Tech In Action

Silent Architects of Precision:

OST and The Future of Semiconductor Integration

Eunice Hong
CEO, OneSystems Technologies

This September, as Singapore's semiconductor community gathers to celebrate two decades of progress with SSIA, we look back not just at the visible milestones, but also at the silent frameworks that have made them possible.

At OneSystems Technologies (OST), we understand that lasting impact is never built overnight. True resilience begins long before systems go live—it starts with understanding the operational realities of high-performance environments and delivering solutions that will not only work on day one, but continue to adapt, protect, and perform for decades to come.

20 Years of Partnership and Progress

Since our founding in 2005, OST has stood alongside some of the most advanced fabs in Singapore, providing end-to-end integration of Operational Technology (OT) and Information Technology (IT) systems. In the early days, when the nation's semiconductor ecosystem was still establishing its footing, integration often meant bridging analogue and digital systems or unifying equipment from multiple vendors into a single operational flow.

Over time, we have witnessed remarkable transformation—wafers shrinking in size, cleanrooms growing in complexity, and production cycles accelerating. Technologies have evolved, supply chains have shifted, and skillsets have expanded to meet the demands of an increasingly sophisticated industry.

Yet one constant has remained: resilient, intelligently integrated infrastructure is the backbone of sustainable growth. Without it, innovation stalls, efficiencies are lost, and vulnerabilities multiply.

An Industry in Transition

Today, the semiconductor sector faces profound structural shifts that will define the next two decades:

- Geopolitical changes accelerating the regionalisation of chip production.
- AI-driven workloads reshaping fab architectures from front-end logic to backend memory systems.
- Sustainability mandates influencing facility design and process engineering.
- Edge computing requirements pushing for decentralised, low-latency production models.
- Supply chain reconfiguration demanding greater operational resilience.

In this environment, fabs are evolving from static facilities into modular, intelligent, and cyber-resilient ecosystems. This demands a new mindset—one where integration is not a project milestone, but a living strategy that enables continuous evolution, interoperability, and risk mitigation.

The Future of Integration: Five Strategic Shifts

Drawing from our cross-industry experience and deep engagement with semiconductor manufacturing, OST sees five shifts shaping the future of integration:

1. Integration as a Platform – Moving away from fixed infrastructure towards modular, service-based architectures that enable seamless upgrades, retrofits, and AI deployment without disruption.
2. Interoperability as a Competitive Edge – Enabling legacy tools and next-gen platforms to work in

harmony through semantic data models and OT-to-cloud synchronisation, ensuring secure and efficient data flow across all system layers.

3. Sustainability Measured at the Wafer Level – Linking real-time carbon, water, and energy metrics directly to tool recipes and yields, allowing fabs to achieve precision sustainability reporting and performance optimisation.
4. Cybersecurity in a Zero-Trust World – Embedding protocol-layer anomaly detection, micro-segmentation, and secure access controls at every operational layer to protect against increasingly sophisticated threats.
5. Digital Twins with Decision Intelligence – Deploying real-time, ML-powered digital twins that can simulate, predict, and autonomously optimise operations—from utilities to logistics flow—at scale.

Integration as Risk Management

For OST, integration has always been more than just technical execution—it's a form of strategic risk management.

- When tool connectivity delays scale-up, that's a time-to-market risk.
- When utility systems lack visibility, that's an operational vulnerability.
- When process and ESG data remain siloed, that's a missed opportunity for improvement.

Our approach is hands-on, collaborative, and deeply embedded in the operational objectives of our clients. Whether we are working with a 5nm foundry, a backend packaging facility, or a multi-site network, we bridge engineering realities with strategic goals.

Strengthening the Supply Chain from Within

In the past, supply chain resilience meant maintaining stockpiles or identifying alternative suppliers. Today, true resilience is built into the operational infrastructure—the ability of systems to adapt, recover quickly from disruption, and maintain coordinated output even under stress.

At OST, we enable this by designing and integrating multi-site systems that allow fabs to share data in real time, maintain regulatory compliance, and coordinate production seamlessly.

This capability is increasingly vital as Singapore strengthens its position as a hub for advanced manufacturing. The nation's vision demands not only capital investment and technological capability, but also cross-industry collaboration—aligning infrastructure, talent, and digital ecosystems to achieve both resilience and competitiveness.

OST is proud to contribute to this effort, supporting initiatives that enhance interoperability standards, build ESG-ready data systems, and develop skilled talent to sustain the sector's long-term growth.

"If I could speak to my 20-year-old self in the industry, I'd say: never underestimate the power of partnerships. Technology will evolve, challenges will change—but trust, collaboration, and adaptability will always be the foundation of success."

Looking Ahead: The Next 20 Years

Minister of State, Mr Alvin Tan, with industry leaders at SSIA Business Connect 2025

The future of semiconductor manufacturing will be defined not only by what we build, but by how we connect, protect, and evolve those systems over time.

In the next decade, integration will be the key differentiator between fabs that merely operate—and those that thrive in a complex, interconnected ecosystem. It will determine whether we achieve isolated success or ecosystem-wide resilience.

As we mark our 20th anniversary, OST's mission remains clear: to deliver integration solutions that drive performance, resilience, and sustainable growth for mission-critical industries wherever they operate. Guided by innovation, grounded in expertise, and proven through reliability, we put our customers at the heart of everything we do.

To our industry colleagues and collaborators: let's shape the future—building smarter, integrating deeper, and achieving more, together.

Learn more about OneSystems Technologies' solutions at:
https://www.onesystemstech.com
enquiries@onesystemstech.com
+65 6776 7611