Commercially supporting Yocto Project Linux with Wind River Systems Linux

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BY 2024:

THE WORLD EDGE COMPUTING MARKET IS PROJECTED TO REACH $250.6 BILLION

—Statista 2021

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Some of the challenges faced by edge solution developers

- Time-to-market
- Hardware enablement
- Cost
- Memory and other device constraints
- Long term maintenance & support
- Managing CVEs
- Portability between hardware platforms
- Managing compliance and export
- Technical assistance

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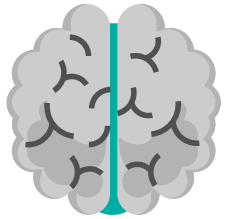
Linux drives the intelligent edge

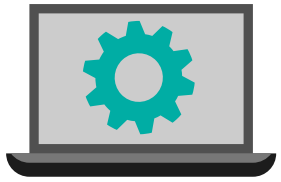


Faster Community-based Innovation

AI and Machine Learning

Standards for All Industries

Highest Levels of Security



Adaptive to Multiple Use Cases

Drives Cloud Native & DevOps

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Purpose Built Linux: One Size Does not fit all

Yocto Project was created in part because of this need for customization

Physical Memory used

Total Used Physical Memory (unit:MB)	LTS-10.21.12
Tiny	25.44
Standard	431.78
Preempt-rt	423.11
OVP Host	582.22

Thread Latency

Cyclictest Maximum Value (sample: 43200000, 12 hours; unit: usec)	CentOS_7.9 Standard	CentOS_7.9 Preempt-rt	LTS-10.21.12 Preempt-rt
Bare Metal Workload	1306	12	5
Container Workload	1796	16	6
VM Workload	1972	126	41

- Tiny kernel is absolute minimum; single task, unconnected, unintelligent device
- Standard kernel is server-class system (COTS server HPE, Dell, etc.)
- Real-time is medium-to-small configuration for low-latency and “real-time virtualization” use cases

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Yocto Project is the foundation for Wind River Linux

Build Your Own Linux Distribution from Source

- Derived from and fully compatible with Yocto Project
- Fully supported by Wind River
- Advanced embedded Linux development platform
- High performance with low-latency and small footprint
- Cloud native and DevOps enabled
- Continuous testing, integration, and delivery

10 Year Standard or Premium Support and Maintenance

Security Vulnerability Protection

Open Source Compliance and Export Artifacts

Project-Based Pricing — No Royalties on Deployed Systems

Support for a Wide Range of Embedded Devices

Full Range of Professional Services Available

Wind River Studio Full CI/CD Application Development Environment (Optional)

Managed Distribution Services Available

Star Lab Titanium Security Portfolio (Optional)

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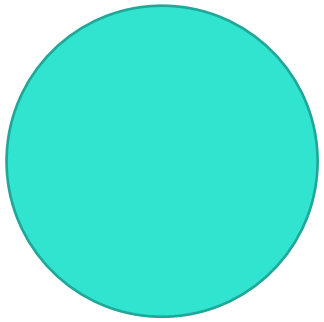
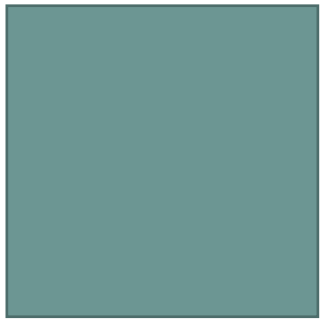
Wind River Linux:
Multiple paths to a purpose-built Linux



