Digital, Data
& Technology

Home Office DDaT

2024 strategy

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Foreward

The Home Office Digital, Data and Technology (DDaT) Strategy is central to the department's transformation efforts. It sets the direction for how we will deliver better services and organise our technology and data estate more efficiently.

At the heart of the strategy sit our 6 principles. These are about reducing the cost and complexity of our technology estate, while being more responsive to data and meeting the needs of our users.

They pave the way for us to deliver more effectively at scale and embrace innovation to meet new and evolving challenges.

We've been promoting these principles internally since 2019, and this has resulted in tremendous progress, particularly in the Migration and Borders area of the Home Office department.

Examples include: the digital delivery of the EU Settlement Scheme; the implementation of a points-based immigration system; the creation of our advanced data analytics and risking system; and the rollout of Digital Services at the Border, which aims to make the UK border crossing more secure.

These examples show how fundamental DDaT is to the success of the department and its manifesto commitments. Looking forward, we must now bolster this type of work to make similar strides across the remainder of the Home Office domain.

We must also address several long-standing issues. Like other government departments, we have accrued technical debt over many years which we now need to address because it constrains our efforts to digitise the department.

During the pandemic, our people showed great creativity and passion as they sought to deliver new policy and services in difficult circumstances, but they often had to work harder because they were wrestling with legacy systems and unintuitive processes.

We must now become digital by design in everything that we do and change the way we operate. This means embracing automation and investing in our cyber capabilities while also becoming more efficient, user-centric and adaptable to changing conditions. We must have a renewed focus on data, making it central to how we strategically and operationally manage the department.

This strategy gives clarity to the wider department on the importance of including DDaT in its thinking around policy delivery, while bringing understanding to DDaT staff on how to use their specialist skills to support the wider organisation.

Visibility of our strategic direction to the public and other government departments will help us engage meaningfully on our plans, share best practice and establish trust as we deliver against our aims.

But publishing this strategy is just the start and delivering its vision will require a joint effort across the department and across government. I look forward to working with our people to embrace these digital commitments.

Simon Bourne
Home Office Chief Digital, Data & Technology Officer

Introduction

The purpose of this strategy is to provide a clear vision and direction for Digital, Data and Technology (DDaT) within the Home Office over the next 3 years. It sets out our ambitions for developing better digital products, platforms and services, and for transforming how we manage data. This will help us to become more efficient and ensure we meet the needs of our users.

Executive summary

Home Office DDaT is central to the department's mission to keep citizens safe and the country secure.

We design and build services that let people apply for visas or passports, support policing and counter-terrorism operations, and protect the UK's borders.

Recent events have challenged how we operate and brought shifts in working practices. While it's been a challenging period, it's inspired us to look at how we can work more efficiently and better respond to our users.

We plan to build on this momentum, making the most of digital, data and technology to help us work smarter and meet the challenges ahead.

We're committed to a set of principles that have helped us deliver strong progress in the Migration and Borders space already. Now, we need to continue making headway in this area, while advancing our capabilities across other areas of the Home Office.

We must become more disciplined in our development and use of technology. Removing the complexity of our technical estate will help us become nimbler and more efficient. This means addressing our technical debt, automating processes where possible and reducing duplication.

Our aim is to become digital by design in everything we do, marking an important and necessary shift in the way we do things. We can deliver better quality services more quickly through setting up cross-cutting teams that are focused on delivering user-centred products, and by working iteratively. We can be more innovative and explore new ways of delivering services through increasing transparency and collaboration.

We must also help the Home Office adapt to the growing availability and influence of data for both the department and the people we serve. This involves supporting the delivery of data as a strategic asset for the department by embedding consistent policies, processes, standards and tools for data management.

This DDaT Strategy and its core principles outline how we aim to do all of this - by seizing opportunities, building the right skills and working towards the shared goals of collaboration, user-centricity and innovation.

Our DDaT organisation

Home Office DDaT was formed in 2016 to consolidate our efforts in digital, data and technology. Following this, it has established a bold and effective operating model and organisational structure for implementing technology change.

Our DDaT organisation is at an exciting point of evolution. Like many other departments, the Home Office has spent the past decade radically transforming its relationship with large suppliers. We've taken back control of the design, build and operational aspects of technology services, wherever appropriate.

In many cases, such changes have lowered our costs, increased our use of niche suppliers with deep subject matter expertise, reduced our technical risk and enabled us to be more agile and responsive to evolving business needs.

We now have 3,800 staff in Home Office DDaT, including our supplier partners. Every year, our systems support over 3 million visa applications, checks on 100 million border crossings, 5 million passport applications and 140 million police checks on people, vehicles and property.

We have delivery centres across the country, but our geographic areas have become less important to our development and operations now that we've embraced more flexible forms of working.

