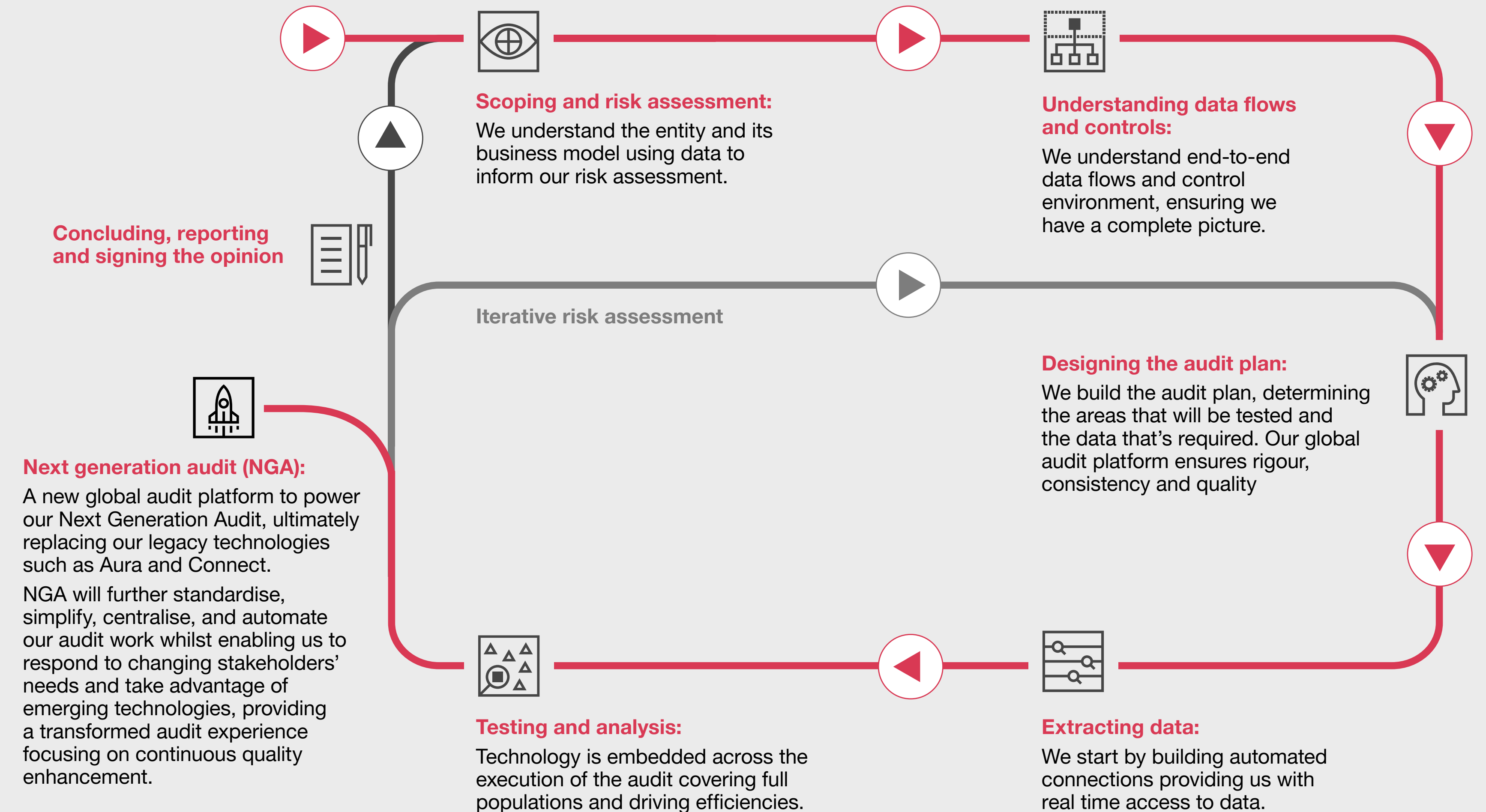# Technology

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Our technology

At PwC, we employ a human-led, tech-powered approach to deliver a high quality audit. We bring together the deep industry and functional expertise of our auditors with powerful technology tools and capabilities, developed both in-house and by our technology alliance partners.

Technology is central to how we operate, and the use of technology is embedded in our end-to-end audit lifecycle, from risk assessment analytics in planning to the use of artificial intelligence, data auditing and visualisation techniques in our audit testing. This targeted use of technology enables our auditors to generate insights to focus on the risks and judgements that really matter.