Wind River Linux Distro

Binary Distribution with OSTree updates

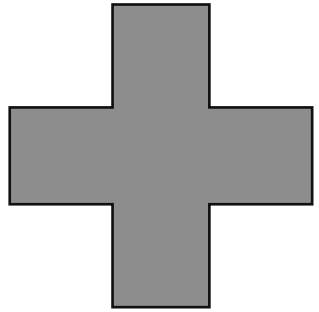


Wind River Linux LTS

Source-based Distro Builder

Wind River Linux CD

Source-based continuous delivery



Studio Linux Services

Services for Yocto Project Linux

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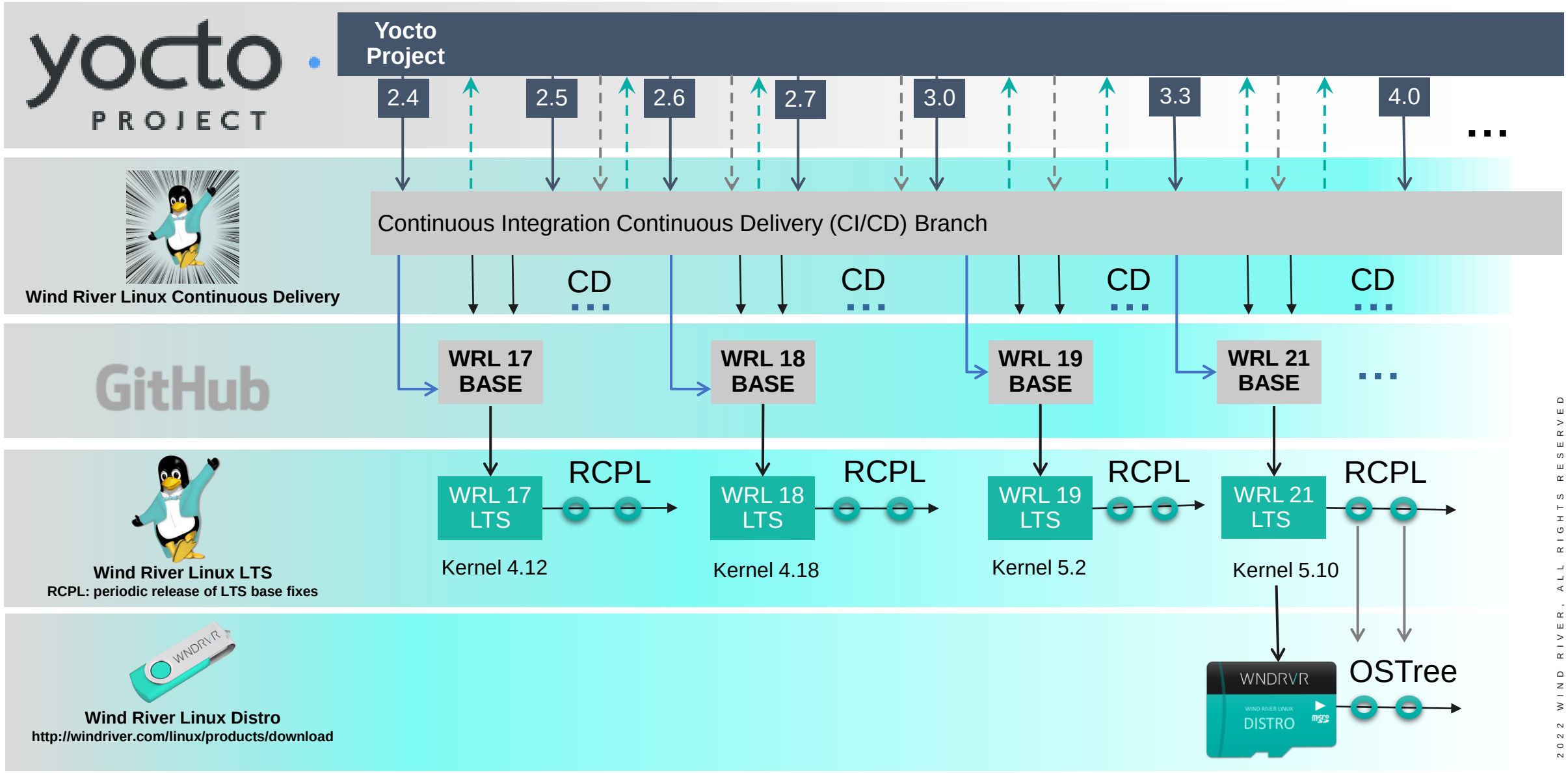
From Yocto Project to Wind River Linux



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Wind River brings commercial support to Yocto Project Linux

- ✓ Built on Yocto Project community participation and contribution
- ✓ Commercial Support with CVE and bug fixes
- ✓ Board Support Packages – Ported, Tested, and Updated
- ✓ Long term support – Minimum of 10 years with periodic updates
- ✓ Optional CI / CD release for customers on the edge of the Edge
- ✓ SDK for Application Development
- ✓ Export and License management
- ✓ Extensive documentation
- ✓ Security Center for proactive CVE management
- ✓ Binary distribution for quick time-to-value
- ✓ Skilled Professional Services for BSP creation, project and custom layer management and more

