the new era of asset intelligence: cloud-connected, AI-driven, future-ready

Asset intelligence: An NCS whitepaper

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We've released this whitepaper - *The new era of asset intelligence: Cloud-connected, AI-driven, future-ready* – that unpacks how AI, digital twins, and cloud-native platforms are reshaping enterprise asset management. Through real-world examples from NCS clients, it offers a practical framework for organisations to adopt predictive, data-driven strategies that deliver measurable gains.

Asset-intensive industries are entering a pivotal era – one marked by aging infrastructure, heightened climate risk, and growing demand for service reliability. In this environment, technology is no longer a support function – it is the foundation of resilience, efficiency, and sustainability.

Asset-intensive sectors face mounting challenges – from aging infrastructure to climate-related disruptions.

Yet the path forward is increasingly clear: AI and digital twins offer a powerful means to shift from reactive to predictive operations.

Key insights

Embracing opportunities with modernisation

Modernising the system of record offers transformative potential. As Maximo, SAP, Ellipse, and Infor platforms move to the cloud, energy, utilities and resources (EUR) organisations face a critical opportunity – not just to upgrade technically, but to simplify legacy customisations, adopt best practices, and unlock real-time integration with AI and digital tools. These cloud transitions position asset systems to become systems of insight.

AI as an enabler for accelerated growth

At the same time, AI is moving to the core of asset strategy. Globally, executives rank AI as the most transformational technology of our time, with adoption increasingly centralised through Centres of Excellence to ensure scalability and compliance. Sectors like manufacturing and infrastructure are already ROI from predictive maintenance, AI-powered inspections, and generative tools that accelerate planning and field operations.

Together, these shifts point to a new model for asset management – one that is cloud-connected, insight-driven, and ready for what's next.

How NCS can help

NCS drives responsible growth across sectors like energy, utilities, mining, chemicals, manufacturing, and construction, enhancing businesses through smarter decisions and optimised operations to deliver operational efficiency, safe and compliant operations along with enriched employee and customer experiences.

We partner with organisations to help our clients navigate this shift – bringing proven capabilities in digital platforms, AI integration, and cloud transformation. By applying these technologies in context, we can support your team to take practical steps towards more intelligent, adaptive asset management.

At NCS in Australia, we are reinventing technology services from the inside out. We provide advisory, design, build and managed services to our clients, with unrivalled service, attention and understanding every step of the way.

Our energy, utilities and resources expertise

Energy, utilities and resources companies play a crucial role in supporting economic growth, ensuring energy security, and promoting sustainable development through innovative technologies and infrastructure investments.

Our team brings adaptive approaches, outcomes and thinking, pairing this with deep industry knowledge to help our clients succeed, every step of the way. We're different. Discover how by connecting with our team today.

The need for intelligent asset management

Across the energy, utilities and resources (EUR) industry, infrastructure assets are critical yet increasingly vulnerable. Aging systems, growing demand, and environmental disruptions are exposing the limits of traditional asset management, which has long relied on scheduled maintenance and historical failure data.

Modern challenges require smarter, integrated solutions – ones that can provide real-time visibility into asset health, enable predictive and prescriptive insights, and optimise maintenance and investment decisions. This shift demands reimagining systems and approaches, with cloud-based platforms, AI, and digital twins at the centre.

Modernising the core: Cloud as a catalyst for change

As enterprise asset management becomes more digitally driven, EUR organisations are reaching a common inflection point: the need to modernise their systems of record. Legacy platforms like Maximo, Infor, Ellipse, and SAP – often heavily customised over time – must now evolve to meet the demands of connected, cloud-native operations.

Migrating to the cloud is not just a technical upgrade – it's a strategic opportunity. Cloud-based Enterprise Asset Management (EAM) systems allow organisations to streamline outdated customisations, adopt current industry best practices, and reduce the burden of on-premise infrastructure. They also offer flexibility to scale services, connect seamlessly with mobile and geospatial systems, and serve as an integrated part of modern data platforms.

These modernised systems support real-time integrations with IoT devices, AI pipelines, and digital twins, turning the system of record into a system of insight. For example, when you move the Maximo system to the cloud, the transition will allow for adoption of IBM's latest industry accelerators embedded in the latest version of the product, reduce technical debt, and embed predictive maintenance models. As a result, greater value can be

delivered including improved work order automation, reduced maintenance backlog, and enhanced operational transparency.

Why AI is now a strategic priority

AI has rapidly shifted from an opportunity to a necessity. Today, enterprises across the Asia-Pacific region are embracing AI not just for efficiency, but also for innovation, faster time to market, and revenue growth. NCS and IDC recently completed a study into AI and digital resilience. IDC projects regional AI spending will reach US$88 billion by 2027, growing at 28.2% annually.

