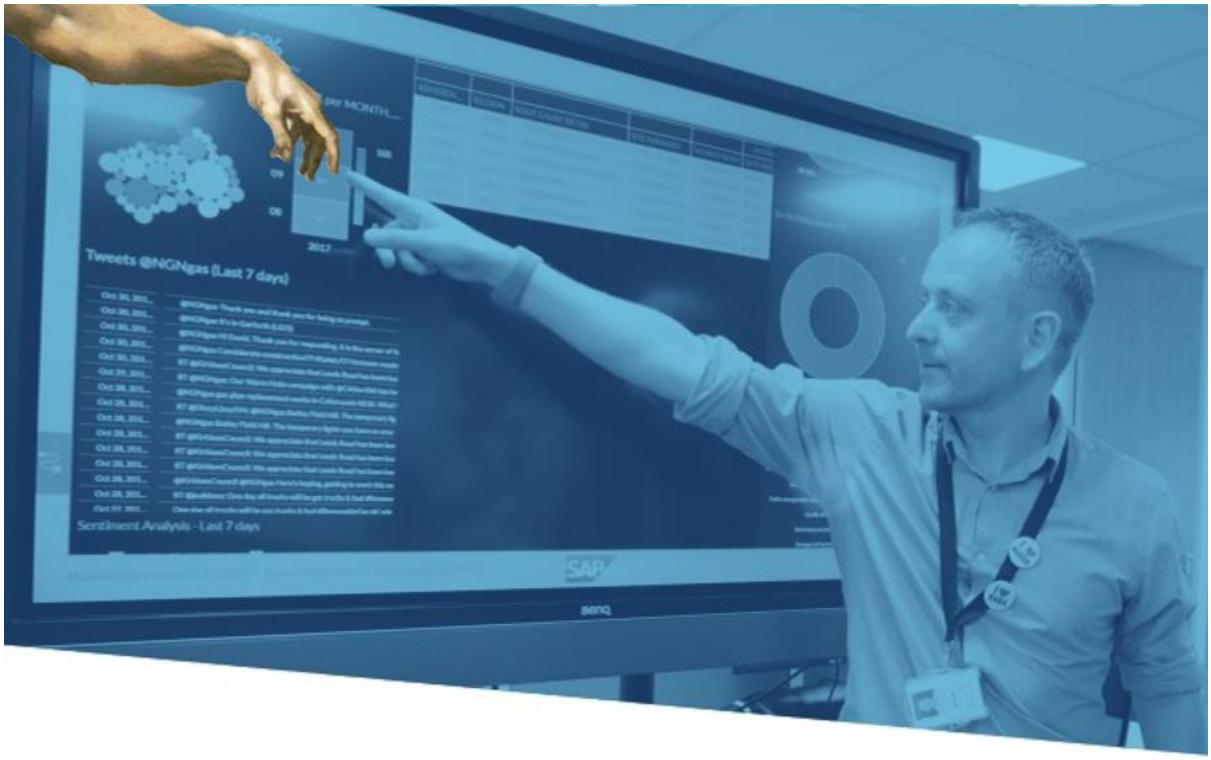
Northern Gas Networks



Digitalisation Strategy

2021 Edition

Before we start...

This is not just another corporate strategy document.
This is a manifesto; a vision of
a better future that we promise we will deliver.
We are **dead serious** about this

Introduction: Thriving in a Changing World

Welcome to the digitalisation strategy of Northern Gas Networks. SPOILER ALERT: There's some cool stuff in here.

We are all living in the Data Age. If you haven't heard of the Data Age then google it, and know that by googling it, you are actively participating in the Data Age. This is such an exciting time to be a Utility (probably the least-used sentence in the English language). The possibilities offered by data are endless, and digitalisation is the key to realise them. Our digitalisation work has already put us in a fantastic position and we are now building on that foundation.

The great thing is that we are not alone. Organisations, institutes and government bodies are all alive to the exciting possibilities of digitalisation, and are keen to collaborate, innovate and explore together.

We will be publishing updated editions of our strategy each year, and future editions will increasingly compliment and enhance the work we and others are doing around Energy Futures and Net Zero.

The theme of this edition of our strategy is change. It is a cliché, but nonetheless true, that change is the new constant, and the pace of technological and societal change is accelerating. Look at the advances in Artificial Intelligence over the past year alone. Deep Learning is pioneering new innovations in medicine. We chat with In Home Devices as if it's the most natural thing in the world. People are now talking about quantum computing as inevitable rather than ineffable. Crucially, none of these advances are truly niche, all have multiple, sometimes innumerable applications, that businesses like ours can use.

Our digitalisation strategy is actually very simple, to build a digital platform for NGN that meets the needs of the present without precluding the needs of the future. We have a lot of cool stuff we know that we want to do, but we're also cognisant that things will come up that we haven't even dreamed about. It's vital that our digital platform can incorporate new technologies, methodologies, and ideas.

> 'By giving people an agile and intuitive experience, we empower them to know more, care more and achieve more'
>
> Matthew Little, 3iG Director

This is the 2021 edition of our digitalisation strategy, finalised in December 2020. As a utility business, if 2020 has taught us anything, it is that change is not always gradual, sometimes it is swift, and completely disruptive. Now more than ever we understand the importance of being able to adapt to new, sometimes extreme, circumstances; to have the capacity and the capability to be flexible. Our work on digitalisation has proved vital to meeting that challenge.

The vision of our strategy has always been integrated information management. It is a phrase you will come upon a lot in this document. Our work towards this vision is supported by four main pillars:

- Collect data at source, store it securely and use it wisely.
- Build applications and processes that are easy to use by our colleagues, our partners and our customers.
- Deliver world-leading technology that keeps us at the frontier of efficiency, safety, customer and integrity
- Never lose sight of the fact that it is our colleagues who will make this technology work

This strategy is split into sections, covering each of the major aspects of our digitalisation work.

Part 1 gives details of what we are doing and why we are doing it. The three headers for this section: Digital by Design, Maximising the Value of Data and Visibility of Data mirror the first three recommendations of the Energy Data Taskforce, the other two recommendations: Co-ordination of Asset Registration and Visibility of Infrastructure & Assets, we have embedded into our strategic thinking as design principles, because one of the ultimate aims of our work should be the enablement of these recommendations.

Part 2 is our Action Plan. This is where we give visibility of each individual piece of work, along with a status of progress. Some things may be conspicuous by their absence from our Action Plan. There are no major investments in digital platforms or the latest enterprise resource planning tools, because we have done all the groundwork in RIIO-GD1. Our Action Plan is therefore one of continuous, iterative improvements on our existing world-class digital enterprise.

It is in Part 3 where we give some background to what we have done during RIIO-GD1 to get us to this position, including the implementation of S4/HANA, and our journey to the Cloud.

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Stakeholder Relationship

Northern Gas Networks plays an important role on a local, regional and national stage, and our stakeholders range from local business and charities to UK Government. We passionately believe that digitalisation will improve not only the service that we provide to our stakeholders, but also our relationship with them, the way that we interact, the way that we share data and information, the way that we work together to achieve common goals. Our stakeholders are at the forefront of our digitalisation strategy.

We have set up regular feedback points to several stakeholder groups, including quarterly meetings with our Customer Engagement Group, and an annual Stakeholder conference. We're also working on making this strategy itself more interactive, so that stakeholders can explore, suggest and comment on our digitalisation work.

Themes in the Key of Life

One extremely useful tool in any digitalisation work is personnas. Using personnas helps to ensure that solutions are designed with all users and dependencies in mind. We have utilised personnas in many of our individual digitalisation projects, especially those that are customer or colleague facing; for instance, our Customer Portal. However, for our digitalisation strategy, we have deliberately stayed away from detailed personnas, instead drawing on broad stakeholder themes that reflect the world we live in. We have done this because we recognise that digitalisation is about the imagined and the unimaginable, and we were concerned that detailed personnas could limit our thinking. Therefore we use the stakeholder themes to ensure inclusivity and input, but only drill down to personnas on specific projects.

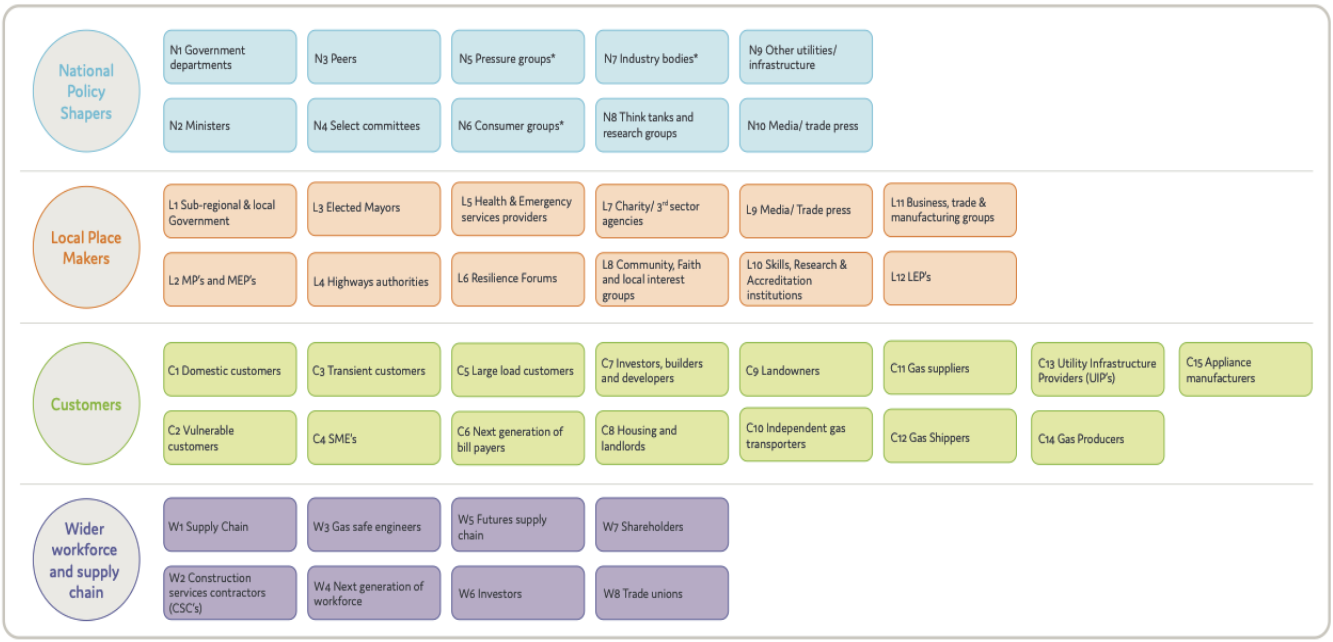

Fig. 0.1 – Stakeholder Themes

Music of the Spheres

Leading on from the Stakeholder Themes, we are building an Influence Map to help draw parallels between certain themes and the areas of digitalisation that they may be particularly interested in. We believe that every part of our digitalisation work has the potential to hold benefits for all stakeholders, not just those who have specifically asked for it, and we use the map to help us to make sure that all areas are considered.

