HFS

Network Rail applies an AI mindset to deal with the complexity of assets

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The Situation: Transforming a traditional asset records function into a self-serve asset management service for the UK's Network Rail organization demands more than automation. It took an AI mindset, customized algorithms, and neural networks to deliver a solution that could handle 20,000 miles of track; 30,000 bridges, tunnels, and viaducts; thousands of signals; level crossings; and a property portfolio including 20 of the UK's largest stations.

Network Rail is a unique public body of the UK Government's Department for Transport—it has no shareholders. It reinvests its income in the railway infrastructure. It is heavy on legacy technologies and, though founded in 2002, it is built on 200 years of UK railway history and acquired formidable process debt along the way.

Excerpt for Wipro

To capture and manage engineering records, organizations need an AI mindset—not just tools with the moniker "AI"

National Records Group (NRG) is part of Route Services. NRG provides the rail industry with a center of excellence for records and content management. It manages and distributes signaling, civil and electrification engineering records, data systems, and health and safety files for internal users and customers. The NRG collaborated with Wipro to establish an AI-first mindset, establishing a broad set of AI-enabled services in a self-service model. The service users shouldn't need any deep technology or process skills.

Stuart Shaw, Records Technical Manager (Route Services), laid out their challenges:

- **When we say legacy, we mean legacy:** The UK is the birthplace of modern railways, the land of Stephenson and Brunel. But how do you capture and digitize 19th-century assets and integrate them into a 21st-century dataset? Shaw reflected, "Traditionally, we might have only had one record—one diagram for a bridge. Now for a bridge, you will probably get about 2,000 records—everything in terms of the actual design, the stress in the maintenance—there's so much more information now than we ever had before. How do we keep on top of the extra information we're now getting?"

- **Only five people handled 200,000 incoming records annually:** One of NRG's teams receives close to 200,000 records annually, a clear challenge with a team of just five people. The team's job is to validate the accuracy of data in Excel sheets passed to them by contractors based on the information in unstructured documents such as computer-aided drawings (CAD) and PDFs. Overall, the daily processing needed to meet the business goals was 800 records.

They were starting with 200 records per day, and then would increase over time. Manual processing meant the costs might go up to handle such additional demand.

To manage National Rail's complexity, Wipro went beyond RPA and leveraged customized algorithms and neural networks

To address this complexity, Wipro moved beyond the usual robotic process automation (RPA) plus optical character recognition (OCR) combination and leveraged customized algorithms and neural networks. The aim was to establish an AI-first mindset focusing on finding opportunities to leverage AI and scale current productive AI-enabled solutions to different process areas to deliver tangible business outcomes.

Wipro approached the engagement with a consultative mindset, leveraging its [4M framework](#) instead of pushing a product. Other than finding solutions that could manage the high volume of records with a small team, Network Rail had no clear expectations of what to ask for. Thus, the Wipro team identified three initial use cases and then progressed to the tool selection. The Wipro team opted for UiPath for RPA and Kryon for process mining. Yet, the challenge of those use cases was in aligning two extremes. On the one extreme, capturing those analog inputs of Victorian bridges, and on the other, the explosion of digital inputs for every asset. Therefore, the solution focused on blending the capabilities of RPA for the repetitiveness of digital inputs with customized algorithms and neural networks to handle the uniqueness of (often Victorian) engineering drawings.

The NRG enhanced the algorithm Wipro delivered to extend beyond its image-related use cases (e.g., real-time object detection leveraged by autonomous cars) and look at unstructured data (CAD AI-powered drawings and PDFs) to extract textual objects or regions of interest (ROI) such as drawing numbers. Those numbers are typically section details or detail callouts. The ROIs identified by the algorithm contain localized information about the text that requires validation, regardless of where they appear in the document. This extracted text is passed back to RPA for performing business validations, eliminating manual work. The solution includes embedded explainable AI to ensure humans can fully understand the AI's results.

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> We were trying to move away from record management toward managing the asset. And I think AI and automation can help us capture data from different sources in different formats.
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> – Stuart Shaw, Network Rail

Network Rail is pivoting from records to assets to enable self-service

The complexity of the many non-standardized engineering images in this engagement adds an order of complexity in which Network Rail chose and appreciated how Wipro set about the task.

