LYNX

Lynx pioneers innovation at the edge with safety, security, and resilience at its core. Our software platforms enable CPU and GPU technologies, delivering exceptional multicore performance and powering edge computing and AI across diverse operating environments.

Who We Are

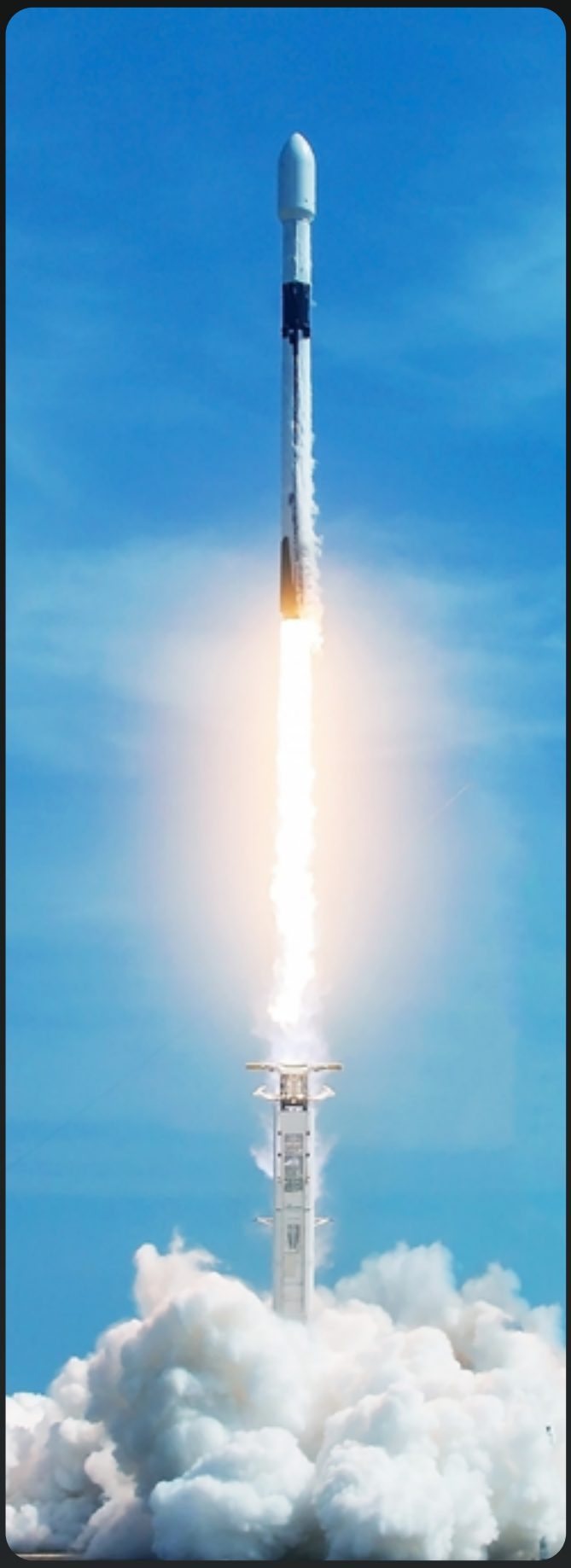
Lynx enables high performance computing at the mission-critical edge by providing software platforms and lifecycle management solutions that enable integration across CPU, GPU, and applications. Our software platforms support heterogenous computing, multicore partitioning, mixed-criticality architectures, artificial intelligence, graphics, and much more.

We also provide a suite of development tools that can be used during the product development cycle to reduce hardware iteration and accelerate prototyping.

For customers building on embedded Linux, we offer Linux security management tools and services to identify and resolve vulnerabilities during your project and also over the life of your product or program.

Lynx solutions have been trusted for over 40 years to deliver safe, reliable performance in the most demanding environments in the world, and beyond.

Partner with us to **Seize the Edge**.



Why Choose Lynx

Trusted

Lynx software has been being used for decades in military and commercial aircraft mission systems, satellites and rockets, automotive infotainment systems, medical devices, and industrial controls. Our engineering services teams work directly with US Department of Defense engineering teams and their contractors on critical path projects. When the world's best are looking for high performance that is reliable, safe, and secure, they choose Lynx.