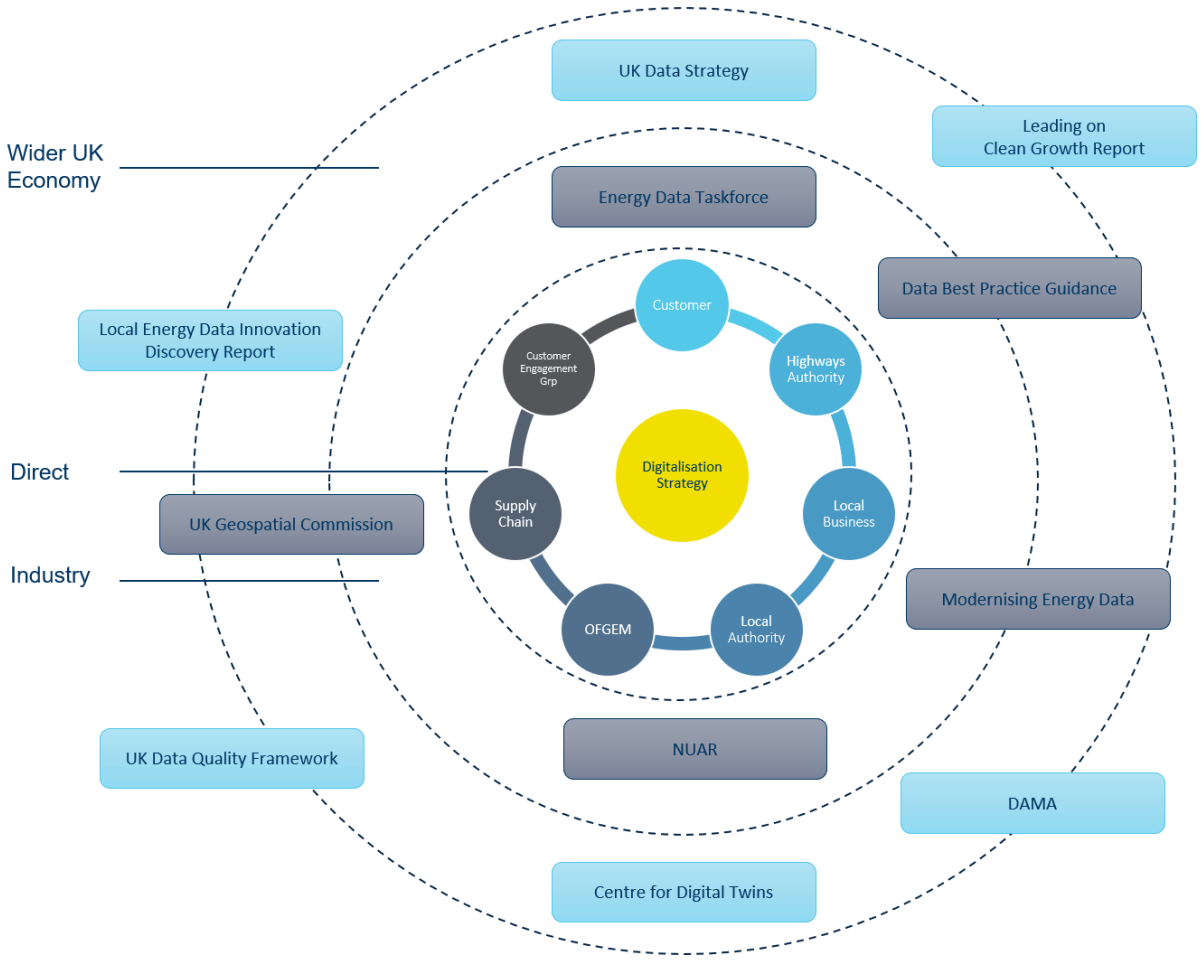

Fig 0.2 – Music of the Spheres..hey, Britney, influence me one more time

The NGN Digital Enterprise

You will be seeing versions of this diagram a lot throughout this document. It is a simple representation of our digital enterprise, designed specifically for integrated information management.

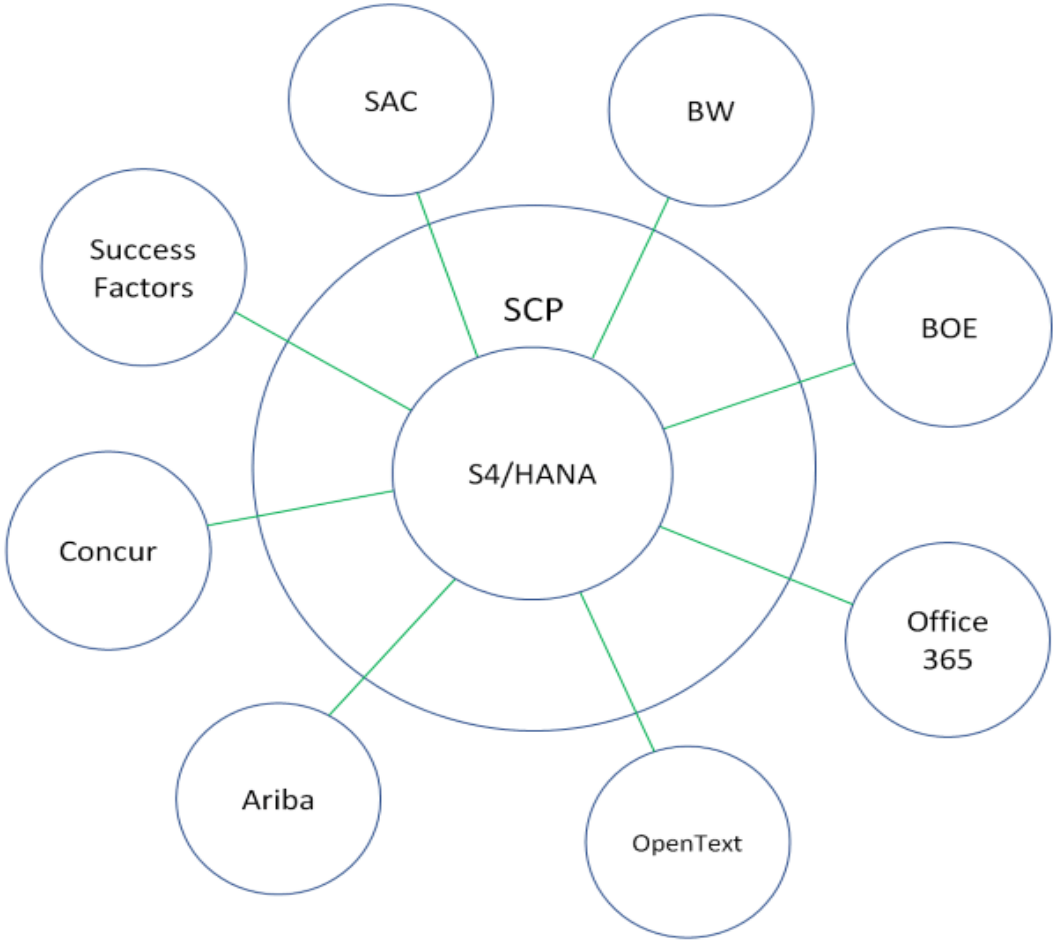

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Fig.0.3 The Northern Gas Networks Digital Enterprise -It's full of stars

Part 1: Building A Better Future

NGN first developed a Digital Strategy in 2014, and like every good strategy, it has grown and evolved, drawing in new technologies, new ways of thinking, and new learning from hard-won experience. However, throughout this evolution, one guiding principle has always been front and centre: Integrated Information Management; the understanding that data flows through everything that we do.

1 Digital by Design

We have wrapped a digital platform around our core ERP, and utilised fully integrated SaaS solutions to provide a stable, scalable landscape that will continue to deliver digital innovation.

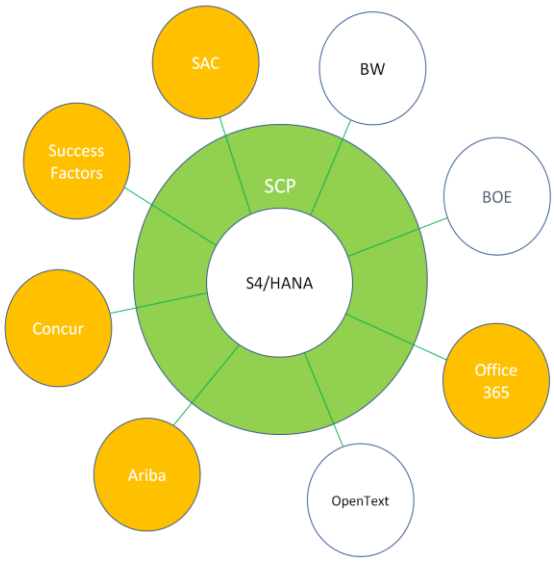

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Fig.1.1 The digital platform (in Green) and integrated SaaS solutions (in Yellow) in the NGN Digital Enterprise

By implementing standard processes, and sticking to our design principles, NGN has achieved the first phase of Integrated Information Management across a platform that can and will benefit from continuous improvement in technical functionality and process capability without the need for complex and costly upgrades or retrofitting. We have a digital platform that is ready for anything.