Our six principles for change

Converge technologies where possible

Create shared technology products

Be product-centric over programme-centric

Embrace innovation

Deliver effectively at scale

Become data-driven to improve our decisions

The Home Office DDaT principles will help us achieve the aims of our strategy. They'll support significant change and create a more flexible and collective approach to how we do things.

These principles are designed to complement the:

Government Design Principles / Digital Service Standard / Technology Code of Practice

Digital, Data
& Technology

Converge technologies

The convergence of technology is when 2 or more different systems, products or technologies, originally unrelated, are joined or unified to:

- to save time and cost - this is normally when the systems or products are trying to solve the same or a similar purpose
- complement each other and create new possibilities or solve challenges

We will explore convergence opportunities across the Home Office, as well as those that relate to the management and operation of this technology.

The target state for our systems and products is for them to be broadly consistent, where appropriate, in terms of architecture, engineering and operations.

This requires us to ensure similar technologies and processes are closely integrated or unified to remove unnecessary duplication and inconsistencies.

Our convergence journey involves:

- adopting technologies that are accessible, scalable and easily maintainable, such as open source and cloud technology - this will help us speed up delivery, reduce cost and improve interoperability
- creating and embedding further standards for the way we buy, build and run software to create more unity in our infrastructure
- ensuring similar systems, platforms and frameworks are brought together to avoid duplication
- establishing principles that will help align technologies across DDaT
- bringing together technologies to meet new challenges - advanced technologies increasingly rely on each other to function properly (pursuing each independently risks overlooking common components and opportunities)
- ensuring our staff do not need to become familiar with many similar internal technologies and processes, saving them time and improving their experience
- We recognise convergence will be a unique evolutionary journey for each Home Office business area, as each will start from a different scale and position of technical complexity.

Benefits

Home Office DDaT was formed in 2016 to merge our efforts in digital, data and technology. This meant DDaT inherited technologies and infrastructure from a number of different areas of the organisation, and has since been on a path to consolidation.

When we focus solely on separate technologies for single problem areas, we risk spending money on tackling similar problems multiple times.

For example, the Home Office currently has multiple instances of search, container and cloud hosting solutions, as well as a proliferation of similar software applications

in the areas of risk management, visualisation, collaboration and knowledge management.

There is a real and significant cost incurred in supporting these multiple alternative technologies. There is the additional complexity of maintaining expertise in, and connectivity between, multiple processing environments.

We aim to rationalise our technology estate, and ensure we have the right support and infrastructure in place to support us as we run, operate and maintain it.

We will maximise the return on investment for each system we implement by looking for convergence opportunities and ensuring systems can be used for purposes besides the ones they were originally intended for.

This rationalisation will also involve converging our technology operations, maintenance and services to deliver substantial benefits.

A simpler technology landscape and reduced duplication will be easier to understand while reducing costs. It will also reduce time, stress and confusion for staff who work across multiple similar systems.

Additionally, we need to understand how different technologies can complement each other to help us meet new digital challenges and make the most from our investment. Embracing innovation will help us to do this.

How we will implement technology convergence
Convergence plans and roadmap for every system

Each Home Office business area has systems, teams and products in place at different scale and maturity levels. We will consider convergence opportunities for each area, taking into account their different requirements.
These convergence plans will be part of our work to define an enterprise architecture for the department.

We will identify key enterprise architecture domains and then create blueprints for these, creating transparency over the domain landscape, for example, what applications and case management systems are in use.

These blueprints, also referred to as reference architectures, will provide clarity over where it makes sense to converge technology from a technical point of view. Our central DDaT Technical Design Authority (TDA), which works with business area TDAs, will then use these to limit divergence and drive convergence opportunities across different areas as our principles and blueprints evolve.

Convergence will only be applied to systems that need continued investment or maintenance. The production of shared technology products will help facilitate this technical convergence.

If there is no investment available for a system or project, we will work with business areas to deprecate and decommission the technology.

TDA governance and a focus on continuous improvement

Our central DDaT Technical Design Authority (TDA) approves initial technology solution proposals and performs ongoing solution assurance. It also evaluates the cost and value for money for proposed designs, infrastructure, architectures, products and tooling.

The board will help promote technology convergence by encouraging reuse. It also holds a set of overarching engineering, technology and architecture principles that will help encourage convergence by recommending the adoption of common standards, including how we work with suppliers to avoid duplication in our solutions.

The central TDA, as well as business areas TDAs, will hold discussions on convergence. These discussions will be published in the open internally to to ensure we have a full view of opportunities across the organisation.

Open standards and a focus on interoperability

Interoperability and the use of open standards will ensure our infrastructure is flexible and can accommodate convergence.

The TDA will recommend the use of open source, open standards and cloud technologies, where appropriate, once they are security assured. These can be used as high-level building blocks in the development of our core products.

Use of open technologies, standards and processes means they can be easily converged, scaled and maintained.

Authoritative registers for our technologies and products

We need registers to capture and describe all the technologies and products we use across the Home Office.

