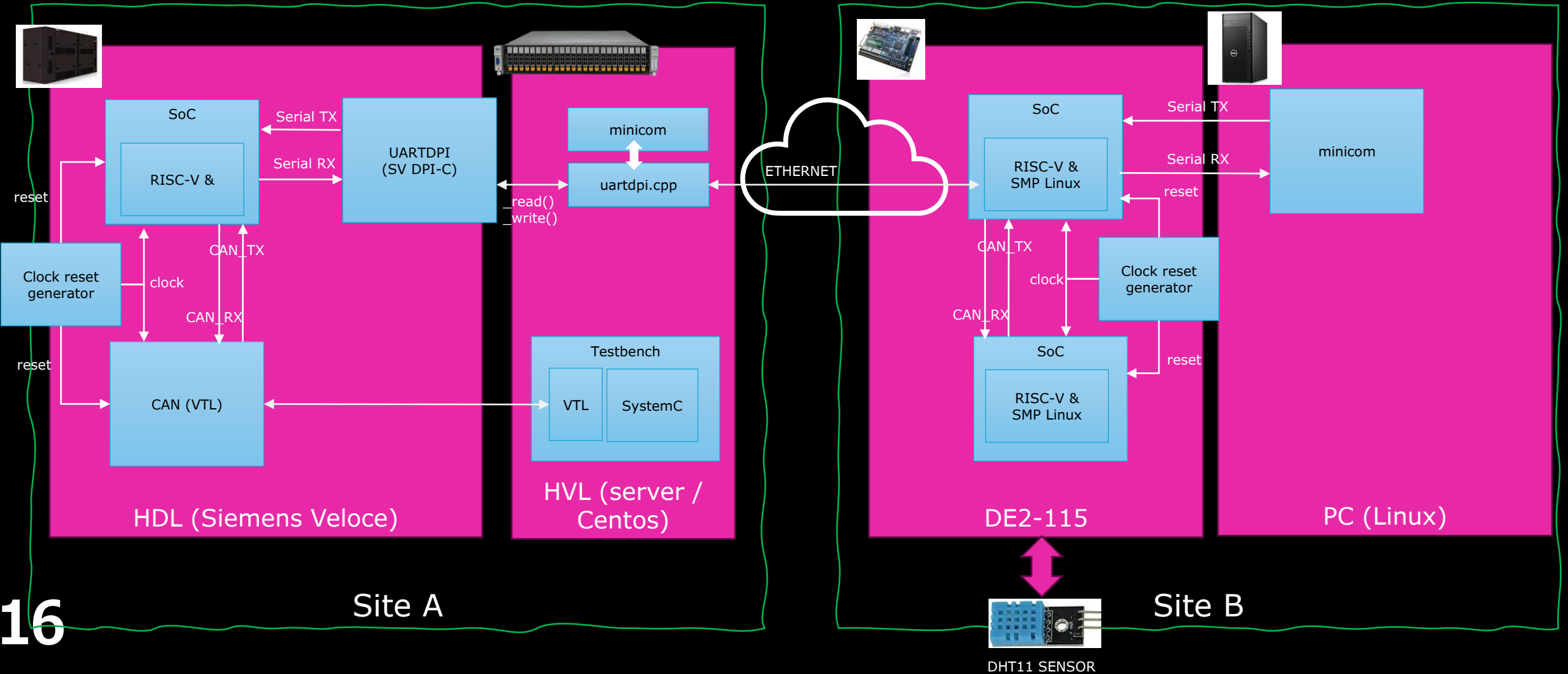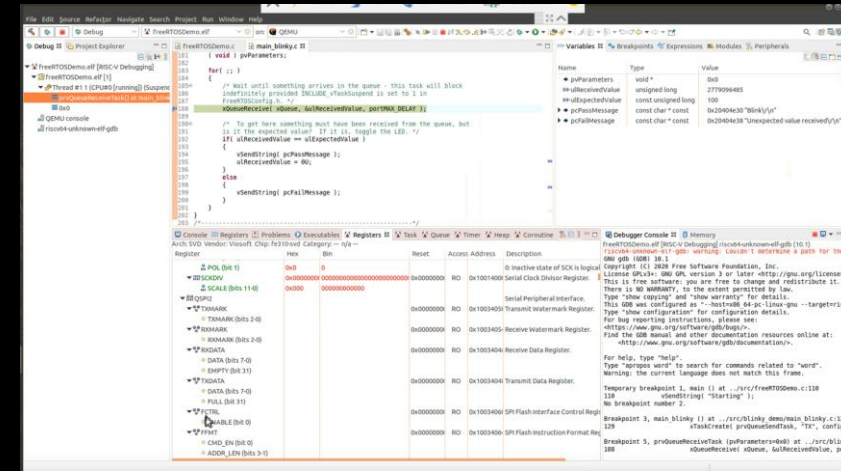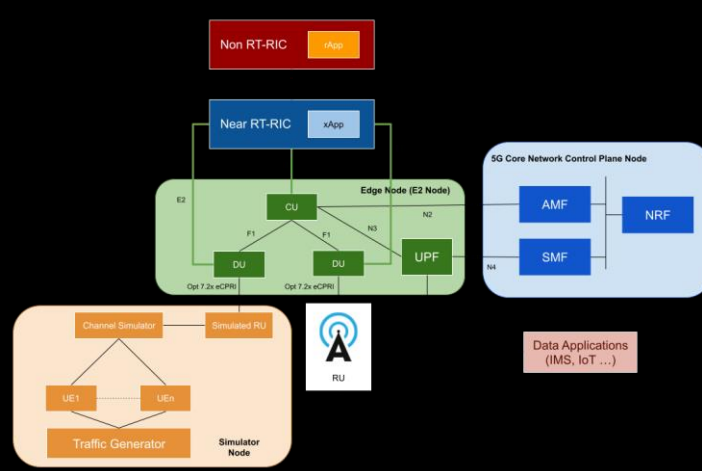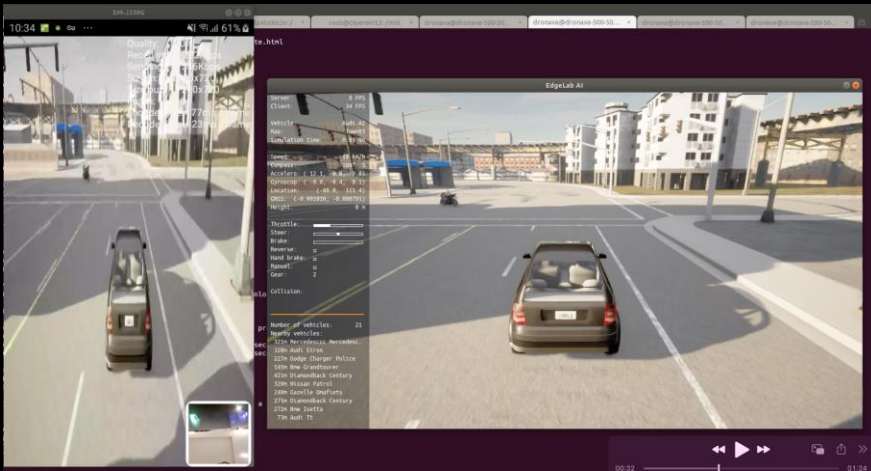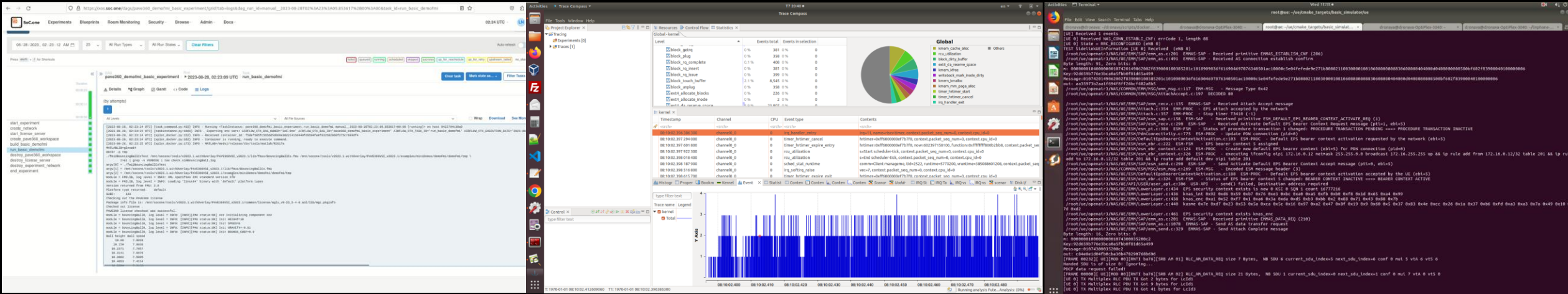
Example: IP and Software enablement

Heterogeneous SDK, toolchain, OS, profiles, blueprints, and reference designs

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Our mission is to help transform ways organizations design and build vertically integrated digital products to deliver competitive advantage through development excellence.

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Q & A

About Us

- Global team of embedded and system developers over three continents since 1996.

- Among one of the pioneering companies to commercialize Linux for embedded

- Long history of enabling customer success in verticals ranging from communication, consumer devices, digital transformation, 5G / networking, defense, and medical

- SoC.one spin-off in 2019 to focus on RISC-V / heterogenous SoC design

A legacy of our customers and partners from SoC.one