NGN continues to develop this digital platform, maintaining a disciplined approach to adopting vanilla systems, adhering to standard processes and fully integrating data across our whole landscape.

The WoW Factor

At NGN we recognise that Digitalisation is not a one time deal, it is an ever-evolving process that should grow and develop as the business, the economy, the environment and everything else grows and develops.

That is why we have introduced Future Ways of Working (FWoW), a continuous programme of digitalisation, process refinement and colleague engagement.

1.1 Integrated Information Management

Northern Gas Networks will be a data-driven, digital business and a thriving, essential component of our economy, our society and our environment. For this we need our data to be integrated, flowing through our network without impediment or break. It needs to be presumed open, properly governed, enriched and cared for. It needs to be understood, parsed and correlated. It needs to be treated like the solution rather than the problem. This is the basis of Integrated Information Management.

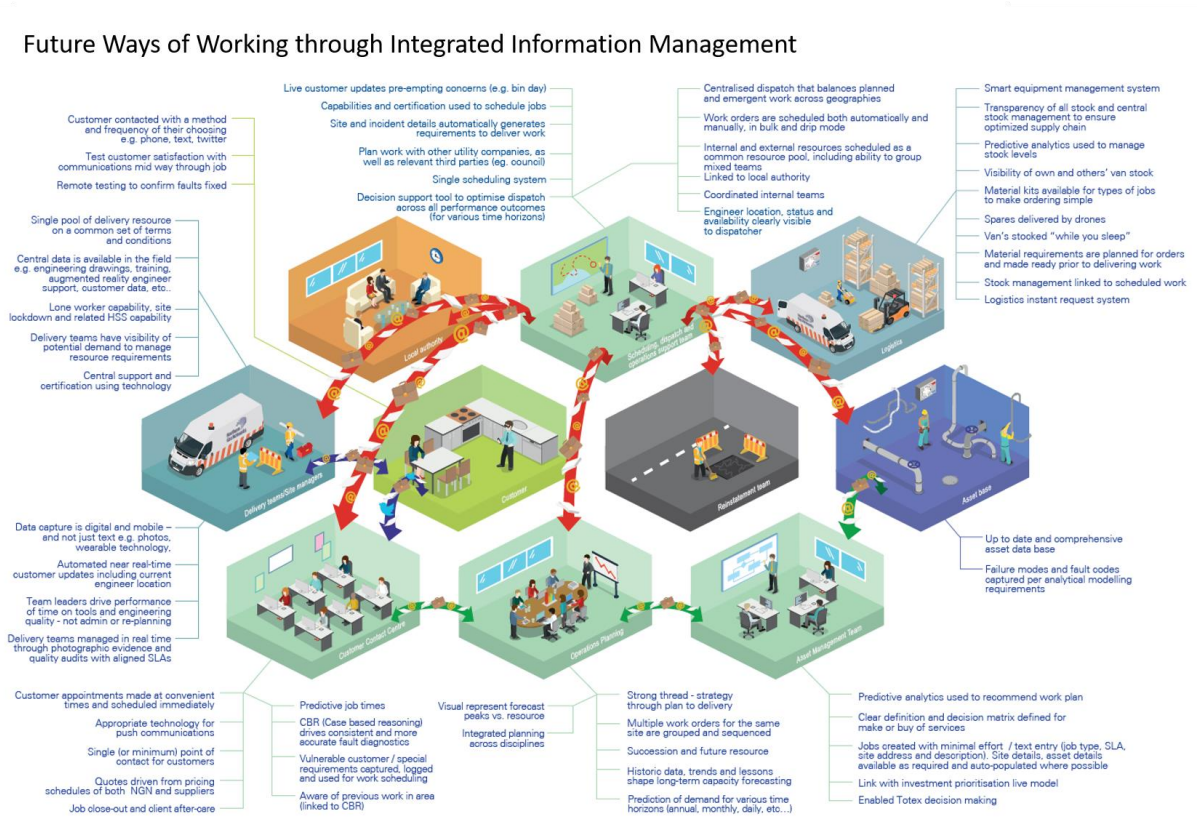


Fig 1.2 A vision of the NGN Digital Enterprise enabled by integrated information management

However, good data management is not the single component of integrated information management. To paraphrase Einstein, data without process is lame, process without data is blind; and behind both data and process? People. For successful integrated information management (and by extension, successful digitalisation), each of these three: data, process and people must be fully incorporated. Our digitalisation work never loses sight of this. There is so much that we want to do, and we maintain a disciplined approach to doing it in the right way.

1.2 No Digitisation without Representation

Digital transformation is not about technology, it's all about people. You can implement the most advanced, most mind-blowing technology in the world, but if people don't use it then it is totally pointless. That is why at NGN all our digitisation initiatives are business led, and our applications are designed by the colleagues that will be using them. There are so many benefits to this way of doing things. Our colleagues feel empowered, digitisation is something they are doing, rather than something being done to them. The application is theirs, they know how it works, and crucially, why it works. So they want to use it, and they understand the importance of using it correctly.

Crucial to the success of our digitalisation work is the concept of Digital Citizens, and it's something that we've spent a lot of time thinking about. As colleagues in NGN, we can't just be ready for digitalisation to happen to us, we have to be part of the change, informed and excited about the possibilities of digitalisation and how we can use everything that is available to us to improve not only our own lives but the lives of everyone. The great thing is that digitalisation is non-hierarchical. Everyone can and should be a digital leader; and developing both our colleagues and in some respects our stakeholders into Digital Citizens is going to be a key activity over the next couple of years to ensure that everyone of us is driving digitalisation forward.

NGN continues to work in new and innovative ways, always ensuring that our workforce is an integral part of our Digital Enterprise.

Remote Working

2020 accelerated our thinking around this, and it has certainly helped with the adoption of digital practices. We're all much better at web-conferencing, we can't just walk to the printer to pick up a physical piece of paper, we have to engage with a digital copy. We are now thinking about how we can build on this to enable potentially radical new ways of working.

Our Stakeholders told us:

'Promote diversity, development and inclusion…'

We are expanding our HR solutions to further digitise our colleague development. Our new Performance & Goals module will enable collaborative working between colleagues, continuous development goals and access to online educational material. Our People Analytics will support our work on diversity and inclusion, providing real-time analysis on the impact and effectiveness of our work, enabling dynamic decision making.

See the Action Plan

1.3 Do the Right Thing, not the Shiny Thing

There is a tendency, especially in a corporate environment, to chase after 'quick wins' and short-term fixes. The move towards digitisation is no different, where the temptation to think 'we'll build an app for that' is strong. Long is the road, and hard, that out of app development leads up to light. Digitisation is so much more than simply exchanging traditional processes with various attractive, user-friendly applications. Applications collect data, drive processes and flow information. All these things have to be considered and incorporated in a true Digital Enterprise.

TEG, you're it

Our internal Technology Enablement Group acts as a design authority making sure that our digital innovations are done in the right way.

At NGN our approach has always been, and will continue to be, to pursue a proper digital transformation, focused on making sure there is a strong foundation, both technologically and culturally, to all the amazing things that we do. This involves work that is sometimes boring, usually difficult, often misunderstood, and completely vital to our success. Work like continuous improvement of data quality, rigorous process controls with robust roles and authorisations, and fully integrated systems sharing a consistent data schema. That's not to say that we won't be producing attractive apps, quite the contrary, the apps we are building are like Robert Redford during the 1960s, (and arguably early 70s), but they will also be built to enhance the digital experience, as part of an end-to-end process that is fully optimised to be as efficient, as secure, and as integrated as possible.

"Digitisation is about doing better things, not doing things better…"

This is a quote from a member of our Customer Engagement Group during a roundtable discussion on NGNs digital strategy, and frankly, we couldn't have put it better ourselves. Digitisation is an opportunity to approach things differently, to redesign processes, to disrupt traditional ways of working and conventional ways of thinking. Digitalisation is an opportunity to do better things.

We found that our biggest advocates for disruptive thinking were our stakeholders. We have kept them involved every step of the way in the evolution of our digitalisation strategy, and they continue to challenge us to think about doing better things.

1.4 Setting the PACE

To make sure that NGN continues to get maximum efficiency benefits from our digital platform, we have created a Process Automation Centre of Excellence (PACE). The PACE continuously reviews, revises and reshapes the processes that underpin everything that we do, ensuring that tasks are performed efficiently, data flows smoothly, and outputs are delivered effectively.

The PACE consists of Business and Data Analysts, Subject Matter Experts and Solution Architects, each armed with the knowledge of what NGN does, and the creativity to reimagine how we do it.

Robots Rule

We are introducing intelligent Robotic Process Automation into our network, and we're currently building bots to automate our PE Pipe Joint Assurance.

