Building an Intelligent, Connected, and Resilient Global Trade Network

Global trade in 2025 faces unprecedented turbulence, with geopolitical flashpoints, escalating tariffs, regulatory shifts, labour unrest and climate-driven disruptions reshaping shipping routes and increasing costs. In this environment, PSA, as a global leader in port operations and supply chain services, is committed to creating a digitally integrated, future-ready trade ecosystem that goes beyond resilience to deliver visibility, agility and efficiency across the supply chain.

PSA's global strategy is integral to this vision, orchestrating a network where ports, logistics hubs, and warehouses function as integrated nodes. This digital ecosystem enables real-time data exchange and seamless operational synergy across the entire supply chain. This integration empowers agile decision-making, optimises resource utilisation and enhances reliability, ensuring that global trade remains faster, greener and smarter even in times of disruption.

For decades, PSA has been at the forefront of innovation, leveraging AI to optimise complex processes and achieve service excellence, from early optimisation algorithms in the 1990s to today's advanced applications in terminal safety, traffic orchestration at Tuas Port and sustainable trucking operations. Now, with the rise of Generative AI and Agentic AI, the opportunity to transform decision-making, automation and adaptability has never been greater.

This year's hackathon challenges participants to harness the full spectrum of AI, from classic optimisation to cutting-edge generative and agentic solutions, to unlock the potential of a globally connected trade network. The goal is to design intelligent, sustainable solutions that keep trade moving seamlessly, efficiently and resiliently in an era of disruption and intelligence.

Problem Statement 1: Smart Port Operations – AI for Horizontal Transport Optimisation

Context

PSA Tuas Port in Singapore is a vital node in PSA's expansive global network and serves as the focal point of a well-integrated supply chain and logistics ecosystem in Singapore. As the world's **largest fully automated** container terminal, Tuas has handled over 10 million TEUs since operations began in September 2022, a milestone achieved in February 2025. This underscores its strategic importance in ensuring Singapore's position as a **leading global trade hub**.

At Tuas, efficient **container movement** between quay cranes (QCs) and yard blocks is critical to sustaining throughput and operational excellence. Automated Guided Vehicles (AGVs) manage this horizontal transport under strict spatial, temporal and capacity constraints. Any inefficiency can

lead to congestion, delays and underutilised resources, making optimisation essential for maintaining Tuas Port's **world-class performance** and its role in ensuring a smooth flow of global supply chain.

The Challenge

Design an AI-driven scheduling and routing strategy that completes container moves using a fleet of AGVs in the shortest possible time, while ensuring full compliance with operational constraints such as lane direction rules, buffer limits and service times. Your solution should minimise congestion, balance yard utilisation and improve overall system efficiency.

What We Provide

- Introduction to the operational concepts mentioned, as well as simulation assumptions, constraints and GUI code references (refer to Appendix provided)

- Executable GUI Code (a ready-to-run Python interface for simulation and visualisation, with QC container job dataset)

- User guide for GUI (refer to README provided in the Simulation GUI folder)

- Videos: https://www.youtube.com/playlist?list=PLCtifntA_CXVwM7FRvUoIhX6y2qJ4HogV

Why It Matters

This challenge reflects PSA's commitment to **operational excellence and innovation** in fully automated terminal operations.

Problem Statement 2: Network Insights – Conversational AI for Global Coordination

Context

PSA's global strategy connects individual terminals into a digitally **integrated global network**. This enables **real-time visibility, operational synergy and sustainability** across the supply chain. The Global Insights dashboard provides **key metrics** such as berth time savings, arrival accuracy, carbon savings, with drill-down views to vessel and business unit performance.

The Challenge

Create an AI-powered **conversational interface** that interprets the dashboard and delivers actionable insights. The solution should summarise key observations in clear business language and suggest next steps aligned with PSA's global strategy. The aim is to reduce the time spent manually interpreting multiple visuals and enable faster, better decisions.

What We Provide

- An Power BI Embedded dashboard access along with the necessary configuration details for embedding.

- Reference sample dataset (for context only as the dashboard is already loaded with this data).

Why It Matters

This challenge demonstrates how AI can enhance **decision-making speed and clarity** in a complex, fast-moving environment, supporting PSA's vision of a globally connected network.