"I was really impressed with the collaborative approach," said Shaw. "Wipro was not using templated advice or focusing on solutions they had designed for other organizations. Rather, they helped us to understand the 'as is' process, which helped us to think through how our team would deal with the new approach. I don't think we ever mapped it out in the same detail as they did. By evaluating every step of the process, they provided really a lot of value

because it made us think, 'Why are we doing this in so many steps?' They were then using that same methodology to map the 'to be' blueprint. It made it very easy to see that what we are developing is something that we actually wanted. And most importantly, it was going to deliver what we wanted."

Shaw said: "If I think about managing the asset, it is about self-service. So rather than my team having to provide information to people, wouldn't it be much better if the engineers could just access the information themselves? They are not going to be able to do that by just knowing what code to put in or what drawing number to ask for."

Measuring the progress of AI projects

Against this background, how did Network Rail measure progress, and what were the main achievements?

- **Getting close to straight-through-processing (STP):** By deploying niche technologies to automate the bulk of the process, the STP metric now stands at 90%. So far, 18,393 transactions have been processed, 16,554 of which were processed directly without human intervention.

- **Reduction in cycle time:** The solution resulted in a 30% reduction in cycle time within just a few weeks of operationalization.

- **Improvement in project lifecycle management:** The project lifecycle improved by 15% because the solution can learn and adapt to new forms of data with minimal training. Since the methodology and technical pipeline remain the same, the effort is mainly on scaling the solution to gather more diverse data, reducing the overall project effort.

- **High automation rate:** Currently, the services leveraging the productionized automation process (bot) handle 500 to 600 records per day. Any increase in demand is handled by running the bot over the weekend.

For success, focus on stakeholder management from the outset

When reflecting on the lessons learned from this engagement, Shaw pointed to the need to drive stakeholder management as early as possible. The Wipro team backed up this view, as Dev Bharti, Head of AI Advisory, UK & EU, outlined, "Network Rail Group's AI-first mindset really came to life when our stakeholders started communicating with other Network Rail divisions about the positive impact AI was having on daily operations. They have become true AI ambassadors, and seeing them collaborate with different divisions to drive AI adoption and embrace the AI-lingo was a really encouraging sight."

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Shaw reflected further, "I think the more people we have involved in the project, the earlier we need to engage with them. They get the idea. They understand the benefits. They get excited by what they're seeing. They are impressed by the results they are seeing. The less engaged people are the ones who didn't properly get involved at the start. Thus, the lesson learned for me is that I probably should have brought everybody in early in the process." But he is also quietly chuffed with his team's achievements on their journey. He closed our conversation by suggesting with a big smile, "Brunel might have been proud of what AI can do with his records." Legendary engineer Isambard Kingdom Brunel is an emblematic figure of the Industrial Revolution, having constructed many railways and bridges.

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The Bottom Line: Applying an AI-first mindset focused on enabling self-service can catalyze change when dealing with vast quantities of unstructured information

This collaboration between Network Rail and Wipro demonstrates how RPA in isolation is rarely the answer to complex process challenges. Organizations must demand a consultative approach with problem solving at its heart. When dealing with the complexity of unstructured information, innovative solutions rather than standardized building blocks will put you on the right track to your desired destination.

HFS Research authors

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Research Leader

Tom Reuner is Research Leader at HFS. Tom is responsible for managing the HFS IT Services practice with coverage areas including cloud native, application modernization, and quality assurance. Furthermore, Tom covers the emerging ecosystems of ServiceNow, Salesforce, and Pega. Leveraging his long entrenchment in the automation community, Tom drives HFS' thought leadership on automation. A central theme of his research is the orchestration and increasing interdependency of approaches such as RPA, AIOps, Observability, and AI. He is also managing the Top 10 program to ascertain consistency and thought-leadership.

David Cushman
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David leads our Emerging Technology Practice – tracking OneOffice enablers from automation and AI, to data and design thinking, integration, process orchestration, workflow and intelligence. He is deeply engaged in research into business value delivered by SaaS, and also leads our HFS Hot Vendors program.

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