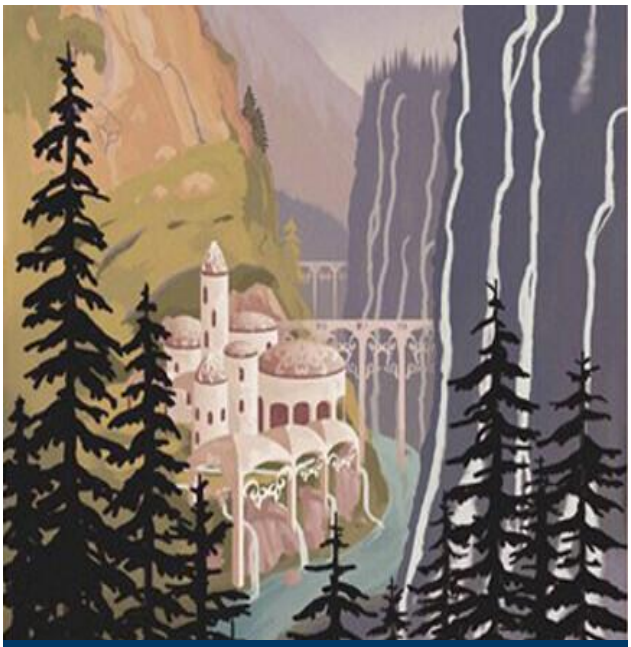
See the Action Plan

Our Stakeholders told us:

'Maintain the value and integrity of your digitalisation investments whilst continuously looking for process improvement…'

We've developed a Process Adherence Monitoring tool, working in close partnership with PwC.This provides a real-time, interactive view of each step of a process, with analytics to identify when steps are skipped, partially completed or repeated, and visualisation techniques to allow our analysts to continuously assess the effectiveness of the process. This is a **Worlds First** development and we will continue to roll it out to all of our processes.

1.5 The Living Network



Our Digital Enterprise provides a strong foundation for the future. The amount of data available to us will continue to proliferate, as will the value of using that data correctly. Our assets can provide us with insight, and we are now able to listen. We will not have *an* Internet of Things, with our Digital Enterprise we will have *the* Internet of Everything. All our assets, all our colleagues, all our customers and stakeholders, everything and everyone unified through our collective Digital Enterprise.

With our integrated approach to digitisation: People, Process, Technology and Data; our network can come alive. The possibilities of this Living Network are endless, and go far beyond asset management, and beyond the type of gas that flows through our pipes.

Our assets are singing, and now we have the capability to listen to, and interpret, that song. More than that, we can integrate assets so that they listen to each other, operating in harmony until there is a problem, and at that point letting us know. We can use sensors to provide data on pressure, temperature, humidity, proximity, and anything else that would help. We can make assets intelligent, we can feed them information and teach them to think.

All this becomes even more exciting if we think beyond our own assets. What about pylons, wind turbines, pumping stations? They may belong to different companies, but they all service the same consumer. Having these different infrastructures all sharing data would provide massive benefits to customers and the energy sector as a whole, without impinging on competition.

The Internet of Everything

We are working with Digital Catapult on an Internet of Things discovery programme to build a robust framework for enterprise IoT.

Watches and glasses and gloves, oh my!

We're currently planning a series of rapid initiatives to explore the potential of IoT, wearable tech and computer vision.

See the Action Plan

Our Stakeholders told us:

'Explore how asset data can be interoperable to benefit a whole energy system…'

Clarity begins at home, and for our asset data to be interoperable with others, we recognised that we needed to get our own data house in order. We are building a data catalogue using consistent naming conventions and ontology. We're also talking with the Energy Systems Catapult about a Common Information Model standard similar to the one used in the electricity sector.

See the Action Plan

1.6 Digital Twins

It's fair to say we are still at the start of the journey to digital twins, but the start of the journey is always the most exciting bit. We know that the use of digital twins has massive potential in our network and as part of a wider energy eco-system, and we're already having to stop ourselves from saying 'are we nearly there yet?' As with all of our digitalisation work, we want to develop the use of digital twins in the right way, one that is fully integrated with our digital enterprise and works seamlessly and efficiently. We know that we have a lot to learn, and we will be collaborating with the leading organisations to ensure that we are moving forward as effectively as we can.

We have joined the Digital Twin Hub, run by the Centre for Digital Built Britain. We are really excited by the Gemini Principles that the CDBB published in 2018, and we are committed to following these in the development of our own digital twins.

All Rise

We've developed a proof of concept on producing digital twins of High Rise buildings in our network, and we're using learning from this to move into other areas.

See the Action Plan

Fig.1.3 Sign o' the times – the CDBB Gemini Principles

The ultimate goal is for our digital twins to be used by us, the wider energy sector and beyond. There's a way to go before that happens, but digital twins will feature more and more in future editions of our strategy.

2 Maximising the value of Data

Northern Gas Networks is not a Gas Distribution Network, NGN is a data management company that delivers a world-class gas distribution service. Data is the most valuable asset that we possess.

2.1 Master Data to find Wisdom

We have mastered our data in properly designed, consistent data schema. All our asset data is mastered in S4/HANA, all our colleague data is mastered in SuccessFactors. This data will be available for consumption across the entire NGN Digital Enterprise, but should only ever permanently persist in either S4 or SuccessFactors. In this way we have complete control over the data, and do not have issues around duplication of data in multiple databases, with the associated support and maintenance overhead.

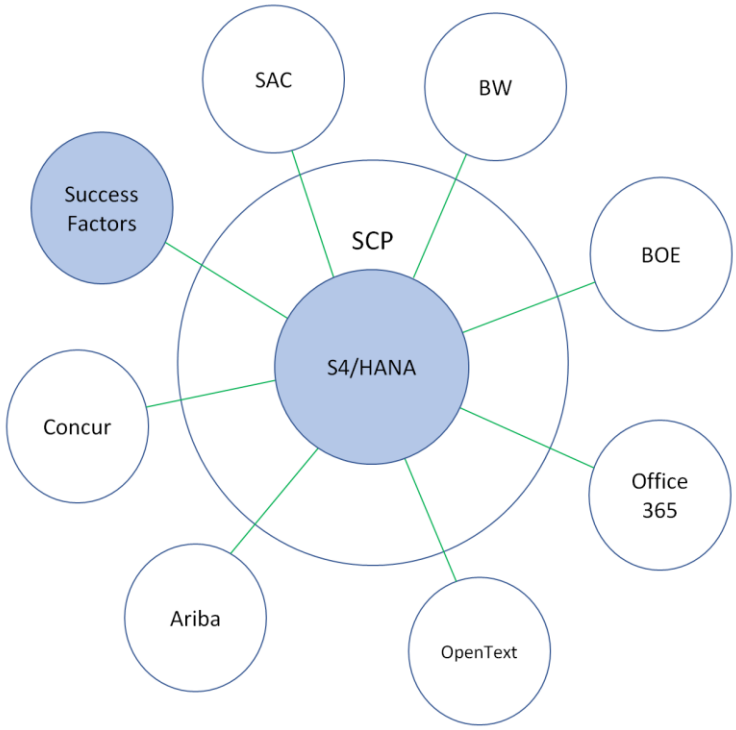


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Fig 2.1 Master Data repositories in the NGN Digital Enterprise

The objective is to maintain a fully scalable and adaptive approach, allowing us to respond quickly and effectively to changing data needs, be that creating new data objects or retiring obsolete ones.

2.2 Keeping it Fresh

We have built our own work management application for our Emergency & Repair function, using the SAP Cloud Platform. This amazing app was designed by our own engineers. They are the ones who are going to use it, they are the ones who know what it needs to do, and what it doesn't need to do.

We're extremely proud of what we have done with E&R, and we're now moving into other areas of the business (see sidebar). Our over-riding aim is to collect data at source, but not to make that a burden on the colleague who is actually doing the work. That means not building a plethora of apps for anything and everything, but a thoughtfully architected, single platform which minimises the need to toggle between applications, maintains a consistent user interface and feeds from and to the same data schema.

User experience is really important, not just because it is a nice thing to do for our colleagues, but also because a seamless, even enjoyable user experience is a potent force in ensuring data accuracy and completeness. As is the amount of data we ask the user to collect. It is tempting to throw everything in there, but designing an application where manual input of data is the exception rather than the rule is an effective way to reduce 'input fatigue', which leads to incorrect data entry.

Applications, Assemble

Building on the success of our **Worlds First** Emergency & Repair application, we are currently expanding the App Cinematic Universe to include Connections and safety audits, all fully integrated with our Digital Enterprise.

See the Action Plan

2.3 Keeping it Open

Our ethos is that the data we hold is presumed open. We want as much as possible of our data to flow freely through our network and also flow freely from our network to stimulate innovation, philanthropy, environmental improvements, anything and everything. Obviously, there are considerations that cannot and should not be ignored: data privacy is of major importance, as is cyber security, and both will necessitate restrictions in certain data types. We have instituted principles of Privacy and Security by Design, working with our Data Protection Officer and Cyber Security/Infrastructure teams to ensure that all our digitalisation work promotes and enhances open data, whilst protecting the rights and safety of individuals and society.

Having our data open leads naturally into making our data visible, and we are working on new ways to facilitate the exploration and use of data, such as open APIs and conversational AI.

Chatbots

We are introducing chatbots into our processes and will continue to grow this exciting capability.

See the Action Plan

Our Stakeholders told us:

'Promote safe open data standards…'

We have classified the data that we hold, to identify the data sets that can be open. This facilitates an automated triage process for data requests, streamlining and improving the experience for all users.

See the Action Plan

2.4 Keeping it Clean

Data is the bedrock of digitalisation, and the quality of that data is crucial to the effectiveness of any digital transformation. Good data means good digitalisation: efficient processes, optimised resources and forward-thinking innovation. Bad data means bad digitalisation: inefficient processes, resources spending all their time wrangling data rather than using it, and innovation focused on filling the gaps.