Secure

We build security into our products from the ground up. Our DevSecOps development process and toolsets enable the identification and resolution of security vulnerabilities at every stage of the project in parallel with verifying functionality. Our software is architected to minimize attack surfaces and enable the compartmentalization of critical and non-critical functions. Customers can choose security certification packages to meet DO-356A and NIST SP 800-53 cybersecurity guidelines. Maintain security integrity and compliance by tracking vulnerabilities within a Software Bill of Materials (SBOM) to rapidly detect and defend against new threats.

Safe

For high-reliability environments we provide solutions certifiable to the highest levels of criticality. For aerospace, DO-178C up to Design Assurance Level A. For automotive, ISO 26262 up to ASIL D. For industrial applications we can also support IEC 61508 up to SIL 4. For medical devices, IEC 62304 Class C. We can also provide the certification evidence packages required by regulatory bodies.

Flexible & Scalable

We understand the challenges that can result in integrating single-vendor proprietary technologies, and of trying to innovate on monolithic software architectures. That's why Lynx solutions are always built on open standards and designed with modular architectures. LynxOS-178 is the only Commercial-off-the-Shelf (COTS) OS to be awarded a Reusable Software Component (RSC) certificate by the FAA. And our CoreSuite graphics libraries for safety-critical systems use graphics APIs that are supported directly in silicon by all leading GPU manufacturers.

Easy to Work With

In addition to providing a suite of products that work seamlessly together, Lynx also offers a comprehensive portfolio of engineering support services. We will work directly with you to integrate our products into your workflow, and can also augment your team with additional expertise for mission-critical application development.

LYNX MOSA.ic™

Traditional multicore architectures often bundle diverse system functions - hardware control, real-time scheduling, security, and multimedia - into monolithic stacks. This approach increases complexity, limits scalability, and creates hurdles in meeting rigorous safety and certification standards. MOSA.ic enables system architects to create smaller, independent stacks tailored to each application's needs.

Acting as an Integration Center — highlighted by the ".ic" in its name - MOSA.ic unifies tools and frameworks to simplify software component management and integration. These capabilities reduce development cycles and enable faster certification and deployment of secure, mission-critical platforms.

MOSA.ic Base Package

- LynxSecure
- LynxOS-178
- LynxElement
- Lynx Simple Application (LSA)
- Buildroot Linux

MOSA.ic Optional Add-Ons

- MOSA.ic.SCA
- MOSA.ic.VIE
- MOSA.ic.EBF
- MOSA.ic.BAL
- SpyKer-TZ

Reduce Certiifcation Costs

Enable Faster Certification

Unify Tools and Frameworks

MOSA.ic can be delivered custom-configured for client applications.

MOSA.ic Base Package

LynxSecure®

The LynxSecure separation kernel hypervisor is offered both as an independent product and within the MOSA.ic product family.

By immutably separating hardware resources into virtual machines used to host a range of software, LynxSecure technology satisfies a range of real-time high assurance computing requirements in support of the NIST, NSA Common Criteria, and NERC CIP requirements for military and industrial computing environments.

The LynxSecure architecture is modular and flexible and supports a wide range of operating systems.

LynxOS-178®

LynxOS-178 is a native POSIX, hard real-time ARINC 653-partitioning operating system developed and certified to FAA DO-178C DAL A safety standards. It is the only Commercial-off-the-Shelf (COTS) OS to be awarded a Reusable Software Component (RSC) certificate from the FAA for re-usability in DO-178C certification projects. LynxOS-178 is the primary host for real-time POSIX and FACE™ applications within the MOSA.ic™ development and integration framework. LynxOS-178 native POSIX implementation satisfies the PSE 53/54 profiles for multi-process and multi-threaded applications used in safety critical systems.

NASA X-59 Quesst Low-Boom Flight Aircraft

CoreSuite 2.0 is being used by NASA to help develop and deploy NASA's "windowless cockpit eXternal Vision System (XVS)," replacing the pilot's front window view with leading-edge sensor display technology. This includes utilizing the Vulkan SC graphics API to enable advanced synthetic vision, object detection, and various sensor fusion capabilities.

