

## CASE STUDY

# Chunghwa Telecom and Nokia validate AI-based predictive maintenance

- Enhanced hardware fault handling efficiency
- More accurate and controllable maintenance actions
- Reduced risk of unexpected service disruption

NOKIA



中華電信  
Chunghwa Telecom

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Through our collaboration with Nokia, we have validated the practical value of AI in network operations and maintenance.

Predictive hardware analytics help our operations teams move from reactive alarm handling toward proactive issue prevention, more accurate decision-making and controllable maintenance.

The resulting improvements in operational efficiency will translate directly into higher network resilience and an enhanced end-user experience for our customers.”

### **Yi-Chou Wu**

Managing Director

Chunghwa Telecom Co. Ltd.



### **Chunghwa Telecom and Nokia partnership**

Chunghwa Telecom, the largest telecommunication provider in Taiwan, plays a critical role in supporting the country's essential communications infrastructure and digital resilience.

With a clear vision to ignite the future with AI, the company is accelerating its intelligent transformation and advancing a more sustainable, AI-powered future.

A key priority for Chunghwa Telecom is strengthening network resilience and service quality through targeted, customer-centric deployments and the adoption of future-ready technologies.

As 5G networks evolve, telecommunication providers face a challenge: how to maintain seamless service quality and availability in increasingly complex environments. For Chunghwa Telecom, this means moving from reactive issue resolution to proactive incident prevention and improving the accuracy of maintenance decisions.

This case study describes how Chunghwa Telecom and Nokia jointly validated Nokia's Predictive Hardware Analytics (PHWA) solution with embedded AI capabilities.

## OBJECTIVE

# Moving from reactive maintenance to proactive prediction

For large-scale telecommunication providers, the challenge of network operations goes well beyond handling a single alarm or individual equipment failure. They need to enhance operational efficiency and agility while network scale continues to expand, end-user service quality expectations increase and operational cost pressures become more significant.

Traditional maintenance models typically rely on alarms, customer complaints or service impact events before operations teams analyze, judge and take action. In a 5G network environment, this may lead to longer problem identification time, repeated resets, unnecessary field dispatches or premature hardware replacement.

Chunghwa Telecom aims to adopt a more intelligent approach: Identifying potential hardware risks earlier, enabling operations teams to make proactive decisions and arrange maintenance actions before services are affected.

## **Predictive hardware analytics proof-of-concept**

Chunghwa Telecom and Nokia collaborated to validate how AI-based predictive hardware analytics can support real network scenarios and help transform reactive O&M into proactive, data-driven network operations.

Key objectives of the joint proof-of-concept included:

- Validating the practical integration of AI into daily network operations
- Improving hardware fault handling efficiency
- Reducing the risk of unexpected service impact
- Building the foundation for a more autonomous operations model in the future

## SOLUTION

# AI-based closed-loop process for predictive maintenance

Based on Chunghwa Telecom's objectives, Nokia provided a predictive maintenance framework that can be gradually integrated into daily operations.

Nokia's PHWA solution uses AI models to analyze multi-dimensional network data. This helps Chunghwa Telecom identify potential risks related to hardware abnormalities in advance. Unlike traditional maintenance approaches, PHWA provides actionable recommendations earlier, allowing operations teams to plan site resets, work orders and hardware replacements before services are impacted.

In the proof-of-concept, the AI was trained with a customer-specific model to align its actions with Chunghwa Telecom's real network environment.

**Prediction → Validation → Recommendation → Maintenance action**

Through continuous data collection, model tuning and result validation in a closed-loop process, the AI-based PHWA can progressively improve predictions and recommendations, making the results more relevant to actual operational scenarios.

As a result, operations teams can more effectively determine when a reset is sufficient and when further monitoring or a hardware replacement is required. This helps reduce the risk of blind resets, incorrect replacement decisions and unnecessary field operations.

With Nokia's comprehensive, AI-based predictive maintenance framework, Chunghwa Telecom can evolve hardware fault handling from a traditional alarm-driven model to prediction-driven and data-driven operations.