Our advanced technology drives:

- high quality audits, with the increasing use of data auditing providing increased coverage and higher levels of audit comfort;

- effective communication and integrated real time project management;

- transparency and clarity over our important audit judgements;

- greater efficiency in testing; and

- unique insights – around data, process, controls, systems and people.

A technology-powered audit

Scoping and risk assessment:
We understand the entity and its business model using data to inform our risk assessment.

Understanding data flows and controls:
We understand end-to-end data flows and control environment, ensuring we have a complete picture.

Concluding, reporting and signing the opinion

Iterative risk assessment

Designing the audit plan:
We build the audit plan, determining the areas that will be tested and the data that's required. Our global audit platform ensures rigour, consistency and quality

Next generation audit (NGA):
A new global audit platform to power our Next Generation Audit, ultimately replacing our legacy technologies such as Aura and Connect.

NGA will further standardise, simplify, centralise, and automate our audit work whilst enabling us to respond to changing stakeholders' needs and take advantage of emerging technologies, providing a transformed audit experience focusing on continuous quality enhancement.

Testing and analysis:
Technology is embedded across the execution of the audit covering full populations and driving efficiencies.

Extracting data:
We start by building automated connections providing us with real time access to data.

Our core technology

Aura Platinum, our global audit platform, is used across the PwC Network. Aura helps drive how we build and execute our audit plans by supporting teams in applying our methodology effectively, by creating transparent linkage between risks, required procedures, controls and the work performed to address those risks, as well as providing comprehensive guidance and project management capabilities. Targeted audit plans specify risk levels, controls reliance and substantive testing. Real time dashboards show teams' audit progress and the impact of scoping decisions more quickly.
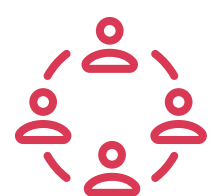
Data Acquisition is the process of connecting to our clients' systems, allowing us to access and collect the data in a standardised format with little or no manual intervention through a common PwC platform. It ensures that the data is extracted securely and correctly the first time, increasing audit quality through eliminating the risk of incorrect or incomplete data being extracted.
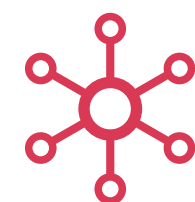
Connect is our collaborative platform that allows clients to quickly and securely share audit documents and deliverables.

Connect also eases the burden of tracking the status of deliverables and resolving issues by automatically flagging and tracking outstanding items and issues identified through the audit for more immediate attention and resolution. Clients are also able to see audit adjustments, control deficiencies, and statutory audit progress for all locations in real time.

Halo, our series of data auditing tools, test large volumes of data, analysing whole populations to improve risk assessment, analysis and testing.

For example, Halo for Journals enables the identification of relevant journals based on defined criteria making it easier for engagement teams to explore and visualise the data to identify client journal entries to analyse and start the testing process. Halo for Funds can gather, ingest, and transform funds data, in combination with third party valuation information, to quickly yield high quality visualisations and perform automated audit tests.
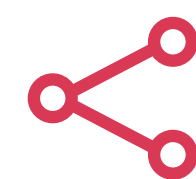
Connect Audit Manager streamlines, standardises and automates group and component teams coordination for multi-location and statutory/regulatory audits. It provides a single digital platform to see all outbound and inbound work and digitises the entire coordination process which facilitates greater transparency, compliance and quality for complex multi-location audits.

Aura Count, which facilitates the end-to-end process for inventory counts, allows our engagement teams to create and manage count procedures, counters to record results directly onto their mobile device or tablet and engagement teams to export final results into Aura Platinum.

PwC Confirmations, is our web-based confirmations platform integrated into Aura Platinum, which facilitates, automates, and standardises the end-to-end process for all types of external confirmations. This allows our engagement teams to create requests and receive external confirmation in a secure environment that helps mitigate the risks associated with receiving confirmation responses electronically.

Reliability and auditability of audit technologies

The firm has designed and implemented processes and controls to underpin the reliability of all of these audit technologies.

This includes clarification of the roles and responsibilities of audit technology owners and users. In addition, we have training and guidance focused on the sufficiency of audit documentation included in the workpapers related to the use of these audit technologies, including consideration of the reliability of the solution, and the documentation needed to assist the reviewer in meeting their supervision and review responsibilities as part of the normal course of the audit.

