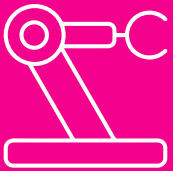




5G Revolution: Transforming Connected Industries in APAC

Eight Case Studies Showcasing the Versatility and Impact of 5G Technologies



Revolutionizing Manufacturing: APAC's Leap into Smart Industry with 5G

Empowering Digital Transformation through Advanced Connectivity in Malaysia

The deployment of 5G technology at Clarion Malaysia, powered by YTL Communications and Cnenergiz Berhad, has revolutionized the manufacturing process by enhancing efficiency, accuracy, and operational agility. This initiative introduced a private 5G network that enabled real-time automation, reduced manual errors by 100%, and increased material handling efficiency by 80%. The integration of smart devices and automated systems not only optimized production processes but also set a new standard for manufacturing excellence in Malaysia.





Background

YTL Communications, the company behind the 'Yes' mobile network, has a firm belief in the transformative power of 5G. As a result of the foresight of having built a fully virtualised core network ahead of others, Yes has a proud history of numerous industry first's: first to launch 4G nationwide in Malaysia (2010), first to launch VoLTE (2016), and now, as the first telco in Malaysia to launch 5G services – 9 months ahead of other telcos.

Yes is the clear pioneer of 5G in the country and is now taking the lead to drive industrial digitization by introducing advanced 5G capabilities with unmatched performance, ultra-low latency, and industrial-grade reliability. The significant lead in launching 5G service has afforded invaluable real-world experience and opportunities for service optimization, resulting in Yes being recognised as the fastest network in Malaysia (across all technologies) by OOKLA for two consecutive years (2022 and 2023).

In May 2024, Yes unveiled a first-in-Malaysia AI and Robotics-based Advanced Manufacturing deployment at Clarion Malaysia, powered by the Yes 5G Private Network. In collaboration with Cnergenz, an expert in advanced manufacturing, they developed a tailor-made solution to help Clarion Malaysia improve production efficiency and quality using robotics and AI, powered by an advanced 5G SA (standalone) Private Network, effectively lifting the bar in operational excellence in manufacturing and automation.

Challenges:

Identifying Key Operational Hurdles in the Path to Enhanced Manufacturing Efficiency

Like many other advancing manufacturing clients, Clarion Malaysia is constantly looking for new ways to improve efficiency, productivity, and quality. A robust end-to-end production process analysis uncovered several challenges that directly impacted its overall business goals:

Materials Receiving and Parts Picking: Extensive reliance on manual data entry for material receiving and picking led to frequent errors and delays, which compromised the accuracy and speed of inventory management.

Leftover Materials Reporting: Traditional methods for counting leftover materials involved slow and error-prone visual inspections, further complicating inventory accuracy, leading to numerous operational inefficiencies and wastage.

Out-of-Sync Material Movement: Manual movement of materials between machines was inefficient and at times, not in sync with production job flow, reducing productivity of the production line and worst yet, product quality.

Connectivity and Cybersecurity Risks: The existing Wi-Fi network cannot support Quality of Service, mobility and latency requirements to enable AI and robotics, while posing considerable security risks. Furthermore, the legacy structured wiring has limited bandwidth and severely limits the ability to instrument the production line for digitisation.

Resolving these challenges will enable Clarion Malaysia to optimize operations and adapt efficiently to changing market demands, enhancing their competitive edge and ability to innovate.

Since these challenges are representative of many such manufacturing facilities, this project serves as an important blueprint to help the country's manufacturing sector transform by enhancing productivity and operational agility.





Solution:

To tackle these challenges, Yes deployed a dedicated Private 5G SA Network on the factory floor. The always-on 5G network provided pervasive coverage and enabled our automation partner, Cnenergiz, to incorporate 5G-connected smart racks that automatically gather material data and update the ERP system to enhance material picking accuracy, removing the possibilities of human errors. An automated 5G-connected X-ray counter enabled Clarion Malaysia to revamp the process of counting leftover materials, improving accuracy and boosting efficiency.

Additionally, 5G-connected Automated Mobile Robots (AMRs) streamlined material movement across the factory to enable just-in-time delivery of materials to ensure maximum productivity for the manufacturing line.