This will help us avoid duplicating solutions and ensure we look for convergence opportunities at the outset of new projects. We will also explore using the registers to capture how our technology is being used so we understand how to fully exploit its capabilities, maximising our return on investment.

We often have one team with a capability and another with a need - but no means to join these up. Keeping registers on technology and products will help us do this through increasing the transparency of our technology estate.

Convergence in our technology operations activities

We will seek convergence in how we operate our technology estate, as well as for the systems themselves.

This means bringing together similar technology operations processes and following similar patterns to improve the efficiency and reliability of how we run Home Office software and hardware.

We will use Enterprise Services to provide more of these converged technology operations capabilities for some of our more widely used services.

Our Enterprise Services division is responsible for operating common technology for the rest of the Home Office where there are cross-cutting elements between business areas.

This convergence in technology operations includes:

- aggregating our supplier contracts to increase our buying power – this can achieve savings that are not possible through individual contracts and purchasing (as long as we avoid the possibility of becoming locked-in to contracts as we aggregate them)
- ensuring our staff know what technology and applications they should have access to, and that this access is approved – we need to do this consistently so we gain the commercial benefits from each application or product that we purchase
- following similar patterns in terms of how we secure systems and monitor environments
- adopting a converged technology operating model with converged operating teams – this will help us be more efficient in our delivery, for example we can offer 24/7 support

Create shared technology products

When there is a digital service or technical component that's likely to be needed by different areas of the organisations, it should be built as a shared technology product (STP).

Implementing a solution once and reusing it multiple times will enable us to respond quickly and efficiently to changing demands, without duplicating effort or costs.

Designing a product for multiple use cases is made possible through the application of user-centred design methods and processes. We can address common problems at the outset by involving users in the design and testing of products. This will allow us to consider a variety of demands and assess the implications and risks of using the same solution in different scenarios.

Where appropriate, we will use existing external platforms, sourced either from third party suppliers or from elsewhere in government. We will develop platforms in-house only when we determine through research that this is the most flexible and cost-effective way of meeting users' needs.

The approach will mean balancing the need for new bespoke technology that adds value against the need for commodity services that can be shared. It will also mean defining when systems should be exposed via APIs to ensure easier reuse.

Benefits

Currently, there is technology reuse within the Home Office but no consistent approach across business areas. A focus on creating shared technology will allow us to increase reuse.

Budget will be allocated at the outset to ensure shared components can meet the needs of multiple use cases. This may mean more cost upfront but will ensure substantial future savings.

Use of shared technology and infrastructure will:
- reduce the amount of money that DDaT spends on duplicated capabilities and siloed ways of working, and optimise the cost we spend on technology products

- speed up delivery for product teams, allowing them to focus on their users rather than underlying technology issues
- improve the quality and reliability of reusable components - both testing and error fixes accumulate with reuse
- increase the interoperability of our systems – reusable patterns and components will improve the consistency of our system interfaces and ensure more products are built to be inclusive and accessible to everyone who needs to use them

While we encourage technology convergence for products that have similar use cases, it's more cost effective and efficient to create a shared technology product at the beginning of a technology

journey, rather than to try and converge two similar products later.

How we will implement STP

A new development approach: encouraging planned reuse

When building new technology, teams should design with reuse in mind. The shared components they build can become part of a toolkit for designing services.

This focus on designing for reuse will involve altering our development approach and supporting teams to think beyond immediate needs.

We will focus on developing software with certain characteristics, such as modularity and loose coupling, which support flexibility and adaptability. We will develop in the open so teams with new use cases can find our shared code and components and explore ways of using it.

As we develop shared products, we will focus on accessibility and continuous user feedback so we account for new user needs.

Investing in documentation and knowledge management

We will place more importance on developer documentation. Even though documentation is very important for us to maintain systems, it is often neglected by teams who are more focused on delivery than reuse.

Investing in documentation will take time but make it easier for more teams to use and adapt the products we build. We will implement a docs as code approach to documentation to ensure it develops in

tandem with products, and to integrate technical writers with development and operations teams.

Reusing software components through shared products will reduce the amount of documentation we write and will reinforce the need for it to be clear and consistent.

We will increase the awareness of technical writing and knowledge management as disciplines within the department. This will involve using existing government standards, templates and tools for writing technical documentation. We will also explore ways to help teams in different parts of the organisation share and access authoritative guidance and documentation.

Shared guidance, standards and best practice

We will provide guidance to technology teams across the Home Office to improve understanding of what should be an STP. We will also provide standards that teams can adhere to when building products.

We will support teams to use and contribute to common resources, like style guides, pattern libraries, design systems, and accessibility acceptance criteria and test scripts.

Our teams should work collaboratively – across the organisation and beyond – to explore common problems and propose flexible solutions than can be shared across teams and other government departments. We will aim to create dedicated forums for knowledge-sharing to improve this collaboration.