Driving innovation through our people

Innovation at PwC is about more than just technology and using our data specialists. It is deeply rooted into our people's mindsets and behaviours. We achieve this by providing our employees with the tools and skills needed to enable them to reimagine the possible. We also empower them to revolutionise all aspects of their work and drive digital transformation from the ground up. Our journey has continuously evolved and improved over the years, with one key theme throughout: putting technology in the hands of our people.

This is our citizen-led innovation approach. To enable this, we have focused on five key drivers.
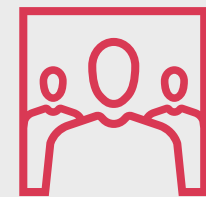
Digital Academies

Hands-on training in data manipulation and visualisation technologies such as Alteryx, PowerBI and UIPath. Our people are digitally upskilled to be citizen innovators, continually seeking opportunities to automate audit tasks for improved accuracy.

5,900+

of our auditors have been trained through a Digital Academy since its inception

Digital Accelerators

Our Digital Accelerators drive our digital transformation efforts. They are deep technical specialists combined with change agents who are deployed across our audit practice.

They are auditors with specialised technology training and play a crucial role in our audit teams. As well as technical training, they receive leadership and upskilling training so they can act as change agents on the ground. They spot audit areas suitable for digital improvement and build the automations to make it happen. They create, and encourage others to create, customised audit innovations.

Digital Lab

Our citizen-led collaboration platform for developing and sharing automations across teams. This ensures technology built by one audit team can quickly be adopted and used by other teams.

Since its inception, hundreds of new tools have been created which have been applied to audits over 17,000 times, with over 800 digital assets that are actively deployed in our audits.

Change network

Across the Audit Line of Service we have implemented a change network structure so that each individual BU (split by either location or financial services industry type) has a designated Change Leader and Digital Driver to support the delivery of the central digital strategy. These are digitally inclined individuals within the BU who understand the day-to-day operations but have a focus on driving forward the digital agenda.

Digital Quest

Digital Quest is our intuitive, web-based app that is designed to assess our digital readiness across the audit practice and help us apply a digital mindset. It was created by our Digital Audit Innovation & Data team this year. The focus of Quest is to help our teams understand what digital tools they are currently engaging with, and most importantly, helps them plan how to increase the use of technology on the engagement going forwards.

Case study: Digital Quest

The purpose of the Digital Quest is to encourage consistent adoption of the latest technology on all of our audits.

Audit engagement teams set up a Quest instance for their client and configure it to the specific attributes of the engagement including the industry, relevant ERP, group/ standalone client and size of client. Through this configuration the digital tools and solutions suggested to the team are tailored to ensure there is a focused list for them to select from. Solutions are bucketed by core assets, data solutions and citizen-led assets.

Individuals input their technical capabilities against a range of core technologies so that teams can identify their strengths and potential skill gaps. Where the team has the right skills this helps drive their decision making around which technology solutions to engage with. Alternatively, where there are potential skill gaps it helps focus the correct upskilling and training available to the team.

A tech-powered audit: Our Digital Quest

As well as helping teams engage with the technology that is available right now, it promotes collaboration and challenges the engagement team on which teams and specialists within the digital network could support in delivering an effective, quality audit.