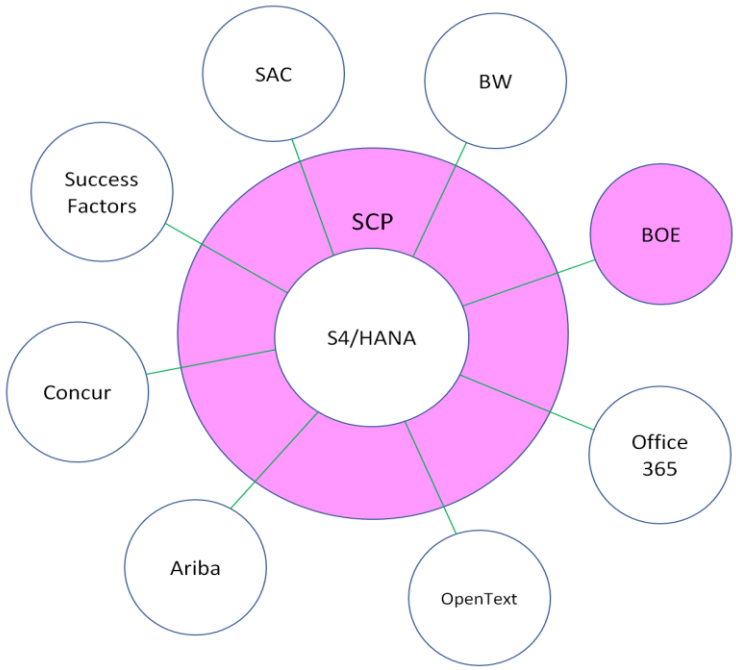

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Fig 2.2 Data Validation and Assurance tools in the NGN Digital Enterprise

We spent a lot of time and effort cleansing our data as part of our S4 implementation, and we are really proud of what we've achieved. However, we know that the data won't stay clean for long.

Traditionally, the method used to ensure that data was always accurate was to apply multiple layers of manual checking and validation. At NGN we are automating this. As mentioned in the previous section, data is auto-validated at the point of collection, and once accepted and stored, we use automated assurance tools to continuously scan the data, apply pre-defined business rules and parameters, and either correct or highlight discrepancies. We have also applied machine-learning algorithms to analyse behavioural trends so that we can stop bad practices before they happen.

Counter Intelligence

We are using the power of Artificial Intelligence to assist with data management. Our daily update of data from Xoserve is now monitored and maintained by AI, greatly increasing the accuracy of our data whilst reducing the manual effort to maintain it.

See the Action Plan

In this way NGN will stay at the frontier of digitisation.

Our Stakeholders told us:
'The data you provide to us must be complete and accurate…'

We have built a suite of Data Validation Models running on SAP Information Steward (part of the BOE toolset). These fully automated models act as a 'Checkpoint Charlie' of data. Nothing gets through without being checked, validated and authenticated. Any discrepancies are automatically corrected, if possible, or flagged for investigation. So far the models cover escape monitoring, connections standards and asset integrity; and we're rolling them out further.

2.5 Rolling the DICE

In our never-ending quest to introduce as many acronyms as humanly possible, NGN has set up the DICE (Data & Information Centre of Excellence). This team is collaborating closely with the international data management institute, DAMA, to support our work to be a datacentric organisation and to support our digitalisation work. DICE does so much they deserve some bulletpoints:

- Adopt International best practice in data management (DAMA) and the information lifecycle
- Implements effective governance of data policies, standards and processes through the implementation of a data controllers programme and representation to governance bodies
- Act as Evangelists of data as a valuable business asset though a programme of communication and advocacy
- Bring a data centric approach to solution design and development through the use of appropriate requirements gathering, analysis, design and modelling. In addition, using robust and statistically sound methodologies including international standards on data management practices, data engineering, automation and predictive modelling techniques to provide business insights
- Improve data quality through the provision of expertise and services for assessing data quality, understanding the business implications of poor data quality, root cause analysis and remedial action management including data cleansing, specifying systems changes and identifying operational improvements

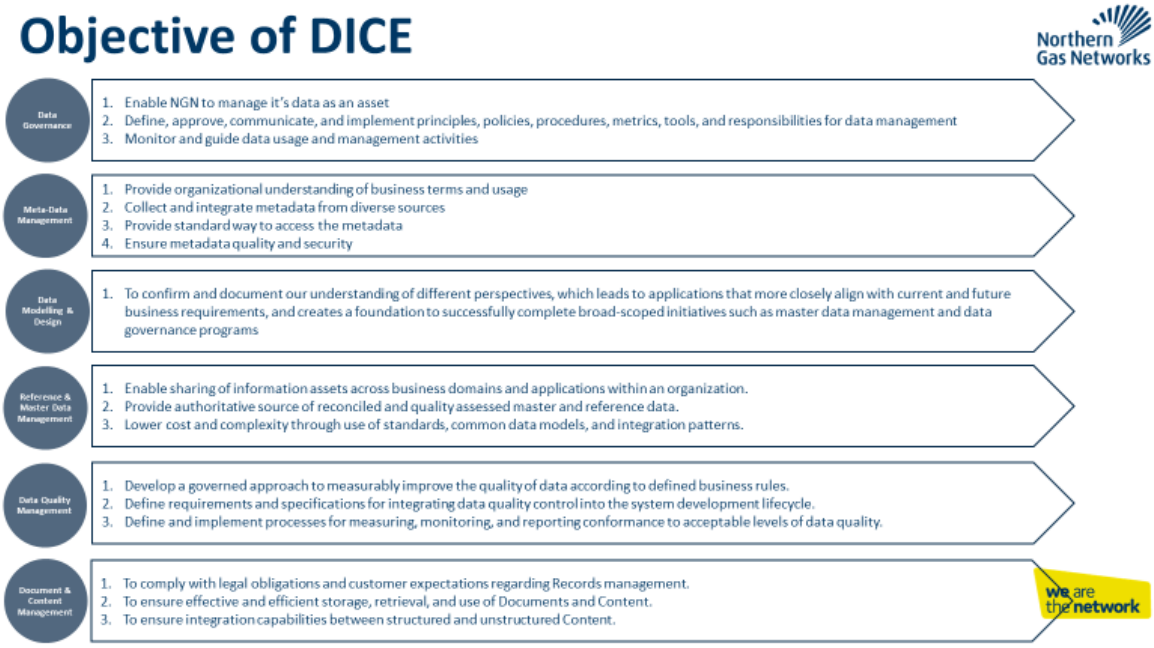

Fig 2.3 Six sides of the DICE

3 Visibility of Data

3.1 The Liberation of Information

Data is for everyone, information is for all. The most important decisions are not made in the Board Room, they are made every day, by all of our colleagues. Decisions made when designing a new connection, when repairing a leaking main, when speaking to a customer, these are the decisions that can have a profound impact on how NGN operates as a safe, efficient and socially responsible business.

The guiding principle of our digital strategy, Integrated Information Management, is all about making information available to all who need it, in the right time, on the right device, and fully contextualised to allow data-driven decision making.

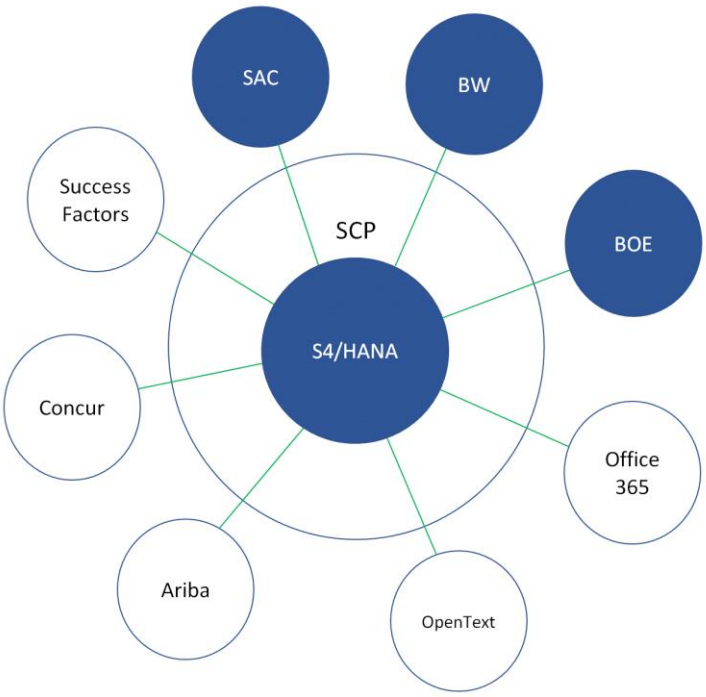

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Fig 3.1 Analytical and data visualisation tools in the NGN Digital Enterprise

Data analytics and visualisation is fully embedded into the NGN Digital Enterprise, with a hybrid reporting landscape that provides a flexible approach to data modelling and exploration for all. Users with different skills, from experienced gas operatives to data scientists, will be able to benefit from the fully integrated capabilities.

ICE, ICE, baby

Another day, another acronym. This one is the Intelligence Centre of Excellence, a team of data modelling and analytics experts set up to help us get the best out of data.

Our Stakeholders told us:

'Embed data integrity into day-to-day operations…'

We're developing Balanced Digital Metrics, which combine traditional, output-driven KPIs with data accuracy, integrity and effort measures to give a truly holistic view of how we are performing as an organisation.

See the Action Plan

3.2 We've got a map for that

The eagle-eyed among you may have spotted that Geographic Information System (GIS) mapping technology does not appear on our digital enterprise. This doesn't mean that GIS does not feature in our strategic thinking for digitalisation, quite the opposite in fact. Visualising our data geospatially is a crucial component of much of our digitalisation work, and we are developing new and exciting GIS solutions that will ultimately fully integrate with our digital enterprise, with no replication between databases, no balancing of master data in different schemas and no need to toggle between systems to get a full view of the network.

Going Underground

We've been collaborating with the Geospatial Commission on the NUAR initiative, and as that grows we will be working closely with them.

Incident Management

We have developed a mobile major incident solution that has digitised our incident management process.

See the Action Plan

In 2021 NGN will embark on a significant upgrade of our GIS system, which will include a move to a utility Network Data Model (UN) - a first for a utility in the UK. The UN allows for a richer set of network devices, network structures, sub-domains, and relationships to be modelled; allowing us to model the network to a previously unobtainable level of detail. One of the most important capabilities of the UN data model is that it now also supports connectivity by association whereas, in the past, connectivity was only supported on the basis of geometric connectivity. In the upgrade we will develop rules and techniques to build and maintain the connectivity and quality of the network as part of the data migration. These rules will also associate assets in the network so that a fully connected data model can be built so that all the operational and analytical benefits of upgrading to UN can be realised.