While early adopters like Australia and Singapore continue to scale AI initiatives, 64% of organisations across the region are already using AI for targeted business use cases. Generative AI is gaining traction, but predictive and interpretive AI still account for 66% of enterprise AI budgets – reflecting the demand for practical, operational outcomes.

Adoption is not without its hurdles. Technology constraints, unclear use cases, data quality, and skills shortages remain top barriers. But organisations that invest strategically, aligning AI to business goals and building the right foundations, are realising real impact, from improved maintenance and operations to smarter customer and citizen services.

AI is no longer a siloed initiative. It is becoming core to how businesses in asset-intensive sectors deliver resilience, agility and long-term value.

Applying AI to asset management

Effectively deploying AI and digital twins requires more than just technology: it calls for alignment across data, infrastructure and teams.

A framework for success

NCS recommends a phased framework. Organisations should:

1. Assess data readiness – ensuring access to accurate sensor, spatial, and operational data.
2. Prioritise business problems, aligning AI use cases to operational pain points such as unplanned downtime or inefficient maintenance.
3. Consider how scalable cloud infrastructure, offered by hyperscaler providers such as AWS, Microsoft or Google Cloud, might add critical value with storing, analysing, and acting on data in real time.
4. Focus on alignment with cross-functional collaboration between engineering, IT and field operations.

AI for asset management: real-world applications

AI is now actively reshaping asset-intensive operations, delivering value across the asset lifecycle, from predictive maintenance to generative knowledge systems.

In the following examples of work delivered by NCS, we share how our team has set a benchmark for excellence with delivering intelligent technology solutions and services for our clients.

Intelligent outcomes for operators

Predictive analytics at Melbourne Water

At **Melbourne Water**, predictive analytics are being used to anticipate turbidity issues in recycled water networks up to three days in advance. Integrated with a digital twin platform, this system achieves 80% prediction accuracy and allows proactive interventions.

Predictive pump maintenance at North East Water

Likewise, **North East Water** moved from reactive to predictive pump maintenance through machine learning, significantly reducing after-hours callouts by approximately 16 out-of-business-hour pump inspections and repairs per pump per year.

AI/ML integrations for a rail operator

AI is being embedded into inspection systems. NCS worked with a **rail operator** to integrate AI/ML models into its track monitoring process. Supported by MLOps pipelines, the system achieved over 90% accuracy in identifying rail defects, significantly reducing

false positives and enabling timely preventive repairs.

AI video monitoring for a global raw materials company

A **global raw materials company** collaborated with NCS to roll out an AI-driven video monitoring platform across 750 cameras. With 11 embedded safety algorithms, the solution improved site inspections and compliance, reducing reliance on manual surveillance.

AI-powered foreign object debris (FOD) detection at Changi Airport

Foreign Object Debris (FOD) on runways can pose safety risks to airside operations. To enhance runway safety, NCS and Changi Airport Group co-developed the iFerret™ 2.0, an AI-powered FOD detection system. The system uses high-definition electro-optical sensors, real-time analytics, and machine learning to detect and verify FOD efficiently. It also provides automated alerts which enable the swift removal of FOD, ensuring minimal disruption to runway operations. Designed for 24/7 operations in various weather conditions, iFerret™ contributes to a safer and more efficient airside management.

GenAI: A game-changer for transformative impact

Generative AI is also transforming knowledge access. Companies are deploying copilots that can retrieve inspection records, design documents and maintenance logs; help new employees onboard faster; and enable field staff to make informed decisions in real time. Some are even using AI to auto-generate work instructions and extract trends from historical data to improve operational consistency.

And in planning, generative models are beginning to simulate expansion or maintenance scenarios, evaluating impacts on service, cost and emissions, while automatically generating downstream tasks.

Modern challenges require smarter, integrated solutions – ones that can provide real-time visibility into asset health, enable predictive and prescriptive insights, and optimise maintenance and investment decisions. This shift demands reimagining systems and approaches, with cloud-based platforms, AI, and digital twins at the centre.

Digital twins: Unlocking system-wide insights

Digital twins provide a real-time virtual representation of physical assets, enabling a shift from reactive maintenance to predictive operations.

Supporting our clients' success

Enabling our clients to succeed is integral to our work at NCS. Here are some examples that showcase how we've delivered value.