Exemplar shared technology products
We are working to deliver 3 STPs as exemplars for further projects to follow.

This includes:
- a form-building and hosting solution
- convergence to a unified DevOps platform
- exploring a Home Office wide identity and access management (IDAM) solution to support joiners, movers and leavers

Our shared forms product will enable teams to design, prototype and deploy digital forms that meet our Accessibility Standard much more quickly and cost effectively than they're currently able to do.

The single DevOps platform will give Home Office teams the tools and automation capabilities that are necessary to perform and manage the continuous delivery of development tasks, without them having to develop bespoke environments.

We will also focus on implementing a shared IDAM solution to manage staff access to information and applications as they join, leave or move around the organisation.

Access management is complicated as applications are often scattered across several internal and external systems, which means we must provide controlled access for a number of different identities. The shared solution will focus on how to maintain both security and data integrity when providing this access.

Identifying the best candidates for STPs
We will focus on prioritising, assessing and promoting the best STPs to be used across the Home Office.

It will continually review technology across the department to understand where shared technology can further add value, and where:
- reuse of technology is possible
- technology is not meeting the needs of its users
- there are technology needs that are currently unfulfilled

When candidates for shared technology products are identified, we will work with relevant business area budget holders to ensure these can be implemented and maintained over the long-term, as it matures.

Be product-centric

Taking a product-centric approach means changing the way we think about the products and services we build and manage.

Instead of defining something in terms of technology (such as an application or component), we consider what people are trying to do. This lets teams base decisions on whether they will help users achieve their goal (outcomes).

Focusing on the impact a product might have, rather than the outputs a team might produce, means decisions are no longer tied to assumptions made at the beginning of a project. Instead, the development process is driven by the needs of users.

This means teams will need to follow a user-centred design approach and have the skills to research, design and test ideas at each development stage.

A user-centred approach is critical to our efforts to become more product-centric. It will also help teams rapidly deliver product improvements according to user needs. Unlike a sequential delivery approach (like waterfall), they can iterate as they test and learn rather than wait for each iteration to be perfect before they commit to it.

Multidisciplinary product teams may work together to deliver a digital service, identify dependencies and ensure their product forms part of a coherent end-to-end journey.

Benefits

The [Public Administration and Constitutional Affairs Committee's report on major projects](#) has endorsed a change in government ways of working. The report highlights how, in prioritising time and costs, we often diminish the potential benefits and value of products themselves.

It also underlines how the problem is compounded by projects committing to specific costs and timescales too early – and before user needs are understood or desired outcomes are agreed – then becoming tied to these estimates.

Shifting focus to outcomes rather than outputs will ensure we see our products as valuable assets. Applying design thinking to problem-solving and decision-making will help us deliver products that provide more value to the Home Office and our users.

All new products will need to start with a discovery to fully understand the problem space, user needs, policy intent, technology landscape and potential constraints. Products will go through the delivery lifecycle with clear criteria in place that are linked to outcomes and learnings to decide when to move to the next phase.

By continuing to invest in products once they have gone live, we will ensure they continue to meet business objectives and user needs as they evolve. This will help us reduce the need for large-scale rework and expensive replacement programmes.

Additionally, members of DDaT will be able to go to their professional communities

for support and guidance on product and team-related challenges. This will help them self-serve and assure their ways of working, which will further help increase our delivery efficiency and quality.

How we will shift to becoming product-centric

Autonomous, multi-skilled teams

Multi-skilled product teams are central to making this product-centric vision successful. Product, delivery, user research and design roles will work alongside service, engineering, test, security and operations roles.

The whole team will be involved at the beginning of the product development process, for instance engineers will participate in user research sessions as part of discovery. Teams will prioritise things like accessibility, security, interoperability and reuse from the outset, building secure and trusted services that can be used by everyone who needs them. Instead of working in disparate units, our development and technology operations staff will work together to evolve the products as needs and technologies change. This 'devops' approach will ensure there's collective responsibility for product performance, speedy delivery, accessibility and usability.

Being product-centric, along with adopting our [enterprise architecture](), will help teams work autonomously and make their own decisions instead of passing them up or downstream. This will help them make decisions quickly and collectively, rather than having to rely on stakeholders who may not be present or aware of wider implications.

We understand that product teams operate best when there is no hierarchy in the team and everyone feels ownership over the success of the product and is committed to one another. The different roles, including levels of seniority, will not represent authority but reflect scope and mindset.

A user-centred 'test and learn' approach

Teams will adopt a user-centred 'test and learn' approach during development to support continual improvement. This encourages teams to:

- consider problems from different angles and explore a range of options before committing to a solution that delivers the most value for taxpayers and our users
- understand the impact of changes on the end-to-end service, including unintended consequences
- base decisions on evidence gathered from high-quality user research to create a clear understanding of the people who use and are affected by our services
- prioritise accessibility from the outset

Long-lived product teams

Teams should stay together as consistently as possible as they take on new challenges. Ideally the same teams should work together on the same product for an extended period, including its ongoing maintenance.