Wind River Linux Board Support Packages

BSP for Wind River Linux	LTS18	LTS19	LTS21	LTS21 Distro
AMD Snowy Owl (EPYC 3000)	-	Released	-	
Intel Agilex-F			RCPL11	RCPL9
Intel Axxia AXM55xx	Released	-	RLSD RCPL4	RCPL8
Intel Axxia AXM56xx	Released	-	RLSD RCPL4	RCPL8
Intel Elkhart Lake			RLSD RCPL4	RCPL2
Intel x86 Ice Lake-SP (Xeon)	-	Released	Released	RCPL2
Intel Grand Ridge	-	-	-	
Intel NUC7i5BNH (Kaby Lake)			Released	RCPL2
Intel Snow Ridge (Atom Server)	-	-	Released	RCPL2
Intel Stratix 10	Released	Released	Released	RCPL5
Intel Tiger Lake (Core)	-	-	Released	RCPL5
Marvell Armada 8K	-	-	-	
Marvell ARMADA 37xx	Released	-	-	
Marvell CN913x	Released	-	-	
Marvell OCTEON CN96xx (TX2)	Released	Released	Released	RCPL4
Marvell OCTEON 10 CN106XX	-	-	RLSD RCPL3	RCPL10
NXP i.MX6 (Quad, SoloX, Ultralight)	Released	Released	RLSD RCPL4	RCPL5
NXP i.MX7 (Dual)	Releases	-	-	
NXP i.MX8 Mquad	Released	Released	RLSD RCPL9	
NXP i.MX8 QuadMax	Released	Released	Released	RCPL4
NXP LS1021-IoT/TWR	-	-	-	
NXP LS1028A	Released	Released	RLSD RCPL4	RCPL5
NXP LS1043A/LS1023A	Released	Released	RLSDRCPL6	RCPL8
NXP LS1046 RDB / LS1026	Released	Released		
NXP LS1088/LS1048	Released	-		
NXP LS2088	Released	Released	-	
NXP LX2160 RDB / LX2080	Released	Released	RLSD RCPL5	RCPL6
NXP S32G			Released	RCPL4
NXP T4240 (PPC)	Released	-	-	
Raspberry Pi 3 (B+)	Released	-	-	
Raspberry Pi 4	-	Released	Released	RCPL2
Renesas R-Car H3	Released	-	-	
TI Sitara AM335x SK/EVM	Released	Released	-	
TI J721E(DRA829/TDA4xM)	-	-	Released	RCPL4
Xilinx Zynq UltraScale+ MPSoC	Released	Released	Released	RCPL5
Xilinx Zynq-7000	Released	Released	Released	RCPL5

BSP challenges

- Diversity of vendors / architectures
- Non-up streamed code – technical debt
- Incompatible changes
- Different update cycles for vendor SDK
- Different kernel adoption cycles
- Resources for ongoing testing
- Specialized skills
- Multiple hardware revisions
- Managing vendor relationships

Wind River BSP Query Tool
https://bsp.windriver.com/home

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Wind River Linux Distro

- A new option for developing purpose-built Linux for intelligent edge devices
- A binary Linux distribution based on the market-leading Wind River Linux LTS (Long-Term Supported)
- Designed for solution developers that do not need the flexibility of a custom-built Linux OS
- A flexible deployment option designed to support assembly of custom Linux images in minutes
- Attributes:
  - Includes multiple methods to customize your purpose-built Linux
  - Support for a variety of Arm and X86 platforms
  - Project-based pricing — no end-device royalties
  - Includes updates and package feeds from Wind River
  - Use for rapid prototyping and more

Wind River Linux Distro - Hardware Support

- Intel Axxia AXM55xx / AX56xx 32bit
- Intel Axxia AXM56xx / AX56xx 64bit
- Intel Elkhart Lake
- Intel Tiger Lake UP3
- Intel Ice Lake
- Intel NUC Kaby Lake
- Intel Snow Ridge
- Intel Stratix 10
- Marvell OCTEON CN96xx (TX2)
- NXP i.MX6
- NXP i.MX8 QuadMax MEK
- NXP LS1028
- NXP LS1043/LS1023A
- NXP LX2160
- NXP S32G
- Raspberry Pi 4
- TI DRA829/TDA4xM
- Xilinx UltraScale+ MPSoC
- Xilinx Zynq-7000