This gives an opportunity for teams to better understand the different parts of the digital network and drives the right conversations with the organisations we audit.
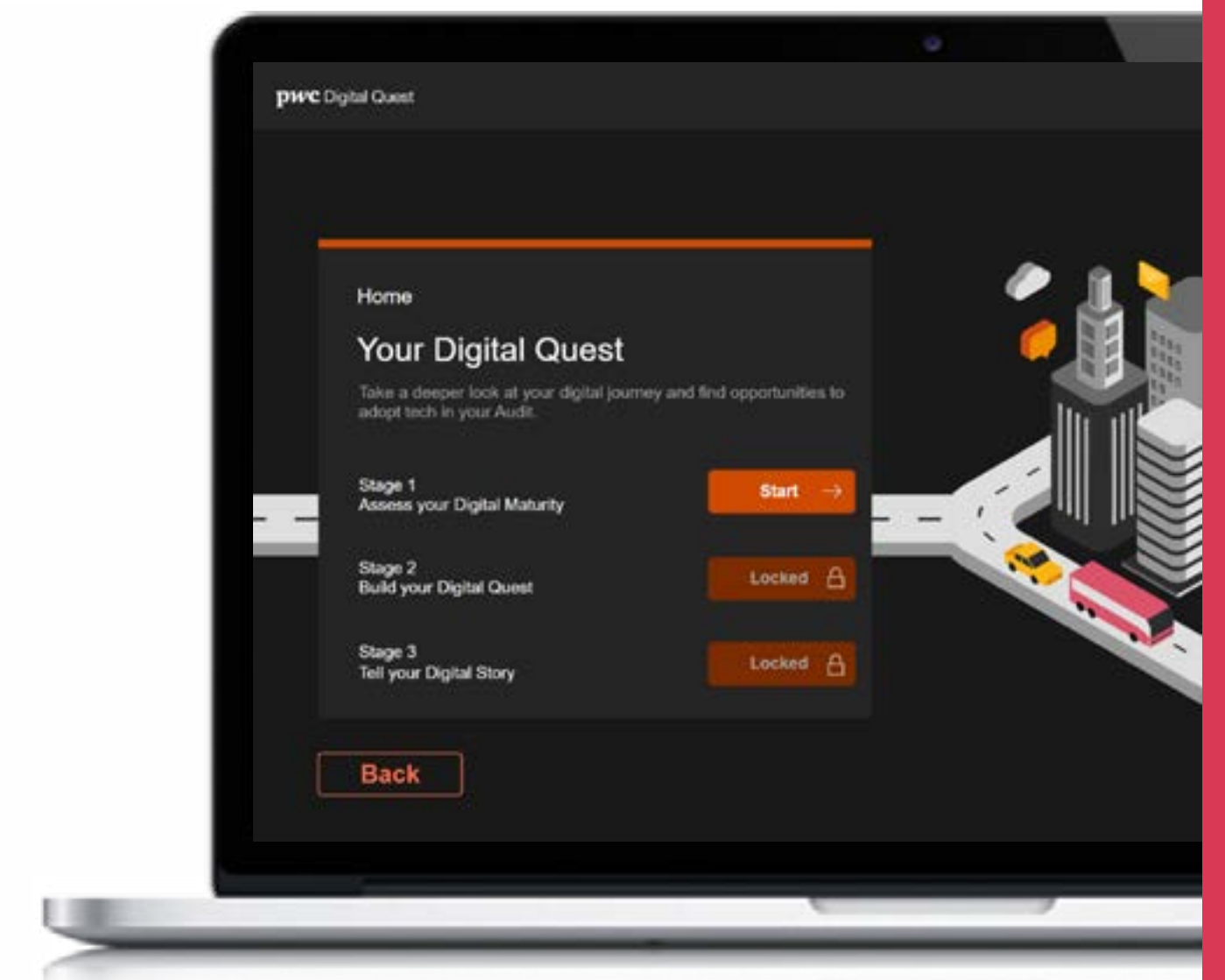
On the completion of Quest teams have created a bespoke digital journey for their client showcasing the current application of digital solutions as well as the planned solutions over the upcoming 12 months. This helps clients understand how and where technology is being used as well as what digital commitments the team is making over the next 12 months.

Data at the heart

Examples of advanced technology used by our engagement teams.

Automated Revenue Testing

A digital mindset and data-driven approach is at the heart of our audit proposition. A key area in which we have continued to evolve is using data to automate our approach to revenue testing.

Our data acquisition technology allows us to extract and analyse large volumes of data, transforming the way we can audit revenue with analytics and transactional population testing that can trace, reconcile, and test revenue from the general and sub ledger all the way through to cash and other settlements, delivering up to 100% coverage.

Key benefits

- Increased testing coverage, driving a high quality approach to revenue testing.

- Analytics and intuitive outputs through data visualisation that provide insights into the revenue cycle by highlighting anomalies and allowing target based risk testing to be conducted.

- Deeper understanding of actual client processes and controls.

Group Scoping

We continue to drive innovation in every aspect of the work we perform. Group Scoping is our intelligent tool that performs group scoping by considering different scenarios and quantitative factors to obtain the most optimal audit coverage across the group, all in real time. From here, we can plan our audit procedures rigorously to address the audit risks for the balances in scope.

Key benefits

- Automated scoping of components to reduce the extent of manual intervention and likelihood of human errors.

- Instant and continuous transparency into our scoping decisions and gives clarity over our important audit judgements by clearly visualising and articulating the results.

- Continuous updates to the audit plan as balances change over time.