## RESULTS

# The practical value of AI-based predictive maintenance confirmed

### **From reactive troubleshooting to proactive prevention**

The PoC validated how Nokia's PHWA solution helps Chunghwa Telecom transition from reactive troubleshooting to proactive prevention.

### **Enhanced hardware fault handling efficiency**

The PoC confirmed the value of training the AI model with live network data and performing model tuning. As a result, AI provided better accuracy in reflecting real operational scenarios and the usability of its predictions and recommendations improved.

### **More accurate and controllable maintenance decisions**

The PoC demonstrated how AI can proactively identify hardware risks in a live environment. As a result, maintenance actions became more accurate and controllable, improving operational efficiency while reducing O&M costs.

### **Reduced risk of unexpected service disruption**

The PoC showcased the value of early risk identification and proactive reset or hardware replacement actions. In the related cases, it effectively reduced the risk of service interruptions caused by equipment failures, while improving network service quality and enhancing the end-user experience.

### **Opportunity for cost efficiency and sustainability**

The PoC revealed the potential for a further reduction in maintenance costs and related carbon emissions. This includes reducing unnecessary field dispatches and increased accuracy of spare parts logistics, hardware replacements and repair processes.

## CONCLUSION

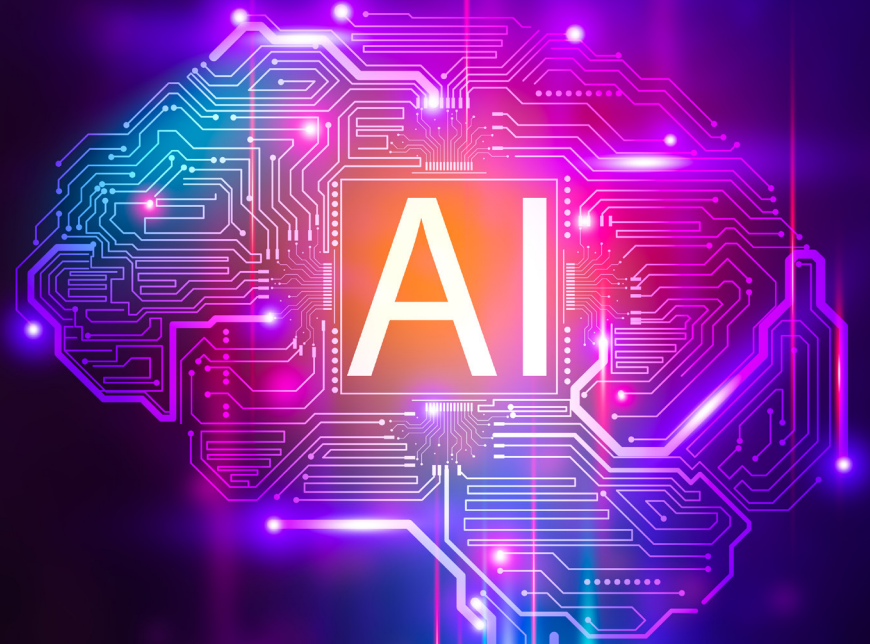
# Enabling AI-native operations at scale

Our joint PoC demonstrates that large-scale telecommunication providers like Chunghwa Telecom can effectively integrate AI into real network operations with tangible outcomes, moving away from traditional reactive maintenance models.

This evolution is critically important as networks grow in scale and complexity, cost pressure increases, ESG requirements become increasingly important and mobile customers expect always-on availability and the highest service quality.

Nokia's predictive hardware analytics solution serves as a starting point on the journey toward AI-native network operations. In the short term, it helps operations teams improve decision-making efficiency for resets and hardware replacements, reducing unexpected service impact.

As the next step, PHWA can be further integrated with automation workflows, operations platforms and reporting systems, allowing predictions to move beyond analysis reports and become autonomous maintenance actions.



Explore Nokia's  
AI-driven Predictive  
Care solution in  
more detail

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