This will allow the team to build trust and develop effective ways of working together.

If the product needs to be handed over to a new team, this should work as part of a planning process not a pre-determined date. It should instead involve an incremental transfer of knowledge and technology operations between teams to ensure there are no disruptions for users.

The whole life cost of a product should be considered wherever possible in the handover.

Defined product-centric roles and ways of working

All our product teams will have defined product-centric roles with clear responsibilities and accountabilities. These are listed in the government's [Service Manual](#) and include product managers, delivery managers and user researchers.

Teams will have access to a centralised authoritative source of guidance and patterns to help them become product-centric. This will be in the form of a product-centric ways of working playbook.

DDaT will share the experience of exemplar teams that are going through the process of becoming product-centric to help support other teams to make transition.

Product-centric ways of working will be reflected in our standards and governance controls. For example, we are committed to meeting the government Service Standard and will explore how to transition our Technical Design Authority into a board that also reviews user-product-centric priorities and ways of working.

Supported product teams

We will ensure teams are set up as product-centric from the first day a new programme is formed and support them by having:

- searchable product and technology registers that can be used to identify opportunities for re-use and de-duplication across the department
- product leadership and user-centred design training for senior leaders and programme managers so they can promote product-centric ways of working and better support their teams
- a product-centric operations model for all our cross-cutting services and capabilities

We have also introduced a design maturity model to help business areas assess their maturity and identify areas for development. This will support teams to use design thinking to drive product-centricity.

Support for teams not working in a product-centric way

All systems should be defining and working towards a product view of their future.

We will support existing change programmes not working in a product-centric way transform into multidisciplinary teams.

If a programme requires no further investment and only maintenance, we will assess the cost of assigning a fully funded multidisciplinary team to the programme against the benefits it can bring to the product's ongoing maintenance.

Become data-driven

As a data-driven organisation, transformation should start with data rather than our technology. Data is our primary asset, and our technical architecture is modelled around the needs of collecting, securing and processing it.

We are aligned to the National Data Strategy and aim to improve how we use data. We want to be an organisation where users can quickly provide and access high-quality data when appropriate.

We need to ensure our product and service teams understand how data should be collected, processed, secured and maintained. They need to be clear on their responsibilities when handling it and contributing to our data estate.

Our data scientists and frontline teams will ensure we use our data to inform our policy decisions and monitor our performance.

We aim to improve data sharing across the Home Office and wider, removing the unnecessary blockers we face when trying to access and share data, to improve our services to the public.

When doing so, we will ensure governance processes are transparent and continue to consider not only whether data sharing is legal, but also whether it is safe, ethical and beneficial to share.

Benefits

Technology investments to develop modern and resilient infrastructure with a focus on good quality data will improve outcomes for the people we serve, while also ensuring the Home Office can be efficiently run.

We aim to build on the work we've been doing to increase transparency around the data we hold about people. For example, the development of a digital immigration status has made it easier for individuals to check their status directly with Home Office systems.

By being data-driven we can also provide access to faster and better services. For example, the EU Settlement Scheme has modelled its architecture around data and APIs. This means it can quickly, securely and accurately confirm an applicant's period of residency in the UK by cross-checking records with HM Revenue and Customs and the Department for Work and Pensions. The speed at which these checks can be performed has ensured an optimised service for users.

Our emphasis on data will also drive better insight and decision-making. Internally, we will use authoritative sources of common data to improve the services we use to manage our staff and finances, including career development, workforce planning and financial forecasting.

Through better use of data, we can use automation to improve how we work. For example, the police are looking to use their National Data Quality Improvement Service to automate the detection and correction

of data quality issues and ensure metrics are collected in a standardised way.

Sharing and reusing data from other departments where possible, while following appropriate safeguards, will help us improve efficiencies and reduce risks while improving outcomes for our users.

Improving data literacy across our organisation and creating a familiarity that helps people gain confidence using and handling it is another priority. This will help build stronger understanding of the power of data and allow it to drive decisions relating to programmes and policy.

How we will become data-driven

Responsible, informed data-driven teams

We plan to improve our understanding of the data lifecycle so we can identify issues relating to how we manage data at all levels.

Every Home Office business area should understand their strategic data sets and the types of answers this data can provide them.

Staff who handle or rely on data should understand their legal obligations and be aware of how to find, collect, store and share it securely. They also need to be familiar with its provenance and know which strategic data sets are important for answering critical questions.

Product and service teams need to comply with relevant data standards so they can be confident the data they are responsible for is findable, available, interoperable and reusable.