*Highlighted boards are available for commercial support

Try it now!
https://www.windriver.com/products/linux/download
(Registration required)

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Choosing the right Wind River Linux

Wind River Linux LTS

- Source-based OS builder
- Key Customer Values:
  - Extreme customization
  - Full control of kernel and user space
  - Supported by Wind River
  - All customizations tracked and reproducible
  - For rigid, complex solutions
  - CVE monitoring and mitigation by Wind River
- Characteristics:
  - Linux OS builder based on Yocto Project
  - Significant learning curve and resource intensive
  - Source code-based patches

Wind River Linux Distro

- Binary-based custom image creator
- Key Customer Values:
  - Simple and quick Time-to-Value
  - Customizable package selection and tuning
  - Supported by Wind River
  - Iterative or ad hoc approach to development
  - For quick prototyping and rapid app development
  - CVE monitoring and mitigation by Wind River
- Characteristics:
  - Pre-packaged OS, based on Wind River Linux
  - Simple Linux Assembly Tool configuration
  - Package Feeds and OSTree binary updates

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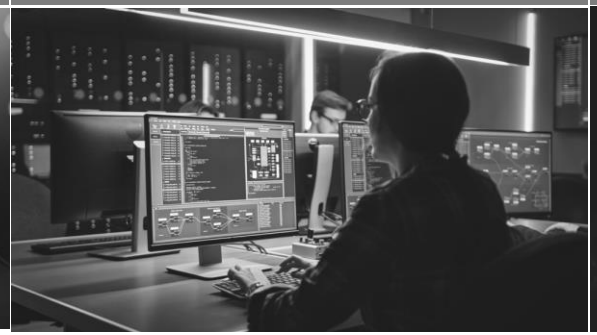
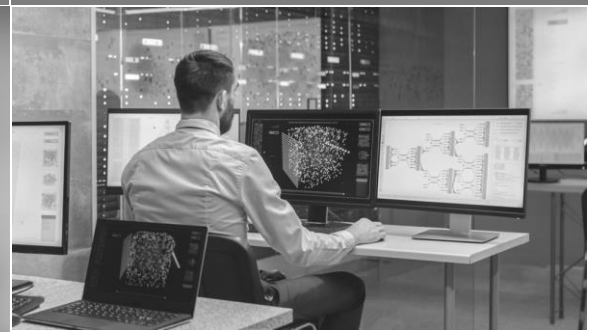
Wind River Studio: full lifecycle management for systems on the intelligent edge

SINGLE PANE OF GLASS FOR COLLABORATION AS A MODERNIZED TEAM

DEVELOPMENT	DEPLOYMENT	OPERATIONS	SERVICES
			

- **CLOUD-NATIVE** curated, integrated pipeline for intelligent systems
- **RAPID PROTOTYPING** and automated testing

- **AUTOMATE DEPLOYMENT** of new services in minutes

- **CLOUD PLATFORM** for zero touch edge operation
- **ANALYTICS** keep the intelligent edge up and optimized

- **ACCELERATE** to the machine economy through automation, digital feedback loops, ai, and data insights