F-35 JSF Lightning II

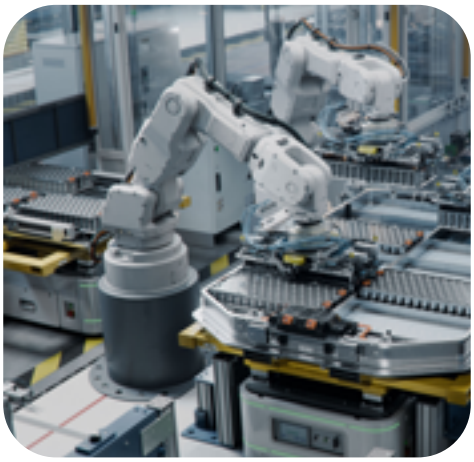
Lynx is providing key technologies to support the development of the next generation Panoramic Cockpit Display Electronic Unit (PCD-EU) for the F-35 Joint Strike Fighter. This development is a key element of the of the "Technology Refresh 3" (TR3) modernization program led by Lockheed Martin.

LynxElement®

LynxElement is the industry's first unikernel to be POSIX compatible and available for commercial use. It runs inside a LynxSecure partition within the MOSA.ic software framework. Multiple unikernels can share a CPU core, which provides higher security and reliability for your applications. LynxElement is FACE conformant as part of our focus on addressing the needs of next-generation mission-critical systems.

What is a Unikernel?

In a unikernel architecture, applications link to the operating system features needed and the compiler will naturally omit unused features. Because unikernels do not perform process-level context switching and they execute in a single address space without preemption, they are not subject to being blocked by competing processes. This makes their execution behavior highly deterministic and easier to observe and characterize. This reduces the burden of multicore timing analysis and makes the safety-certification process more manageable.



Lynx Simple Application (LSA)

A Lynx Simple Application allows wholly-independent, secure, and sensitive applications to directly execute on the LynxSecure Separation Kernel Hypervisor, removing the need for an operating system environment. It allows 32-bit or 64-bit applications to run directly on LynxSecure in an independent partition, isolated from other guest operating systems. LSAs can operate independently or in cooperation with other guest operating systems to isolate security-critical or safety-critical functions. They are also utilized to impose security policies on a guest operating system function in a non-bypassable and tamper-proof manner.

The LSA Network Guard runs directly on LynxSecure Separation Kernel Hypervisor and imposes security policies on network traffic.

MOSA.ic Optional Add-Ons

MOSA.ic™.SCA

Prevent up to 70% of security incidents with robust Software Bill of Materials implementation.

Modern software development increasingly relies on open-source components and third-party libraries. While these resources accelerate innovation, they also introduce risks - vulnerabilities, licensing issues, and outdated dependencies - that can threaten security and compliance.

MOSA.ic.SCA is a comprehensive solution for Software Composition Analysis (SCA), designed to help you identify, analyze, and manage both proprietary and third-party open-source libraries across your entire software project. Integrating automated monitoring, policy enforcement, and risk mitigation tools ensures your software supply chain meets internal standards and external regulations.

MOSA.ic™.BAL (Build Automation License)

A MOSA.ic.BAL Build Automation License (BAL) augments the customer's standard development seats by providing network-accessible Lynx development tools for the purpose of automating tasks such as project creation, configuration import, compiling, linking, and deploying. The MOSA.ic.BAL eases project configuration management and maintenance across multiple teams. MOSA.ic.BAL is ideal for integration into DevOps pipelines.

SpyKer-TZ™ Powered by Tracealyzer from Percepio

SpyKer-TZ is an advanced trace analysis tool owned and managed by Percepio, a Lynx ecosystem partner. It can be used with LynxOS-178 and LynxSecure. SpyKer-TZ helps developers debug faster, optimize more intelligently, and eliminate the most challenging bottlenecks in complex real-time systems.

Built to give developers full-system visibility over time, SpyKer-TZ is the first dynamically instrumented system trace analyzer designed for complex, multi-threaded, multi-OS, and bare-metal environments. Unlike traditional debuggers, SpyKer-TZ instruments the kernel at runtime, and without requiring a system reboot, allowing your teams to track down elusive bugs, identify CPU load spikes, and optimize system performance faster and with higher with precision.

With over 30 advanced visualizations, SpyKer-TZ enables real-time monitoring of CPU load, event logs, memory allocation, and system scheduling, helping teams track down elusive bugs, optimize performance, and ensure system reliability.