Teams also have an obligation to:
- make sure any data they collect is

accurate and up to date to maximise its usefulness and reduce the risk of errors
- be aware of their legal obligations and relevant best practice when handling data, and actively review and retire data in line with these policies and guidelines
- understand the value that user research, analysis and data science can bring to ensuring their decisions are based on evidence
- consider the impact that data-driven decisions may have on other services or teams, as well as any social, technology, environmental or economic consequences
- present insights in a simple, straightforward way that makes sense to both technical and non-technical audiences, reducing the risk of data being misinterpreted
- use our product and technology registers to manage data about our technology systems
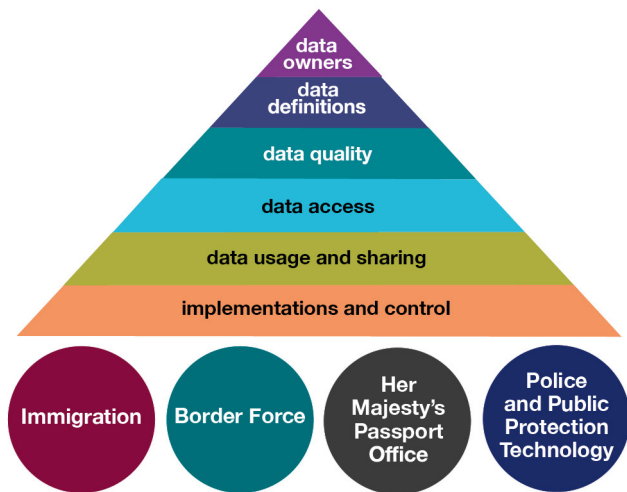
A federated data architecture approach

We are moving from a centralised storage approach to a federated architecture model, where data sources are managed by core business areas. We see this as the most efficient approach for ensuring teams can access common sources of trusted data.

Adopting a federated model will prevent us from creating siloes in data management and confining decisions to business areas. We aim to:
- create data stores to serve each of our core business areas - these will be our authoritative sources of common data
- consistently use data standards to shape our data into a form that can be used by individual services
- make data available to share using APIs (application programming interfaces)
- create reference data architecture

Technology portfolios

Data driven

data generated by legally independent organisation entities such as law enforcement agencies.

We aim to ensure these records are authoritative by building and maintaining data stores for each of our core business areas, and by following [government standards on reference data](). The data stores will underpin the applications and services across our business areas.

We already have the Person Centric Data Platform as a data store for our Migration and Borders business area. This gives a single view of individuals to around 700 services, and this single view is crucial to the protection of our borders.

Meanwhile other core business areas are developing similar data stores that will deliver highly secure and scalable automated systems of record.

models to ensure a consistent approach across business areas

- make it easier to share and access data with standards, templates and guidance for data sharing agreements and memorandums of understanding (MOUs)
- establish robust governance structures to review and assure our data practices

Authoritative data stores

System audits give us a good understanding of the systems we are running across the Home Office. These systems serve our core business areas, including Migration and Borders, Public Safety and Homeland Security.

The data sets in these systems are acquired externally or generated through Home Office processing and are known as records or systems of record. This processing does not include

Improved data matching and use of metadata

To ensure our data is of a consistent quality and can be used by a range of services, we will use metadata standards to clearly define and label each record. This will include information relating to provenance.

This approach will help us reduce duplicated data and make it easier to review records across different systems. We are also exploring the use of a data catalogue tool to manage our data records and [Information Asset Register]().