This new and updated ecosystem will be integrated with our recently implemented SAP S/4 HANA and utilise the SAP Geo Enablement Framework (GEF)

Geospatial visualisation is great for linear assets, but we want to expand it out to show everything. LIDAR imaging of our pipes, where are our complaints located, who's tweeting what and where, how is the traffic flowing in an area, which parts of our network are liable for flooding, or soil erosion, or excessive footfall. Crucially, how do all these things interact with our assets, our colleagues and our works. Geospatial is so much more than pipe layers on a map.

3.3 A Window on our Network

Our network is constantly on the go; our colleagues, assets and data working 24/7/365. All this activity cannot hide in a black box, we need visibility of what is going on, where we are going, what we are doing and how we are performing. So do our customers and stakeholders.

Planning and scheduling are important activities for us. Effective scheduling means that we can keep our workforce as productive as possible, we can minimise the environmental impact of travel and we can make sure our customers receive the service they need and deserve at the right time. As we increasingly move to a Totex workforce, it becomes even more essential that scheduling activities is integrated and consistent. We are implementing Multi-Resource Scheduling as part of our S4/HANA application, which will be used by all our work functions, drawing from the same data schema, fully interoperable whether we're digging a hole, purging appliances, delivering equipment, or connecting a service. This will integrate with all our mobile and SaaS solutions.

Having MRS opens up further exciting opportunities; why not give customers the capability to plan their own connections, purge & relights, etc? Why not let them track their particular job, or any projects that are happening in their area? Why not let stakeholders schedule information requests, or collaborative/complimentary works? Why not?

Demand Forecasting

Combining our scheduling capability with predictive analytics, we will further automate the planning of work based on available resource capacity.

See the Action Plan

3.4 What's the meta, baby?

Metadata is an incredibly useful resource in its own right, not simply as a way of managing content, but as an analytical asset containing real insight. This is why NGN regards metadata as a vital part of not only our own digital strategy, but also across the entire energy sector.

NGNs Digital Enterprise has been designed to make the most of metadata, in terms of usability, availability and consistency. Many of the systems and applications that make up our digital landscape will manage content through the use of metadata, and NGNs Data Model will govern the metadata conventions to ensure a consistent, cross-application approach.

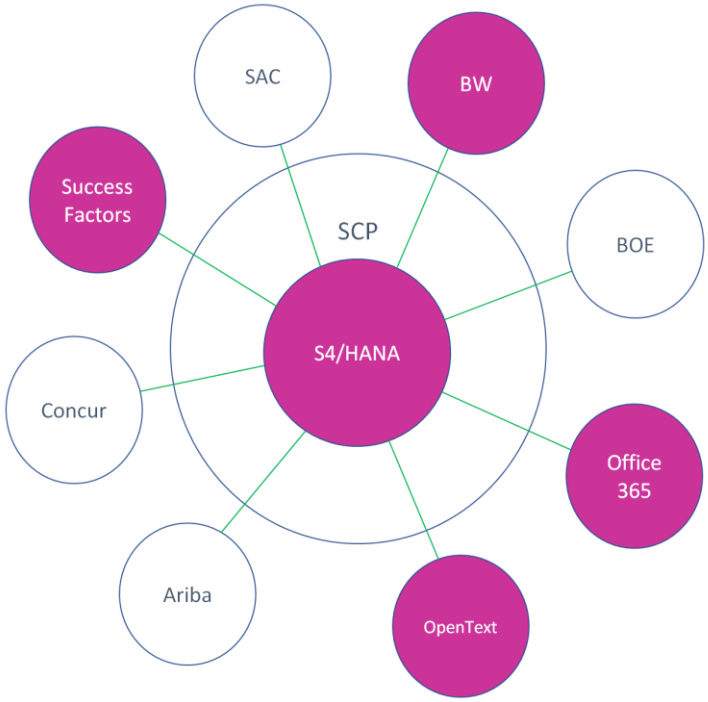

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Fig 3.2 Metadata repositories in the NGN Digital Enterprise

NGN's Open Data Standards extend to metadata, and data catalogues will continue to be designed to be interoperable between systems, and available for reporting and analysis through SAC. Catalogues will contain the 15 metadata elements defined in the DCMES (Dublin Core Metadata Element Set), whilst asset characteristics will utilise standard SAP formats and conventions used by a significant percentage of companies within the energy sector and beyond, contributing to our ability to share a common metadata catalogue across multiple agencies.

Our integration and orchestration capabilities through the SAP Cloud Platform allows NGN to manage metadata across the entire landscape, and make this data available to external parties through Application Program Interfaces, based on Open API standards.

3.5 Making Sense of Unstructured Data

The importance of context in any data-driven decision-making means that unstructured data must be considered in digitalisation. Unstructured data like photographs, documents, audio files, text etc can and do provide vital insight, especially when combined with structured data like asset information. One key consideration in the continuing development of the NGN Digital Enterprise must be the integration of unstructured with structured data.

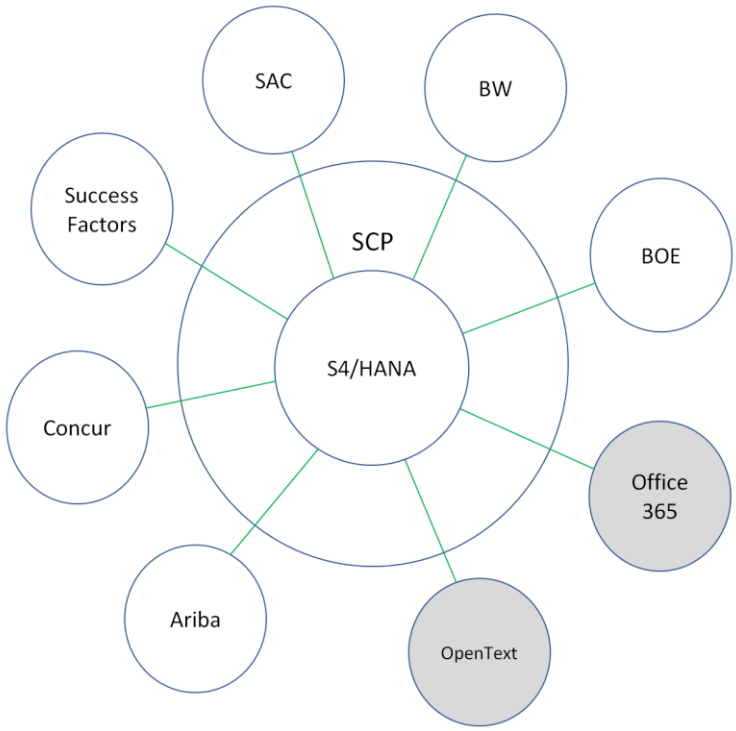

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Fig 3.3 Unstructured Data Management Systems in the NGN Digital Enterprise

Having Opentext and Office 365 applications like Sharepoint fully integrated with the whole of Digital Enterprise means that unstructured data such as technical specifications are keyed to the relevant structured assets, and available to our colleagues working on those assets via the apps we build on our digital platform.

The Big Picture

We're linking all photos taken through our work apps with the job and asset record via OpenText, and we'll be doing the same with other unstructured documents like Non Routine Operations, 3D CAD files and schematics.

See the Action Plan

Part 2: Our Action Plan

Legend:
Blue = Complete
Green = Being actively worked on
Amber = Not yet started
Grey = Still in consultation with relevant stakeholders.

Strategic Objective	Key Actions	Activity	Status
1 Digital by Design	Deliver the Stage 1 Designed for Digital plan	Introduce design principles during S4 implementation	Complete
1 Digital by Design	Deliver Process Adherence Monitoring Tool	Map Replacement step-by step process	Complete
		Build Process Adherence Monitoring Program	
		Integrate program with SAP Analytics Cloud	
		Map Procurement step-by-step process	To Start
1 Digital by Design	Diversity and personal development	Implement Performance & Goals, Compensation and Onboarding & Recruitment solutions	To Start
		Rollout People Analytics solution	On Track
1 Digital by Design	Joint Assurance Robotic Process Automation	Build Bot with underlying infrastructure	On Track
		Introduce Machine Learning and Artificial Intelligence components	To Start
1 Digital by Design	RPA for data requests from external stakeholders		tbc
1 Digital by Design	Internet of Things – Pressure Sensors	PoC for pressure monitoring/alarms	On Track
		Integrate with S4 and SAP Analytics Cloud	To Start
		Parse data for external consumption	tbc
1 Digital by Design	Internet of Things – Discovery		To Start