Boost optimization of system performance with precision

Accelerate your development cycle

CoreSuite 2.0™

CoreSuite 2.0 is a framework of hardware accelerated visualization and computational libraries and supporting tools that have been designed from the ground up for deployment and certification in safety-critical edge computing environments. It can be used with a range of graphics processors and system-on-chip (SoC) devices with graphics cores that include:

- AMD E9171 discrete graphics processors
- Intel 11th Gen SoCs with Iris Xe graphics cores
- NXP i.MX8 SoC processors with VeriSilicon Vivante GPU Cores
- Arm Mali-G78AE GPU cores (silicon provided by Arm partners)

Lynx CoreSuite 2.0 supports leading OS and RTOS platforms, including DDC-I Deos, Green Hills Software Integrity, LynxOS-178, QNX OS, SYSGO PikeOS, Wind River VxWorks, Windows, Linux, etc.

Why CoreSuite 2.0?

Certification-Ready for Aerospace, Automotive, and Industrial Applications

CoreSuite 2.0 is built on technology originally developed by Core Avionics & Industrial, which was acquired by Lynx. Developed over two decades from the ground up for safety-critical environments, Lynx products are flying in military and commercial aircraft worldwide and are certifiable to DO-178C Design Assurance Level A, one of the most stringent standards for safety-critical reliability in the world. CoreSuite 2.0 can be provided with the full suite of certification evidence required to meet the following standards:

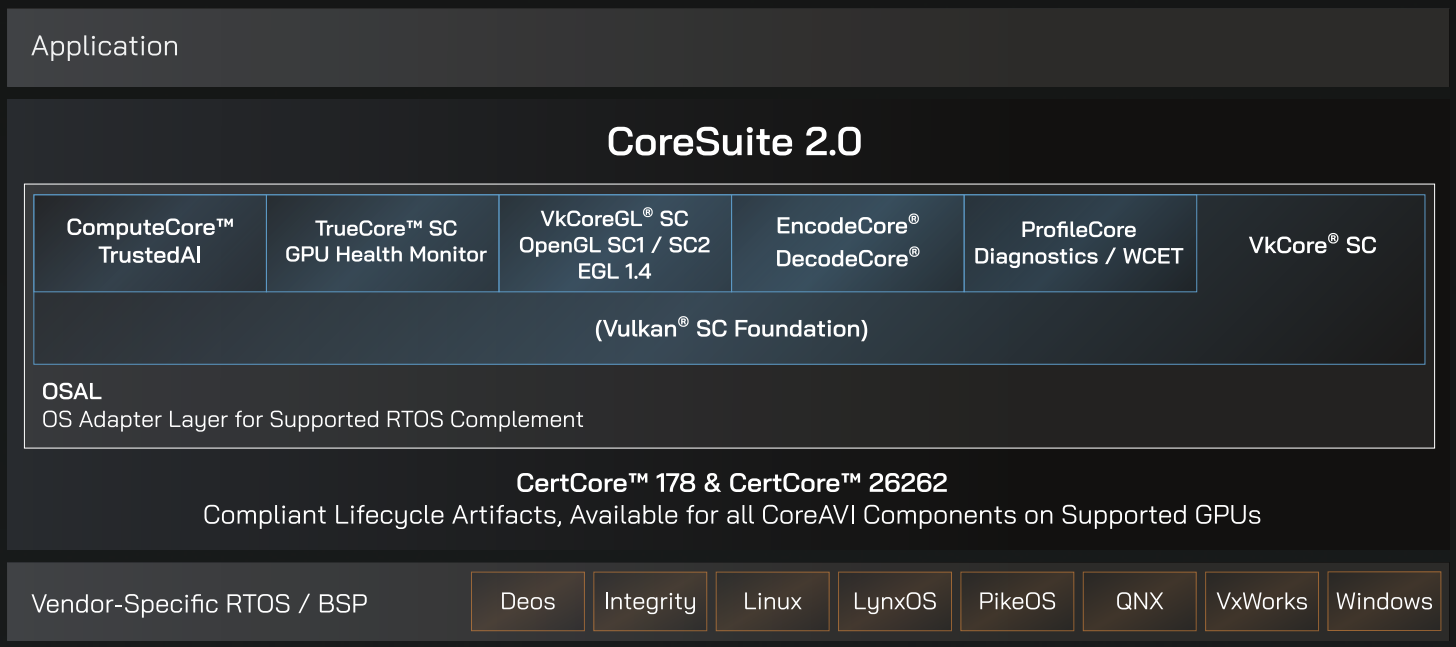
- DO-178C, up to Design Assurance Level A
- JSF SEAL Level 1 (F-35 Joint Strike Fighter)
- ISO 26262, up to ASIL D