To help us match data between records from different systems, we recommend the use of common data models. For example, the data model POLE (parties, events, locations and objects) helps teams use data for analytics and insight purposes.
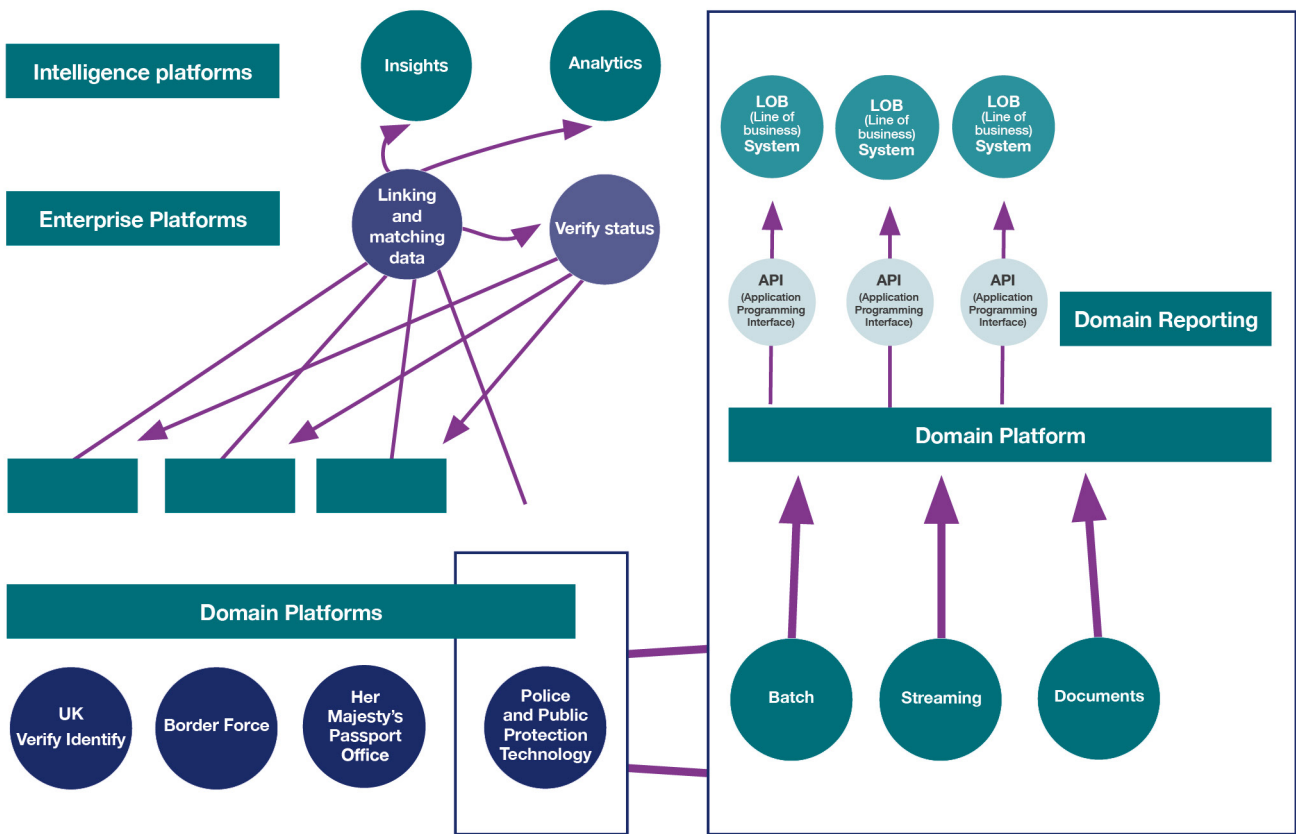
Data reference architecture

Outside of these insight and analytics domains, we encourage our people to use data models they find useful to ease the process of matching data across our domains.

Our Data Services and Analytics (DSA) technology programme is our centralised service that oversees and manages data analysis and insights. It ingests data from multiple federated data stores and uses its search tool, Entity Search, and matching engine to stitch together common data to provide insight.

Being able to match records confidently across our business areas is critical and requires smart technology and innovative thinking. It also requires us to embed an understanding of data ethics and relevant best practice in data science teams.

Scaling this and ensuring we are confident in the match of each record is essential to enabling automation, machine learning and artificial intelligence.

DSA will be at the forefront of helping us understand how we can best use this technology and our skills to take advantage of the data we hold.

Increased use of APIs

To ensure data can be transferred from our different data stores, operational systems and DSA programme, we want all new systems to have clearly defined API strategies as part of their roadmaps.

These should be put in place as early as possible to encourage teams to think about exposing underlying datasets before they focus on developing the systems themselves. If teams consider sharing opportunities from the outset, it should help kickstart further digital development.

The growth of APIs will help us easily access system data without having to request costly third-party development. To ensure this ease of access, we recommend following the https://www.gov.uk/government/collections/api-design-guidance, where possible.
We will also explore a controlled API technology layer to expose and manage API access.

New reference data architecture models
We currently have a data reference architecture model to ensure we continue to collect and organise our data in ways that can be easily understood, used and treated as an authoritative source.

We are planning further reference architecture models to promote consistency across our data and technology estate.

Our Home Office Data Board, Technical Design Authority, and Finance and Investment Committee will ensure compliance with these models.

Closer collaboration with other government organisations
To help us provide services that meet our users' needs, we need to make efficient use of data held by other government departments and agencies. We also need to be able to share our own data easily, while ensuring our staff understand and assess any benefits or risks that this may bring.

Sharing data between government organisations can take time and be complex because of the data access application process, which can involve creating a Data Sharing Agreement or Memorandum of Understanding (MOU).

We aim to simplify this process to make it easier and faster for us to share data with other government organisations.

As part of this, we will:
- maintain a central inventory of data sharing agreements and MOUs for the Home Office - managing these centrally will ensure compliance with best practice and avoid duplication of data agreements
- provide teams with templates and guidance on how we draft MOUs in the Home Office to ensure these are drafted consistently
- continue to create umbrella MOUs, which are overarching frameworks and high-level principles that can apply between 2 departments for a specified period
- add appropriate APIs to the Government API Catalogue

Deliver effectively at scale

To become a truly innovative organisation that delivers user-centred, data-driven products and services at scale, we need organisational change that is both comprehensive and iterative.

We've already started to move away from traditional siloed structures with defined hierarchies. In their place, we want empowered networks of multidisciplinary product and service teams working in rapid learning cycles towards a common purpose.