Hybrid digital twin at North East Water

North East Water exemplifies this shift through its deployment of a hybrid digital twin built on AWS IoT TwinMaker, SiteWise, and Grafana. The platform brings SCADA and IoT data into a predictive system accessible by frontline staff, enabling early detection of sewer pump anomalies and supporting faster interventions. The digital twin solution collected data from the existing SCADA data lake and brings the data feed online in a safe and effective approach.

Modernising IT/OT infrastructure for a major regional utility

A major regional utility engaged with NCS Australia through an innovation association within the water industry to modernise their IT/OT infrastructure through digital twin and cloud technologies. Major tasks of the project involved:

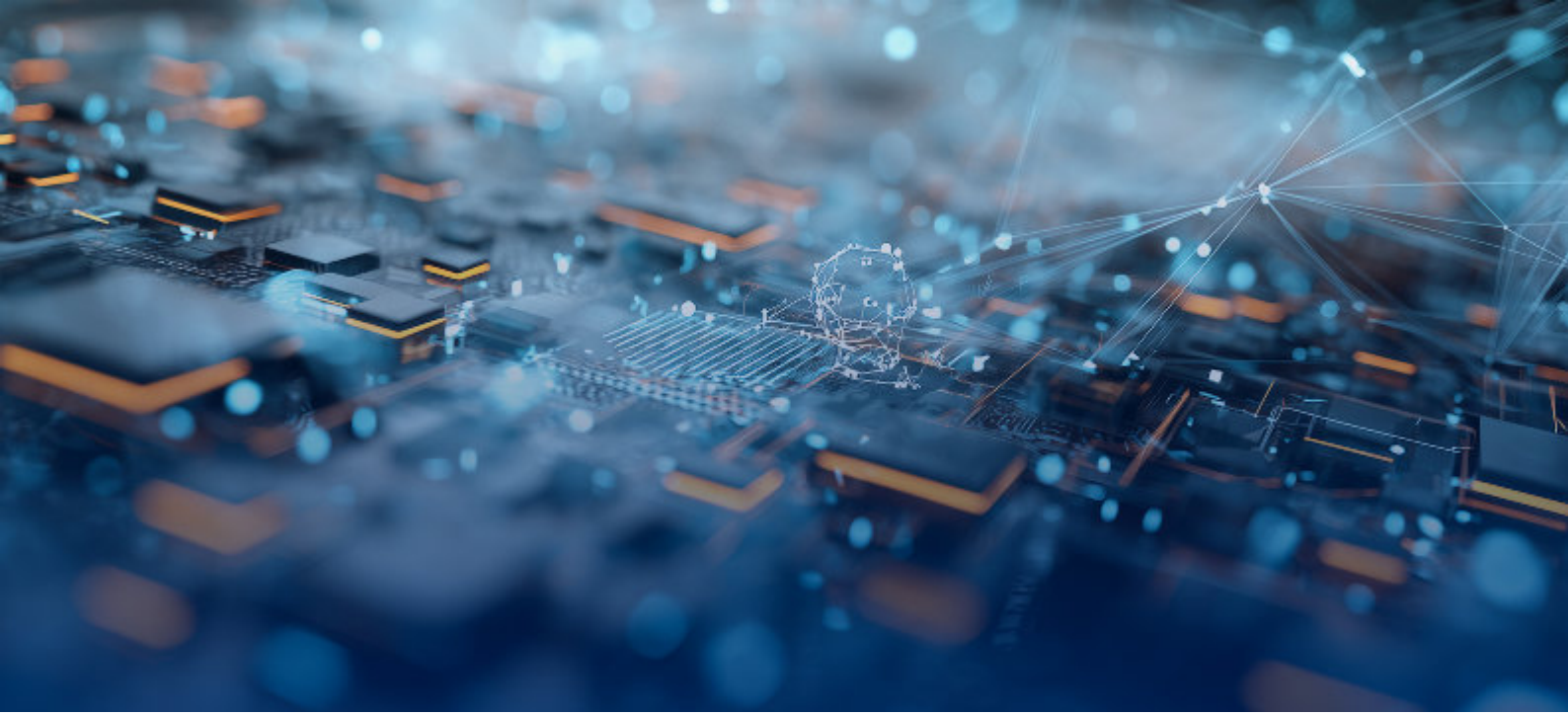
- aggerating disparate IT/OT systems
- data cleaning, processing and modelling
- 3D scene setting with real-time data & alerts, and business intelligence dashboards

Cloud-based digital twin for Melbourne Water

NCS developed a cloud-based digital twin for **Melbourne Water** that simulates the entire recycled water production process, integrating data from multiple platforms. This system is integrated with AI models and helps anticipate factors that could affect the production of recycled water, ensuring a more reliable supply and improving customer communication.