GPU Compute

Thanks to the power of GPU-based computing and the Vulkan SC API, resource-constrained embedded computing devices can use the Lynx ComputeCore / TrustedAI libraries and supporting tools to carry out advanced computer vision, neural network inferencing, and artificial intelligence tasks directly within the edge device. This toolset is compatible with and designed to seamlessly integrate with TensorFlow, PyTorch, Caffe, ONNX and other popular neural network modeling tools and frameworks. CoreSuite 2.0 includes:

- **The BLAS Library (Basic Linear Algebra Subprograms) -** Offers routines that provide standard building blocks for performing basic vector and matrix operations.
- **The FFT Library (Fast Fourier-Transform) -** Supports 1D, 2D and nD FFT algorithms, which are heavily leveraged for data-intensive signal and image processing use cases
- **The NN Library (Neural Network) -** Is based on the Khronos NNEF (Neural Network Exchange Format) specification and is designed to import trained neural networks and perform inferencing.

A rich complement of sample applications and supporting algorithms are included. These simplify the integration, adoption, and migration from non-safety critical instances of CUDA®, OpenVINO™, ROCm™, and OpenCL™ APIs, to Lynx's certifiable safety-critical libraries.



VkCore® SC – A conformant implementation of the Khronos Group Vulkan SC open standard API, with pre-integrated support for a target GPU. VkCore SC facilitates the deployment of a graphics processor in safety-critical ("SC") embedded computing applications. It is the hardware abstraction foundation layer on top of which the other CoreSuite 2.0 libraries operate. The VkCore SC library can be used independently or in conjunction with other CoreSuite 2.0 components.

VkCoreGL® SC1 / SC2 – A conformant implementation of the Khronos Group OpenGL SC 1.0 and 2.0 APIs. VkCore SC1 / SC2 supports legacy applications that require OpenGL. These libraries are built on the top of the Vulkan VkCore SC foundation layer. They provide a highly optimized implementation of OpenGL SC 1.0 and 2.0 that allows an application to leverage available advancements in graphics acceleration technologies.

EGL 1.4 – Handles graphics context management, surface / buffer binding, rendering synchronization, and enables high-performance, accelerated, mixed-mode 2D and 3D rendering using other Khronos APIs. EGL 1.4 includes the video capture and compositing extensions required for content sharing across independent applications.

CertCore™178 / CertCore™ 26262 – Options include certification evidence packages for DO-178C up to DAL A, and ISO 26262 up to ASIL D.

TrueCore™ – A GPU safety monitor that continuously verifies the integrity of GPU graphics generation and/or the GPU compute pipeline and reports processing failures to the application. Runs graphics and compute tests that over time provide coverage of the full Vulkan SC pipeline.

ComputeCore™ – GPU compute libraries that enable applications to leverage the graphics processor for computer vision, neural network inferencing, and artificial intelligence tasks. Includes software modules for Basic Linear Algebra Subprograms (BLAS), Fast Fourier Transformations (FFT), and Neural Network inferencing.

ProfileCore – A GPU performance profiling suite. ProfileCore enables optimal application execution and resource usage by facilitating WCET (Worst-Case Execution Time) assessment and validation.

EncodeCore®/DecodeCore® – Enables video encoding and decoding using H.264 (MPEG-4/AVC), H.265 (HEVC), and other video codecs. Implements a low-latency design synchronized with the graphics and compute pipelines.

OSAL (Operating System Abstraction Layer) – Enables the abstraction of CoreSuite 2.0 libraries from the details of the underlying operating system, facilitating modularity and OS portability without impacting the CoreSuite 2.0 product libraries.

edge@lynx.com

US: 408-979-3900

UK: +44 (118) 965 3827

Headquarters:
910 E Hamilton Ave #400
Campbell, CA 95008, USA

www.lynx.com