Impacts and Statistics:

The 5G Smart Factory Solution has revolutionized Clarion Malaysia's manufacturing operations:

- Intelligent scanners have reduced errors by 2x improving inventory utilisation and traceability while stamping out the risks of misplaced materials;
- 5G smart racks have boosted picking efficiency by 80%, optimizing production workflow and reducing material waste;
- X-ray automated counters have eliminated manual inspection and sped up material return lead time by 13x while ensuring real-time inventory updates to the ERP and PLM systems;
- AMRs have reduced manual labour by 4x, making material movement more efficient; and
- The flexibility to have anytime anywhere connectivity has enabled instrumentation throughout the production line where the application of advanced analytics and predictive maintenance have minimized unplanned downtime by 90%. Resultantly, the OEE (Overall Equipment Effectiveness) at Clarion Malaysia has improved by a whopping 70% thanks to the implementation of Smart Factory powered by Yes 5G Private Network.



Wider Implications:

The successful implementation of the Yes 5G Private Network and Cnenergiz's Smart Factory Solutions at Clarion Malaysia underscore the transformative power of Advanced 5G technology. The impressive metrics should inspire the adoption of Private 5G across industry sectors. One can envision the efficiency gains from AI and robotics-based automation can easily be extended to healthcare, transportation, logistics, and other industries. But it is worth noting that without Private 5G (P5G) - and its unique capabilities of an ultra-low latency, high capacity and secured wireless connectivity fabric - is required to unlock next generation pervasive and integrated digitisation powered by AI.

In a healthcare setting, P5G can facilitate advanced holomedicine services allowing experts from different discipline to collaborate real-time on operations planning to improve operations success and reduce patient recovery time. In the areas of container ports and logistics, the deployment of P5G can enable autonomous vehicles, traffic management systems, and deep insights from inventory movement, leading to increased efficiency and reduced operational costs.



Stakeholders:

This collaborative effort is powered the Yes Private 5G Network from YTL Communications together with manufacturing automation provider Cnenergiz Berhad and Dassault Systèmes with their world class Enterprise Resource Planning (ERP) and Product Lifecycle Management (PLM) system.

Implementing 5G to Transform Manufacturing at Clarion Malaysia

Leveraging Cutting-Edge Technology for Operational Excellence

To tackle operational challenges at Clarion Malaysia, Yes and Cnenergiz deployed a private 5G network, chosen for its high-speed, reliable, and secure connectivity essential for real-time data processing and automation. The integration process seamlessly connected the 5G network with ERP & PLM systems and manufacturing setups, optimizing operations without disrupting ongoing activities, providing advanced analytics and predictive maintenance which minimized unplanned downtime by 90% and achieved an impressive OEE (Overall Equipment Effectiveness) of 70%.

Key innovations included 5G-enabled smart scanners and automated mobile robots (AMRs), which automated material handling and inventory management, drastically reducing manual errors. These devices updated the ERP system in real-time, enhancing inventory accuracy and reducing waste. Additionally, automated X-ray counters replaced manual counting, speeding up material assessments and increasing accuracy.

This approach not only resolved Clarion Malaysia's immediate issues but also laid a foundation for future technological upgrades, enhancing overall manufacturing efficiency. Additionally, the use of 5G-enabled smart devices was intended to boost production quality through real-time data connectivity and process optimization. The flexible and scalable network infrastructure was designed to allow Clarion Malaysia to adapt quickly to changing market demands and technological advancements, while also enhancing data security within the manufacturing environment. These objectives were set to not only overcome current challenges but also to position Clarion Malaysia as a leader in the digital transformation of the manufacturing sector.

"The benefits of Private 5G Network are clearly self-evident from this successful deployment. We'd like to thank Clarion Malaysia and our partners to help realise this shared vision. Importantly, we hope this success story could be replicated to bring forth a new generation of connected industries to help uplift economies and improve lives throughout the region."

- Wing K. Lee, CEO, YTL Communications



Architecting the Future: Building a Resilient 5G Network

Exploring the Technical Foundations and Security Enhancements of Yes's Private 5G Network

The network at the core of Clarion Malaysia's digital transformation is the Yes 5G Private Network, designed specifically to meet the high demands of modern smart manufacturing. Adhering to the 3GPP global standards for 5G SA (Standalone) and Network Security Assurance Scheme (NESAS), the network ensures a tailored, secure, and highly efficient connectivity solution. Performance is optimized with speeds exceeding 880 Mbps and ultra-low latency of 10-12ms, crucial for real-time automation and data processing. The security framework is robust, featuring strongly encrypted private SIM cards and end-to-end security measures to safeguard sensitive industrial data. This private network architecture not only enhances performance and reliability but also provides the flexibility needed to scale and adapt to varied industrial needs, making it an ideal backbone for demanding environments where precision and uptime are critical.

