

## Value-Based Comparison LYNX MOSA.ic.TSN vs. DIY

By integrating Lynx's TSN solution into the development process, organizations can achieve significant cost savings and efficiency improvements across multiple stages, particularly benefiting industries like aerospace, automotive, and electronics, where hardware costs and development timelines are critical.

### Development Time and Speed to Market

#### Lynx TSN Solution

Offers a pre-integrated, ready-to-deploy TSN capability with a certified stack, reducing development time by 20-40%. This acceleration can lead to cost savings of approximately \$200,000 to \$400,000 for projects with a \$1 million budget.

#### DIY Approach

Requires extensive development efforts to integrate TSN standards, leading to longer project timelines and increased labor costs.

### Lack of Expertise in Advanced Networking

#### Lynx TSN Solution

Lynx pre-integrated and ready-to-deploy TSN-Enabled certified stack provides application developers a familiar interface to access the TSN services. This approach is possible because Lynx provides the expertise needed to integrate and control the TSN capabilities of the underlying custom hardware of choice. The result is a significant reduction in development time, according to Lynx experience the ramp up time just to get started with TSN internals is about six months to one year.

#### DIY Approach

Requires application developers to gain extensive knowledge into the TSN services. The senior engineers in the team must dedicate their efforts to the details of the SW/HW integration, diverting attention from value-added avionics applications. Still the lack of specific experience leads to trial-and-error approaches, unreliable planning, risks of delays, extended project timelines, and increased labor costs. It is estimated that laying the TSN groundwork will require the equivalent of at least two full-time senior engineers, amounting to a cost of \$500,000 per year.

### Aviation-grade Precision Timing

#### Lynx TSN Solution

The Lynx TSN-Enable certifiable stack includes a Precision Time Protocol (PTP) instance, capable to handle multiple time domains and matching the high demands of the Aerospace Profile (P802.1DP) for timing availability and precision. This component, highly critical and avionics-specific, is one of the most complex elements of the entire TSN infrastructure. Lynx went through the difficult path of analyzing the requirements, designing the PTP software, testing the performance and making it certification ready for the benefits of customers.

## **Aviation-grade Precision Timing Continued**

### DIY Approach

Any organization willing to design their own aviation-grade, certifiable PTP implementation should account for the effort to set up a dedicated test lab at the cost of several hundred thousand dollars in equipment and test software licenses.

## **Integration of Complementary Functions**

### Lynx TSN Solution

The LYNX MOSA.ic “Integration Center”, the LynxOS-178 RTOS and the TSN-Enabled certifiable network stack modular design allows a rapid integration of extended capabilities such as secure booting, hardware assisted encryption, extensive platform performance monitor, validation of the system security posture and other implementation-specific functions.

### DIY Approach

Developers need to decompose and reconstruct the network stack to insert additional functions, such as multi-level encryption. Given a monolithic stack, this is a major effort which can impact the system performance and stability. Handling network security is expensive – for example the cost of a basic VPN application is about \$150,000.

## **Testing and Validation Efficiency**

### Lynx TSN Solution

Enables automated, scalable testing in virtual environments, improving testing efficiency by 20-30% and saving \$100,000 to \$150,000 for projects with \$500,000 in testing costs.

### DIY Approach

Testing is constrained by hardware availability, leading to slower, manual processes and fewer test scenarios.

## **Risk Mitigation and Bug Detection**

### Lynx TSN Solution

Facilitates early detection of bugs through simulation, reducing defect resolution costs by 50-80%, which can translate to savings of \$500,000 to \$2 million, depending on the number of bugs caught.

### DIY Approach

Bugs are often detected late in the process, when they are more expensive to fix, potentially costing 10-100 times more than if detected early.

## **Scalability and Flexibility in Development**

### Lynx TSN Solution

Allows parallel development on both simulated and real hardware, improving project efficiency by 15-30% and saving \$150,000 to \$300,000 for a project with a \$1 million budget.

### DIY Approach

Hardware constraints limit the number of teams that can work simultaneously, leading to bottlenecks and slower development.

## Sources

- Lynx Software Technologies: Aviation-grade TSN Solution Design Experience
- Nimble AppGenie: Cost to Develop a VPN App
- Parametric Design: Time and Cost Saving with Simulation
- Ten10: Cost of a Software Bug