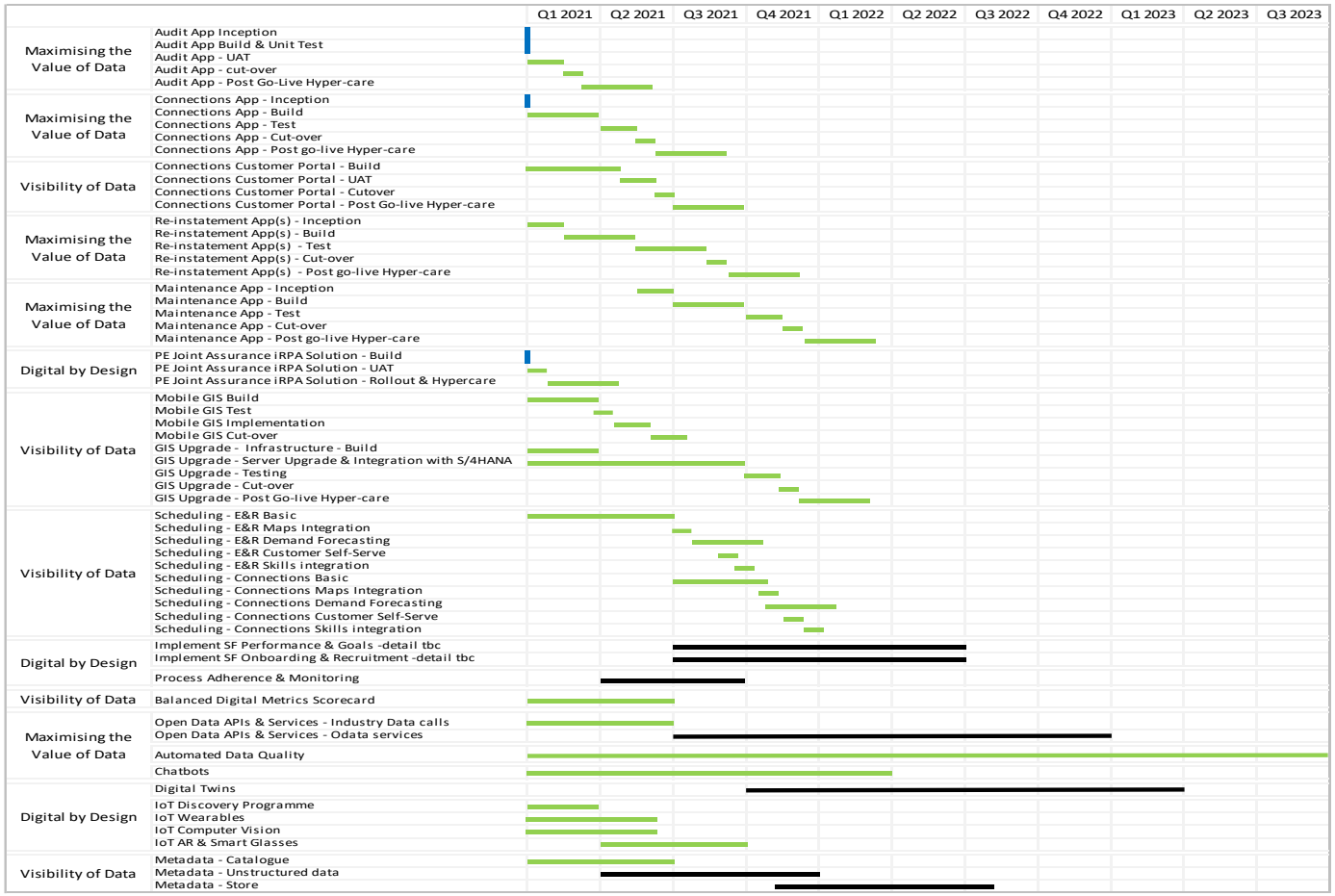
1 Digital by Design	Internet of Things – Wearables & Computer Vision		To Start
1 Digital by Design	Common Information Model		tbc
2 Maximising the Value of Data	Validation of Industry data through AI		Complete
2 Maximising the Value of Data	Automated Data Quality Monitoring		On Track
2 Maximising the Value of Data	Mobile Audit Application	Scope all compliance and safety audit requirements	Complete
		Design application architecture	
		Design and build application	On Track
		Integrate application with SAP Analytics Cloud	On Track
		Integrate with OpenText for unstructured data	On Track
		Develop portal for external stakeholder use	tbc
2 Maximising the Value of Data	Connections Work Execution Mobile Application	Scope all connections process requirements	Complete
		Design application architecture	
		Design and build application	On Track
		Integrate application with SAP Analytics Cloud	On Track
		Integrate with OpenText for unstructured data	On Track
		Integrate with S4	On Track
		Integrate with Customer Portal	To Start
2 Maximising the Value of Data	Reinstatement Execution Mobile Application	Scope all reinstatement process requirements	Complete
		Design application architecture	On Track
		Design and build application	To Start
		Integrate with E&R/Connections work apps	To Start

		Integrate with S4/ Opentext etc	To Start
		Integrate with Customer Portal	tbc
2 Maximising the Value of Data	Maintenance Execution Mobile Application	Scope all reinstatement process requirements	Complete
		Design application architecture	On Track
		Design and build application	To Start
		Integrate with S4/ Opentext etc	To Start
2 Maximising the Value of Data	Presumed Open Data	Classification of NGN datasets	Complete
		Data Triage Process	On Track
		Consult on Open Data product services	To Start
		Bundle Open Data product services	
		Launch Open Data product services	
2 Maximising the Value of Data	Open Data APIs	Implement cloud platform with integrated API layer	Complete
		Partner with Xoserve 'calling' market sector data rather than persisting it.	On Track
		Publish API Catalogue for external stakeholders	tbc
2 Maximising the Value of Data	Chatbots/ Conversational AI	Trial Chatbot PoC on ring-fenced process	On Track
		Rollout Chatbot/ conversational AI to the wider business	To Start
		Integrate conversational AI with Open Data APIs for external stakeholders	tbc
3 Visibility of Data	Adoption of Balanced Digital Metrics	Develop Key Performance Indicators	Complete
		Build PoC Dashboard	
		Build enterprise solution	On Track
3 Visibility of Data	Mobile Mapping Solutions	Build Incident App	Complete
		Collaborate with ongoing NUAR and NESM initiatives	On Track

		Integrate GIS	To Start
3 Visibility of Data	Scheduling	Implement MRS	On Track
		Customer Self-Service	To Start
		Demand Forecasting	

You Gantt be serious!

As you would expect, we are carefully planning our digitalisation work over the next few years, and we'll keep updating this Gantt chart as things progress, and new initiatives come online. It's a little small, because there's a whole lot of exciting stuff going on, so you'll have to make full use of the zoom function on your device.



Part 3: The Story so far…

A Bit of Background

The support and management of NGNs IT capability was historically outsourced to third party suppliers. The result of this outsourced approach was high cost, limited in-house knowledge of systems and slow and expensive delivery. One damaging impact of this was that NGN operated with aged and complex systems close to end of support life. Our reliance on System Integrators often resulted in overly complex systems and landscapes, and this, coupled with a general disconnect between IT and the business, meant that inefficient and inconsistent processes developed in the back office.

A study of these inefficient processes, where data was often seen as the source of problems rather than the solution, showed that NGN was effectively running on spreadsheets (with over 7 million being stored on our shared drives), and the spend on information management within the back office was reaching £20m per annum, with very little value to show for it.

All this labour intensive wrangling of data was producing reports that were in some cases weeks out of date.

The WoW Factor

It was time for Future Ways of Working (FWoW), a digital transformation programme that introduces consistent, standardised processes based on industry best-practice, fully integrated information management and data captured and validated at source. WoW uses the latest technology to provide real-time reporting, accurate data capture and reduces overhead through the facilitation of increased self-service. WoW provides a common platform for all processes, meaning cross flexing between teams is much easier, and it builds on NGN's cultural and organisational development and terms and condition changes to deliver IT enabled transformation.

Digitising IT and the birth of 3iG

At the start of RiiO GD1 NGN operated our IT through a series of outsourced contracts, with a small in house team to manage these contracts. Through this, NGN operated from 7 different IT datacentres, had aged and complex systems and the delivery of changes and enhancements were very slow. Our IT team kept the systems working but were not delivering services or projects that would change the business or deliver innovation for our colleagues or customers.

These outsourced IT services were also expensive to operate

During GD1, NGN has established its 3iG (Information, Improvement and Innovation Group) to transform how we operate IT and how we deliver innovation and improvement projects with information at their heart.

Through the establishment of 3iG, NGN's IT services are now operated from public cloud infrastructure, are supported in the main by NGN's own teams and we operate modern digital systems that far better support our colleagues and customers. We have also adopted Agile Delivery as our preferred methodology for the delivery for change and in doing this, we have delivered significant change and transformation initiatives quickly and that are better aligned to what we really need and at a lower costs. Through this work, significant achievements have been made, which include:

- Establishing an in-house IT support team
- Transforming and migrating systems to public cloud
- Using Agile and Dev Ops methodologies
- Implementing a digital platform through the WoW programme
- Building apps in house to support the work of our colleagues
- Building an analytics platform that is managed by our colleagues to give greater insight and decision making in real time
- Reducing our IT operating costs by c£2m per year
- 3iG becoming a certified SAP Centre of Excellence

This work means that at the start of GD2 NGN has a modern flexible digital IT team and suite of systems with data and how we are of it at its core. This is operated and enhanced by a team of highly capable IT professionals that work using Agile and DevOps to support our continued journey towards digitisation

This change in how we operate from IT to 3iG has also been shared widely with interested stakeholders, who have visited to see the changes that we have delivered. This includes companies from the banking, retail and construction sectors as well as both local and national government.

Realising the Benefits of Digitisation

Through our work in GD1, NGN have already realised a wide range of benefits from embracing digital technology and ways of working. This have been delivered in a number of stages and we have realised a range of benefits to our colleagues and customers:

'Cool' - Delivered (2015-18)

- Digital Operations Room (real time window on NGN)
- MY NGN established as our colleague's portal into all of NGN's systems
- Success Factors (employee self service for HR and learning management)
- Damages App (built in house)
- Customer strategy and adopting the voice of our colleagues and our customers through our use of personas
- System Control moved to Amazon Cloud (World First)
- Decision Support Tool
- Delivered our CEM (customer engagement management) system in 8 weeks using agile delivery

‘Amazing’ - Delivered (2019)

- S4 HANA and new standard processes
- New work management App built by NGN
    - This was designed by our colleagues
    - With this application we can deploy enhancements in days to all our colleagues, in the past these changes would take months to deliver
- Incident management app PoC
- GRC tool to improve our governance and controls

‘Incredible’ - Ready for Delivery (2020)

- Further development of work management app
- A new GIS system
- Process compliance and optimisation monitoring
- Process automation (RPA) of large percentage of back office support processes
- Complimenting Realtime information with AI to make better decisions

‘Mind-Blowing’ – Ready for Delivery (2021)

- New scheduling system to allow customers to book appointments online and to automatically schedule planned work
- Automated Real-Time RRP reporting
- Predictive and Prescriptive Analytics
- Further back office process automation
- Internet of Things backbone

Cost savings through Digitisation

Through NGN’s digitisation work in GD1, significant cost savings have been made through a reduction in IT OPEX costs and through business efficiencies driven by Digitalisation

Utilisation of the Cloud

Using Public Cloud and a series of simplified supporting contracts has saved c.£2m a year in IT operating costs in NGN. NGN have used Amazon Webservices (AWS) to operate both System Control services and its new S4 HANA systems.