Problem Statement 3: Redefining Level 2 Product Ops, levelling up — AI for faster resolution, stronger reliability, seamless digital experiences

Context

PORTNET® is the world's first nationwide B2B port community system, enabling seamless trade flows across Singapore's maritime ecosystem. It connects shipping lines, hauliers, freight forwarders and government agencies, supporting over 15,000 subscriptions and processing more than 350 million transactions annually. This ecosystem is digitally integrated through Electronic Data Interchange (EDI) and APIs, ensuring real-time connectivity between stakeholders. Any IT incident affecting PORTNET® can disrupt operations across the entire community, making rapid resolution essential.
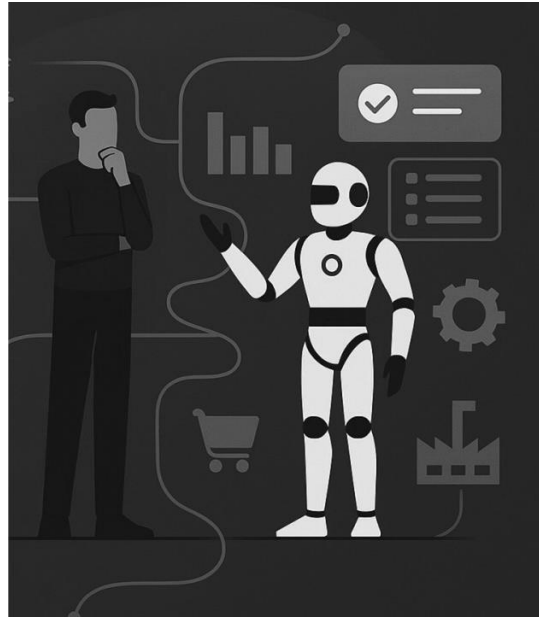
The Challenge

Develop an **AI solution** that empowers **duty officers** to manage incidents with greater speed, precision, and foresight. Your design should **ingest incident reports** from multiple sources, **analyse system logs and historical data** to identify root causes, and **recommend targeted remediation steps**. It should also **auto-generate escalation summaries** and optionally **integrate with ticketing workflows** to accelerate resolution.

The objective is clear: **reduce resolution time**, **enhance operational resilience**, and **ensure business continuity** across Singapore's port ecosystem.

What We Provide

- Support case log, Duty Officer Knowledge Base and Escalation Contacts.

- Database schema file to set up and initialise a sample database.

- Sample application logs.

- Test cases.

Why It Matters

This challenge demonstrates how **AI-driven Level 2 operations** can transform incident management into an **intelligent, proactive discipline**. Participants will help **strengthen the reliability, responsiveness, and resilience** of Singapore's maritime operations, setting a new benchmark for **next-generation digital product support**.

Problem Statement 4: Future-Ready Workforce – AI for Employee Growth and Engagement

Context

As PSA navigates rapid technological advancements and business **transformation**, managing employees' careers and keeping them **future-ready** has become increasingly complex. This challenge is compounded by the need for timely, tailored development support, mental well-being resources and equitable access to growth opportunities across diverse employee groups. There is a growing need for a holistic, AI-driven solution that **empowers employees** with personalised career guidance, adaptive upskilling pathways and inclusive support systems.
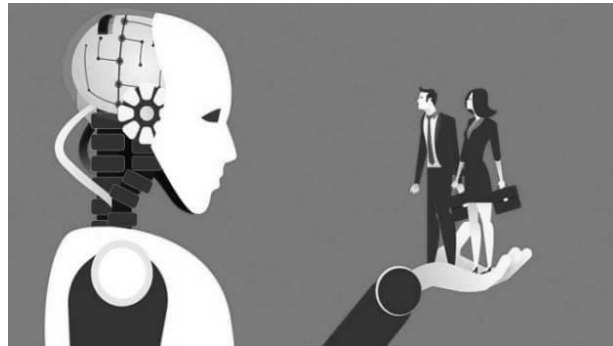
The Challenge

Develop an AI-powered platform that:

- Recommends personalised career **pathways**, internal mobility options and upskilling or reskilling plans based on individual **aspirations**, strengths and skill gaps.

- Provides conversational support for engagement, mental well-being and continuous development.

- Predicts future **leadership** potential using behavioural, performance and engagement data.

- Supports inclusive workforce development through targeted mentorship, digital accessibility and a feedback and recognition system aligned with PSA's values to engage a multi-generational workforce.

What We Provide

- Sample employee profiles with career and training history.

- A representative list of functional and skill areas.

Why It Matters

This challenge reflects PSA's commitment to workforce **transformation** and offers participants the chance to design solutions that empower employees to thrive in a rapidly changing industry while promoting **inclusivity and well-being**.

Additional Note for All Themes

- Participants may mock data as needed, provided they follow any schema supplied in the challenge. They will also be given access to an API for OpenAI LLM to support natural language processing and generative AI capabilities.
- Where applicable, provide a **creative name** for Bots or GenAI artefacts that are meant for interactive use.