"The significant number of scoping components, the use of multiple benchmarks add huge complexities to the scoping assessment. The Group Scoping tool increases audit quality through less manual processing and reducing the risk of error…"

Audit engagement team

"The scoping exercise for our client is complex, with the UK team acting as both the Group auditor and component auditor for numerous overseas entities each of which require different materiality levels and specified procedures over balances. Digitising this scoping process allowed us to streamline our scoping exercise, reducing input time from the senior engagement team and also reduced the likelihood of human error…The outputs are easy to understand and make it significantly easier to collate required information into a single user-friendly document – a previously time consuming manual task."
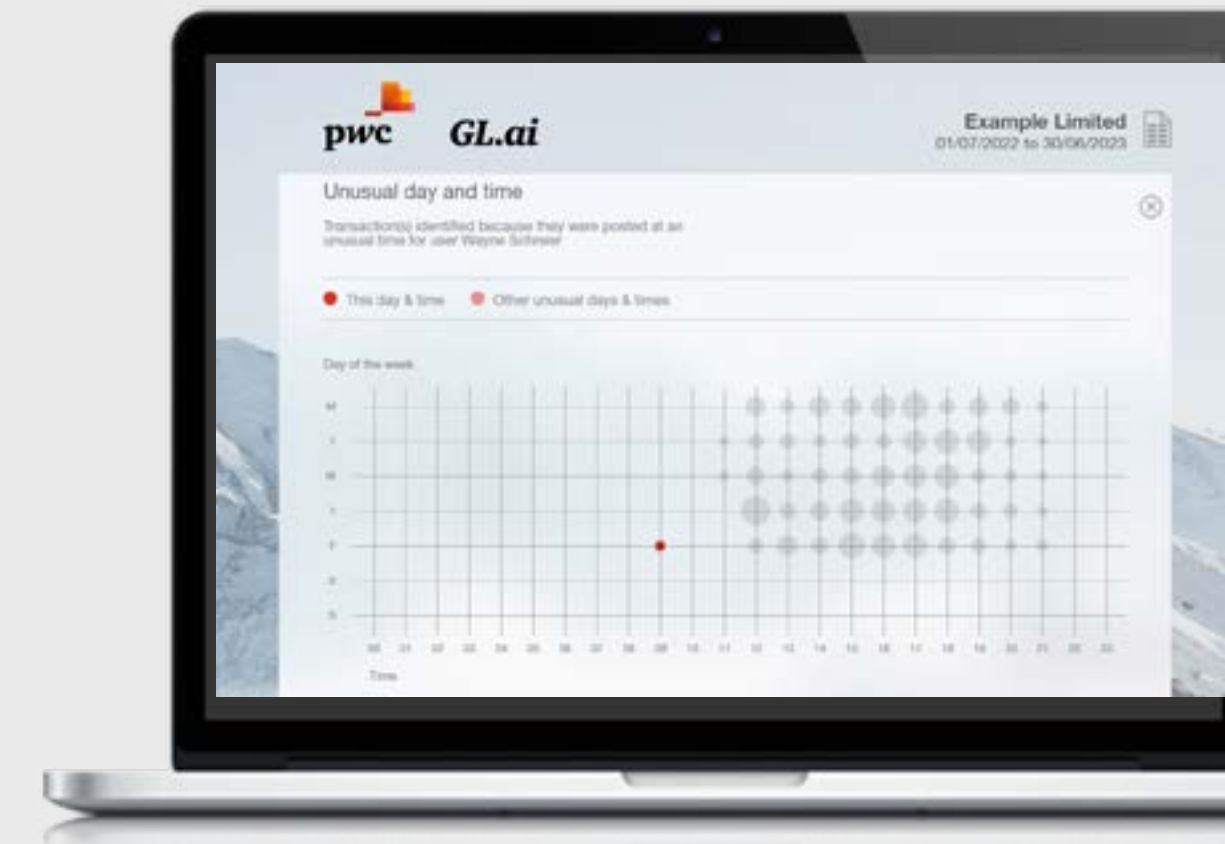
Audit engagement team

Using Artificial Intelligence (AI) – AI Prototype for the General Ledger (GL)

AI Prototype for the GL is our groundbreaking application that detects anomalies in the GL using bespoke anomaly detection algorithms trained by experienced PwC auditors.

It replicates the decision-making processes of experienced auditors, analysing billions of data points in milliseconds and applying judgement to identify entries deemed to have higher-risk characteristics which can then be robustly challenged by our auditors.

AI Prototype for the GL is currently used in the planning stage for risk assessment with plans to expand this to our fraud risk tests over journals, subject to regulatory approval.

Example audit assets designed and developed by our auditors that are available for every engagement team to use include the following.

Related Party Director Search – an automation which performs an Application Programming Interface (API) call for a company number to the UK Companies House and returns a list of directors and their other appointments.