Measurable Outcomes from 5G Deployment at Clarion Malaysia

Quantifying Success in Smart Manufacturing Enhancement

The deployment of 5G technology at Clarion Malaysia has enabled significant improvements in manufacturing operations, as proven by quantitative data. The integration of 5G-enabled smart devices and automated systems has led to a 100% reduction in errors during material handling, significantly enhancing inventory accuracy. Automated processes have improved operational efficiency, with material picking efficiency increased by 80%, and manual labour reduced by 300%. Furthermore, the introduction of automated X-ray counters has accelerated material return processes by twelve times, ensuring real-time updates and eliminating delays.

These results underscore the transformative impact of 5G technology on manufacturing, making operations not only faster and more efficient but also more adaptable to changing demands. The positive outcomes have cemented Clarion Malaysia's position as a leader in manufacturing excellence, setting a benchmark for future technological advancements in the industry.

Harnessing 5G for Future-Ready Manufacturing at Clarion Malaysia

Summarizing Breakthroughs and Envisioning Next Steps

The deployment of 5G technology at Clarion Malaysia has been a pivotal step in transforming its manufacturing operations into a model of digital excellence. By integrating 5G-enabled smart devices and automation, significant challenges such as manual errors, inefficiencies, and connectivity issues were successfully addressed, enhancing overall operational efficiency and production quality. The project not only reduced manual labour by 300% and increased material handling accuracy but also set a new standard in manufacturing adaptability and security.

The positive outcomes from this implementation suggest vast potential for future applications across other sectors and further collaborations. Moving forward, Yes is positioned to continue its work with Clarion Malaysia, exploring wider applications of 5G technology to drive innovation and efficiency in more complex manufacturing scenarios and other industries.

Yes's 5G Solutions offers major advantages to other businesses

The Private 5G solution provided by Yes offer significant competitive advantages to various industries.

Industrial Grade Wireless Connectivity: For the first time in wireless network evolution, we now have the technology capability to deliver secured connectivity with fibre-level capacity and latency and with the freedom and flexibility enabled by wireless.

Unparallel Flexibility: The flexibility afforded by Private 5G enables automation anytime anywhere. This is particularly crucial in supporting the mobility requirements of AGV and robotics along with the ever evolving need to instrument AI and automation throughout the entire production line. Yes's 5G Private Network connectivity enables seamless operation of these automated systems with a high degree of security and resiliency demanded by OT environments.

Adoption of Advanced Technologies: A key advantage lies in the integration of artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT) to enhance operational efficiency and productivity. These technologies, when combined with Yes's 5G Private Network, enable businesses to optimize their processes and achieve higher accuracy in their operations.

Long-Term Vision

YTL Communications is committed to enabling digital transformation across Malaysia by making 5G affordable and accessible for SME and industries with some of the most competitive offerings in the industry.

Through our Group's Digital Bank partnership with Sea Limited (which owns Shopee and Garena), Yes is bringing a new level of financial inclusion, providing banking services and digital commerce to bring the benefits of digital economy to all Malaysians.

Yes is also committed to sustainable practices, exemplified by the development of Malaysia's largest Green Data Center Park, powered by 100% renewable energy. This initiative not only reflects YTL's dedication to environmental stewardship but also offers businesses sustainable solutions that align with global eco-friendly standards. These innovations provide businesses with efficient, secure, and accessible financial solutions, streamlining financial management and operations.

In collaboration with Nvidia, YTL Communications is delivering an AI-cloud built using Nvidia GB-200 superchips. At 300 exaflops, this AI-cloud will be one of the world's fastest supercomputers. Combined with the national 5G and 4G footprint from Yes, this will help enable equal access to world class AI to industries and consumers alike.

YTL Communications is taking a holistic approach toward digital infrastructure to make a substantial and sustainable impact to establish Malaysia as a leading hub for digital innovation.

Future Plans

Asia Pacific is witnessing a second wave of 5G rollouts with 20 markets commercializing and 5G activities gaining momentum in several new markets, including India since the end of 2022 (GSMA Intelligence). This growth is further emphasized by an 18% CAGR for smart manufacturing IoT connections between 2021 and 2030, driven by Industry 4.0 initiatives and manufacturers deploying IoT to automate production, streamline operations, and increase productivity (GSMA Intelligence).