The digital twin provides three-day advance notice of critical turbidity levels, providing early warning to both operational teams and customers, as well as visibility about when recycled water production can resume.

A Melbourne Water treatment plant.



Securing OT assets: Why cyber security is no longer optional

As industrial and infrastructure environments become more digitally connected, the attack surface for OT systems is rapidly expanding. Unlike traditional IT environments, OT assets such as SCADA (Supervisory Control and Data Acquisition) systems, field sensors, and PLCs (Programmable Logic Controllers) —were not originally designed with cyber threats in mind and often lack fundamental security controls.

In today's regulatory and threat landscape, securing these systems is not optional — it is a critical imperative. The Australian Government's Security of Critical Infrastructure (SOCI) Act mandates that operators of critical infrastructure implement and maintain risk management programs, including cybersecurity obligations.

For many organisations, this means aligning their OT security strategies with recognised frameworks such as the Australian Energy Sector Cybersecurity Framework (AESCSF), the Essential Eight, and IEC 62443.

Effective OT cybersecurity requires:

- Real-time threat detection and anomaly monitoring,
- Robust access control and network segmentation,
- Centralised incident response and clear governance structures,
- Compliance with SOCI-mandated risk management and reporting duties.

One industrial manufacturer, for example, enhanced its OT security posture by segmenting its network, deploying continuous monitoring tools, and establishing a centralised threat response protocol. These measures reduced incident response times by 40% and delivered a measurable uplift in overall cyber maturity.

With both regulatory pressure and cyber threats intensifying, Australian organisations must act decisively. OT cybersecurity is no longer just about protecting operations it's about fulfilling national obligations and safeguarding critical infrastructure.

From reactive to predictive: Realising impact

AI and digital twins offer measurable improvements in asset management:

- **Operational efficiency:** Faster issue detection and response
- **Customer reliability:** Reduced service outages and disruptions
- **Cost reduction:** Smarter maintenance cycles and fewer emergency repairs
- **Sustainability:** Lower emissions, reduced waste, and optimised resource use

The transformation is not limited to traditional utilities. ConX, a SaaS provider for construction contractors, illustrates the broader impact of cloud-native asset management. Partnering with NCS and Google Cloud, ConX reduced infrastructure costs by 70% and accelerated software release cycles by over 50%. With 99.99% uptime and BigQuery-powered analytics, the company now supports 2,500 users and is integrating machine learning to automate key tasks like plan take-offs.

Steps to future-ready your business

Start by identifying high-impact operational pain points where AI can unlock immediate value. A data readiness assessment is essential to determine what can be measured, modelled, and improved. **Pilot projects with clear ROI can demonstrate quick wins and help build internal momentum.**

Get your foundations right

Equally important is laying the right foundations for scale and governance. That includes:

1. **Establishing AI governance and trust Define policies for the ethical use of AI and GenAI –** covering privacy, transparency, fairness and security. These should align with industry standards and compliance requirements.

*"IDC predicts that **by 2026, 25% of organisations will adopt AI-enabled risk and compliance solutions** for real-time monitoring and prediction of non-compliance."*

2. **Building a robust data value chain Develop a comprehensive data governance framework to ensure data quality, traceability, and compliance.** Reliable, trustworthy data is the backbone of effective AI systems
3. **Aligning build-vs-buy decisions with long-term goals** Whether building AI capabilities in-house or procuring off-the-shelf solutions, choices should align with your broader transformation roadmap. Balancing cost, capability, and agility is key.
4. **Evaluating value and building for the future** Identify metrics and KPIs to measure the value of AI solutions – whether it's cost savings, efficiency gains, improved decision-making, or competitive advantage you are after. Continuously monitor performance and adapt strategies based on real-world data.
5. **Investing in people and culture** Across the organisation increase awareness and understanding of AI technologies. At NCS we have provided upskilling and training in AI along with productivity boosting tools to around 13,000 employees. A key lesson learnt working with clients is the effectiveness of

assembling cross-functional teams that foster collaboration between IT and OT functions.

Organisations that start with clear intent, strong governance, and scalable infrastructure will be best positioned to unlock AI's full potential in operations and asset management.

As part of this commitment, we're excited to offer the NCS AI–Digital Resilience Diagnostic Tool – designed to help you assess your organisation's AI readiness and uncover strategic opportunities for implementation.

Taking the next step

Now is the time to act. By defining your priority challenges, mobilising your data, and working with experienced technology partners, you can unlock new levels of performance and sustainability in your asset operations.

Reach out to our team today if we can support you and your business on your transformation journey.

To find out more **visit our website >**