Identify Reversing Journals in Listings – this workflow identifies debits and credits that net to nil within client listings. The output separates reversing entries into separate tabs and provides a listing without reversing entries ready to input into a sampling tool.

IFRS 16 Lease liability calculator – a tool for auditing leases under IFRS 16 which automates the calculation of the opening and closing lease liability, total repayments and total interest charge, total depreciation charge, and accumulated depreciation.

ITGC Access Management – Joiners and Leavers workflow – this workflow performs a reconciliation between one or more user/system access listings and one HR listing which contains employee joining/leaving dates, to identify joiners/leavers who have access to the system.

Search for Unrecorded Liabilities Tool – a tool which identifies transactions that can be target tested based on value and risk for the search for unrecorded liabilities testing.

Insurance: calculate Unearned Premium Reserve in Alteryx – an Alteryx workflow which calculates unearned premium for a general insurer with a straight line earning pattern, based on 100% of gross written premium for the year.
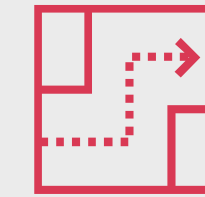
Future of the Audit
Open Banking

At PwC, we are constantly evolving and digitising our audits. We are taking the next steps in the audit of cash transactions by piloting Open Banking.

Open Banking allows us to obtain digital access to our client's bank account transaction information directly from the bank, digitally. This new source of data gives the promise of better-quality audit evidence through greater comfort over the accuracy of transactional data. Clients will no longer need to submit responses to Connect requests for bank statements from every account as all banking transactional data will instead be accessible by auditors on a single platform in a consistent easy to use format.

Case study: Using innovative imaging and AI to audit hard to reach farms

As part of PwC's audit of Westfalia Fruit we developed an innovative use of satellite imagery, radar and AI to audit their fruit farms across two continents.

The Westfalia Fruit Group operates the largest avocado-growing footprint in the world, with farms located in South Africa, Chile, Colombia, Peru, Portugal, the US and India. The company's crop constitutes a considerable asset, therefore determining its correct scale was critical.

A number of Westfalia's farms are in particularly remote locations, making it difficult for the audit team to undertake site visits to determine the correct percentage of the planted areas. These hard to reach locations encouraged us to devise an innovative approach.

We brought together expertise from across the firm to advise on the options available to our auditors. Drawing on the digital imaging and analysis experience within our drones team, the innovative method we devised involved commissioning satellite images of a sample of Westfalia's farms, and then employing an AI analysis tool to determine the percentage of the area that had been planted. We then tested the results produced by the AI programme against a manual assessment of the same images, concluding that the AI analysis provided accurate data.

We commissioned satellite imagery of 30 Westfalia sites across three countries (Colombia, Mozambique and Chile) and used the AI powered analysis to determine the planted areas. Persistent cloud cover over a number of the farms made it even more challenging to make an accurate assessment. Returning to our digital imaging and analysis experts, we identified that Synthetic Aperture Radar data could also be collected via satellite, through the clouds, and provided us with the evidence we needed. Using these two methods we were able to assess Westfalia's farms total planted areas.

The deep expertise and collaboration across PwC allowed our team to employ satellite data within an audit in a way that has never been used before. Given the importance of their crop to the financial health of Westfalia's business, our ability to assess their total planted area was crucial to the robustness of our audit. By designing an innovative, technology powered process to collect and evaluate an unprecedented level of audit evidence, we were able to make that assessment with great efficiency and confidence.

"Thanks to PwC's approach it gave us comfort that reported planted areas are accurate which is an important factor in our procurement strategy."

Rian Du Toit
Group Chief Financial Officer at Westfalia Fruit

Next Generation Audit

As part of our commitment to building trust and delivering sustained outcomes, the PwC Network is investing in a multi-year effort to deliver a new global audit platform to power our Next Generation Audit, ultimately replacing our legacy technologies such as Aura and Connect. By exploring and investing in new technologies and redefining underlying audit processes, PwC will further standardise, simplify, centralise, and automate our audit work.

PwC's investment will accelerate ongoing innovation and enable us to respond to changing stakeholders' needs while taking advantage of emerging technologies, providing a transformed audit experience focusing on continuous quality enhancement. PwC's vision for NGA is to provide efficient, robust and independent assurance and audit insights across financial and non-financial information, helping to build trust in what matters to our stakeholders. As PwC gains momentum around the Next Generation Audit programme, we will continue to release new capabilities on an ongoing basis to enhance quality and the overall audit experience.