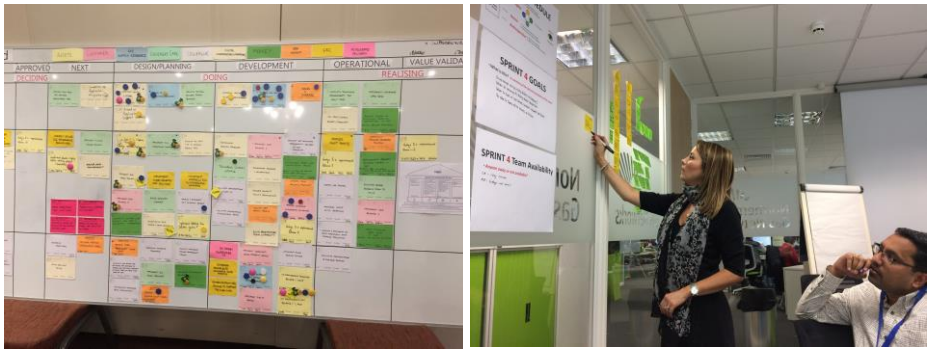
Smart Information Management/ Future WoW

The delivery of Future WoW, where data and information were put at the heart of NGN's new operating processes has saved £4.5m in back office support costs, with a further £4.5m planned into GD2

Agile Project Management

NGN use Accelerated Delivery as our standard model for delivering technology and data projects. This means that change is delivered by largely in house led NGN teams that are supported by technical external experts as required. NGN no longer use traditional systems integrators to deliver change. This delivers significant savings in delivery costs and ensures NGN retains knowledge form projects and gets an outcome that is better aligned to our objectives.

This was demonstrated in the benchmarking done by PwC on the Future WoW project, where costs were benchmarked very favourably for the complexity of the programme



NGN Agile Delivery way of working, showing one of our Kanban boards and a Sprint Planning meeting

Ongoing Efficiency Improvements through Revolutionary Work

NGN have delivered ongoing efficiency benefits through digitisation by:

Standard and simple processes

NGN have implemented S4 HANA as standard (1,000s of customisations reduced to 10's)

- Very limited amount of customisation means simple standard processes can be used
- NGN are the only SAP customer (including SAP themselves) to do this so far with HANA
- This is the key to the efficiencies in NGN's processes that will be delivered through the programme

Design and build our own

- NGN colleagues have designed and built our new work apps

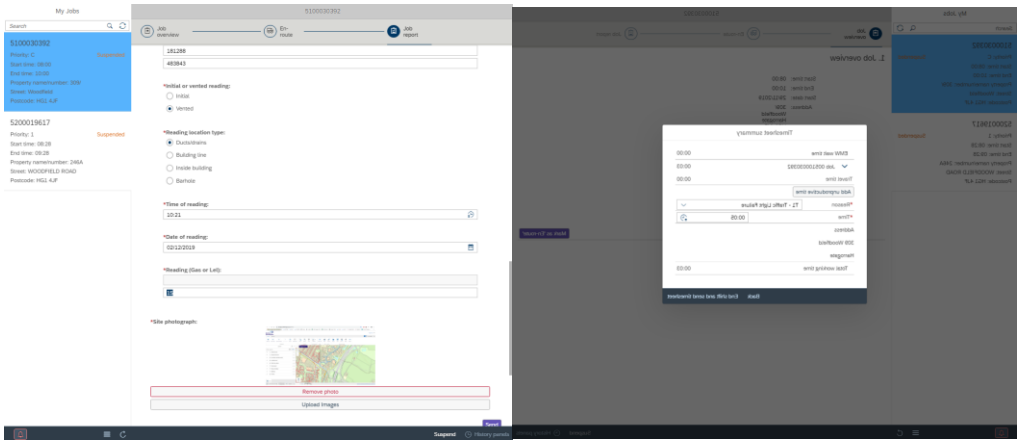
- Colleagues have led the design of our new processes
- NGN's SAP Team lead the technical side of the project and will support systems when the go-live

Brand new technology

- First use of SCADA in public cloud
- Early adoption of cloud technologies- first in our sector in the UK
- First European company and first global utility to use the Digital Operations Room
- First use of SAP Cloud to build mobile work apps

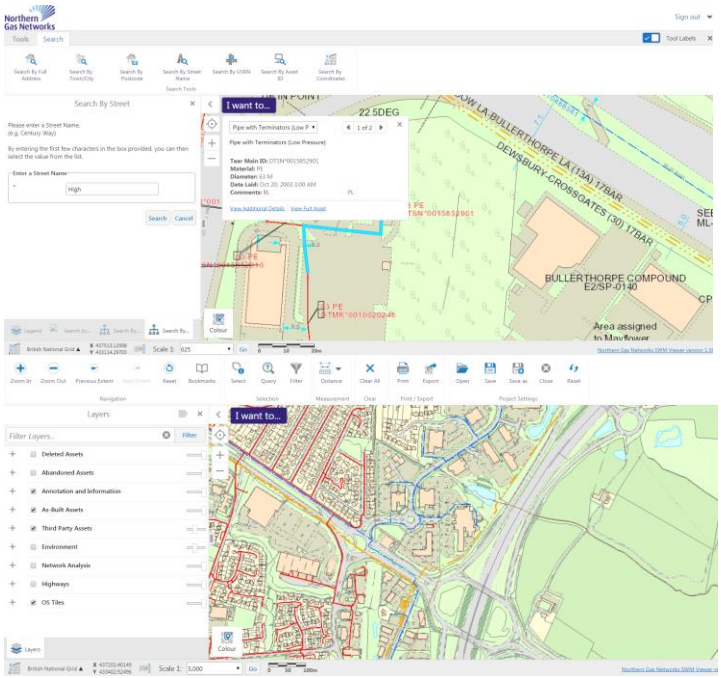
No System Integrator

- NGN are a certified SAP Centre of Excellence and support our own Public Cloud infrastructure
- Work with specialist suppliers and not a single outsourced system integrator
- Developed in house capability in through the programme

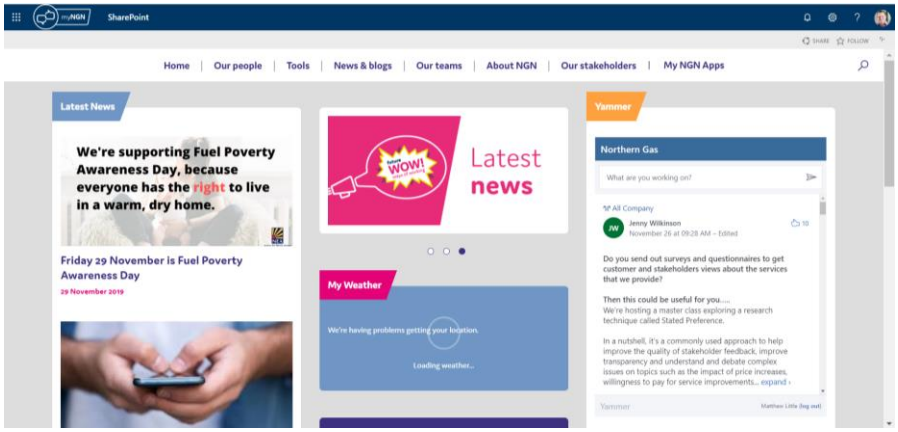


NGN's New Mobile Application built on SAP's Cloud Platform, designed by NGN Colleagues and supported in NGN's DevOps teams

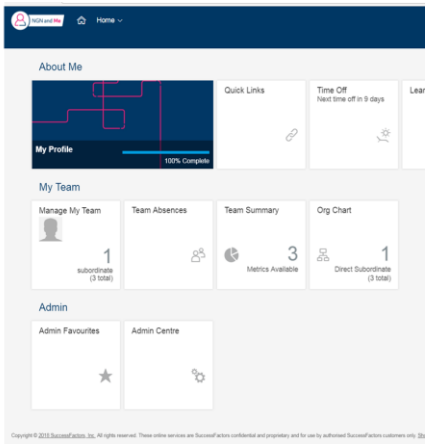
NGN's new Digital Operations Room, using real-time data analysis to drive decision-making in the business.



NGN's new MY DART System- designed by our in-house teams and delivered through Agile delivery



NGN's MY NGN Portal, designed and managed by NGN Colleagues



NGN and Me, NGN's employee and manager self service system

Supporting consumers and the wider economy

Our strategy for digitisation supports our customers by reducing our IT cost base, by helping to make NGN more efficient and by making us better at managing and protecting our customers data. It also has allowed us to deliver systems (like our CEM, our website and our online payments gateway) quickly and that improve the service that we deliver to our customers.

In GD2 this will be further demonstrated as our digital technology allows customers to book some appointments directly themselves online

Through our digitisation work, we have supported the wider economy by sharing our knowledge and experience with other organisations, wither through visits to our teams or through our active participation and presentations at events such as Agile Sheffield, the SAP UKSUG, SAP SAPPHIRE, and Geospatial conferences. Through this work we have shared knowledge and experiences with organisations from a wide range of sectors, including gaming, banking, retail and government as well as within our sector.