The number of connected IoT devices is projected to grow by 9%, reaching 12.3 billion globally, with cellular IoT now surpassing 2 billion (IoT Analytics).

About YTL Communications

YTL Communications Sdn Bhd (793634-V) is a subsidiary of YTL Power International Berhad and serves as the communications arm of YTL Corporation Berhad, a leading infrastructure conglomerate in Malaysia. YTL Communications Sdn Bhd is a global frontrunner in telecommunications and operates a mobile network called 'Yes', Malaysia's first nationwide 4G provider. As the youngest operator with 92% population pure 4G coverage, the Yes network is the only network in Malaysia with a modern all-IP architecture. On the back of this advanced architecture, Yes became the first in Malaysia to provide nationwide VoLTE (Voice over LTE) in 2016 —five years ahead of all other telcos. In 2019, Yes successfully made Malaysia the second country in the world and the first in Asia to deploy Terragraph. In 2021, Yes yet again emerged as Malaysia's first 5G service provider to launch 5G and in May 2022, Yes launched Malaysia's first truly uncapped 5G service with the lowest tariff globally in line with the vision of "5G for All". Today, Yes is proud to be the nation's undisputed 5G leader with back-to-back Malaysia's Fastest Mobile Network award wins by Ookla in Q3-Q4 2022 and Q1-Q2 2023. For more information about Yes 5G Enterprise Solutions for your business, please visit <https://www.yes.my/business/>.

About Clarion Malaysia

In 1970, the late Mr Tan Chuen Hock, a Malaysian entrepreneur, forged a partnership with Clarion Co. Ltd of Japan to establish a company called Clarion Malaysia. This company built its first manufacturing plant in Penang, and it was the first Clarion offshore plant in the world. 54 years later today, Clarion Malaysia has evolved to an integrated manufacturing facility, capable in all aspects of making In-Vehicle-Infotainment systems, from development, manufacturing to marketing and to customer support. Clarion Malaysia truly understands the characteristics of each market and strives to be a trusted partner in bringing the perfect interface between people, sound and information. The sophistication and the demand of today's customers is high. And this motivates us to continue pushing boundaries to achieve the impossible, to be a global leader in the IVI industry. For more information about Clarion Malaysia's products and services, kindly visit <http://www.clarion.com.my/>.

About Cnergenz

Cnergenz Berhad, incorporated in Malaysia in August 2021, is an investment holding company listed on the Main Market of Bursa Malaysia Securities Berhad. Its subsidiary, SIP Technology (M) Sdn Bhd, specializes in providing surface mount technology manufacturing solutions for the electronics and semiconductor industries. Cnergenz focuses on offering tailored solutions to customers seeking new integrated production lines or automation for their production facilities, particularly in the assembly of advanced semiconductor packaging products and the testing of printed circuit board assembly (PCBAs). The company is aligned with Industry 4.0 principles, contributing to the advancement of smart manufacturing technologies within the electronics and semiconductor sectors. For more information about Cnergenz's solutions, kindly visit <https://cnergenz.com/>.



About the GSMA

The GSMA is a global organisation unifying the mobile ecosystem to discover, develop and deliver innovation foundational to positive business environments and societal change. Our vision is to unlock the full power of connectivity so that people, industry, and society thrive. Representing mobile operators and organisations across the mobile ecosystem and adjacent industries, the GSMA delivers for its members across three broad pillars: Connectivity for Good, Industry Services and Solutions, and Outreach. This activity includes advancing policy, tackling today's biggest societal challenges, underpinning the technology and interoperability that make mobile work, and providing the world's largest platform to convene the mobile ecosystem at the MWC and M360 series of events.

We invite you to find out more at [gsma.com](https://www.gsma.com)

Follow the GSMA on Twitter / X : [@GSMA](https://twitter.com/GSMA)

GSMA APAC 5G Industry Community

Launched at the Mobile 360 Asia Pacific 2021, the APAC 5G Industry Community is a forum for people to learn and advocate 5G benefits to industries and enterprises. The Community has been designed for stakeholders across the value chain including government and agencies, industry associations, mobile network providers, enterprises and industry players, solution providers, analysts, and consultants. It serves as a collaboration platform to support 5G industry innovation, application and business opportunities, and to unlock the power of 5G connectivity so that people, industries and society thrive.

www.gsma.com/asia-pacific/communities/ap5gic/

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