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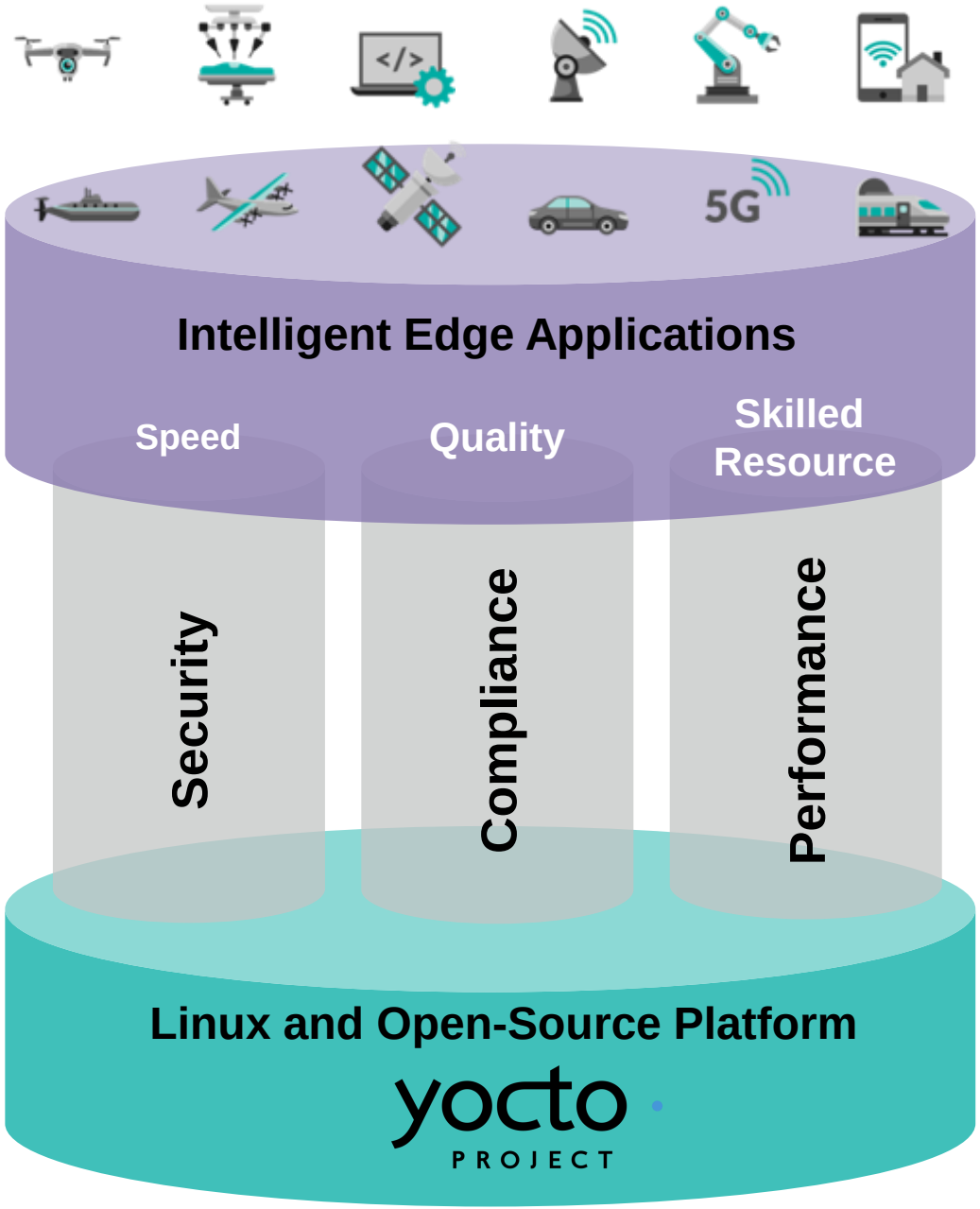
Five ways Wind River *Studio Linux Services* can help customers succeed with Yocto Project Linux

1. Scan and find security and compliance issues
2. Resolve and get Linux platform up-to-date
3. Keep it all up-to-date on an ongoing basis
4. Manage the lifecycle and all the complexity
5. Architect and implement unique requirements



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Summary: The Wind River Linux Advantage

- Extreme customizability for the most demanding embedded applications
- Fully supported by Wind River to remove the burden of managing CVEs and bug fixes
- Available as a Yocto Project–based source environment or as customizable prebuilt binary images
- Rooted in the Yocto Project community

Security	Reliability	Performance	Sustainability	Compliance
▪ Continuous threat mitigation against emerging vulnerabilities ▪ Star Lab portfolio for cyber-hardening the Linux OS	▪ Engineering processes certified to ISO 9001:2015 ▪ More than 3,000 builds daily with over 60,000 automated tests	▪ Low-latency performance and small-footprint optimization ▪ High-performance virtualization and container support	▪ Designed and built with CI/CD and DevOps methodology ▪ Complete lifecycle support; long-term and legacy support	▪ All open source products are export ready ▪ Mitigation of legal risk, complete IP and code traceability

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yocto PROJECT

THE LINUX FOUNDATION