These teams will have hands-on leaders who can provide a clear vision. They should feel empowered and include people with the skills to research, design, build and test ideas at each development stage.

Each member will bring deep knowledge of their role, yet everyone will be treated as equally important. We value different mindsets and approaches and will encourage teams to work collaboratively and make decisions collectively.

The planning process should include time for user-centred design and research activities that help the team explore different options, learn about the people who will use the product or service, and test ideas so we're continually learning and improving.

We will encourage people to work in the open and share knowledge to support good decision-making and build institutional memory.

Benefits

Delivering effectively means all members of our product and service teams are clear about what they are doing, why they are doing it and how their work supports the strategic aims of the Home Office.

Multidisciplinary teams iterating as they go will help us deliver evidence-based solutions at pace and scale. Ensuring these teams are diverse and working collaboratively will help us solve problems faster and develop more creative solutions with improved results.

Empowering staff to work in the open and make collective decisions will help us respond to emerging challenges more effectively as they will not be hampered by rigid governance structures or top-down decision-making.

Instead of defining solutions at the outset, teams will research and test throughout development to make sure their product or service meets users' needs. This approach will help them identify and tackle risk early and means they can release incremental improvements as they iterate and learn.

At the same time, staff will continually develop their skills and work as part of wider professional communities. This will encourage collaboration while helping teams stay informed about current issues, work to shared standards and understand the impact of what they are doing.

Sharing knowledge and best practice across teams and business areas will reduce risk and duplication. It will also build institutional memory, and help teams

develop a shared understanding of our products, services and users.
Creating opportunities to learn from each other will help us promote an inclusive culture that values honesty and empathy, and where staff feel able to challenge harmful or discriminatory behaviour in good faith, without fear.

How we will deliver effectively at scale

Bold leadership

We want leaders who have an in-depth understanding of their practice area. They should have the digital literacy to engage with both technical and non-technical staff, as well as suppliers, on how to meet the needs of users.

We want leaders who:

- are accountable for the quality of their products or service
- identify and share examples of good practice
- seek ways for technology, policy and operational areas to work together
- consider the impact of decisions on delivery, including any consequences for users
- encourage staff to work collaboratively and learn from each other
- question decisions and practices when something isn't working
- seek and receive feedback

We will run comprehensive training programmes for all senior DDaT staff to improve leadership and ensure managers feel empowered to lead diverse teams, navigate change and make courageous decisions.

We realise this training needs to be combined with strong support for leaders to act boldly, accepting this may sometimes involve a change in direction for programmes or policy.

Our most senior digital professionals should be permanent civil servants. We will use contractors and consultants to meet spikes in demand and provide specialist skills that we do not want to invest in long-term.

Collaborative and compassionate teams

We want product and service teams that work collaboratively to understand and meet the needs of users. To support this, we will encourage team members to develop an understanding of the different disciplines in these teams.

Our learning and development opportunities will reward people's efforts to add broad experience to their existing expertise, as well as specialised knowledge and skills. This should also help create an environment where team members feel able to have open discussions, challenge strategic decisions and agree solutions collectively.

We also want teams to develop and record a shared understanding of who their users are, what they're trying to achieve, and any barriers or historical context that may be a factor. This will help them deliver evidence-based outcomes, while building institutional memory.
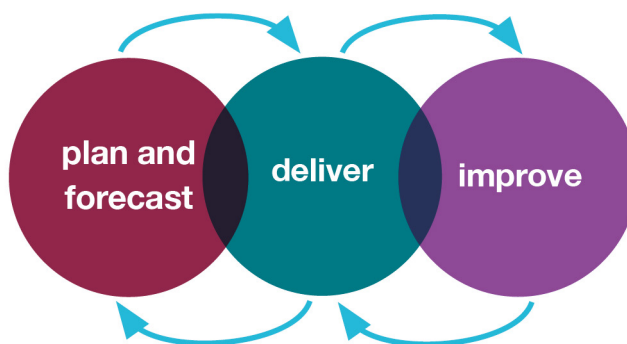
3-stage delivery lifecycle

Collaborative teams deliver

We will encourage staff to get stuff done, with a focus on defining and meeting outcomes. We will support this by following a 3-stage delivery lifecycle: plan, deliver, improve.

This framework is simple enough to work across different contexts and can scale to meet the needs of all our programmes. It will involve product or service teams working collaboratively to:

- plan and forecast – we will ask the critical questions to ensure we have the right people and skills in teams, map dependencies, and use and collect the right data
- communicate objectives clearly ensuring stakeholders have access to information about products or services when they need it
- iterate based on feedback loops – we will test ideas with users, stakeholders and critical voices to ensure we continuously improve our data, analysis, products and services, and can correct our approach where needed
- implement the right ways of working and governance for the team – teams will have the tools, conditions and environment they need to collaborate, test ideas and make decisions collectively, for example through standups and retros
- review risk-sharing agreements with suppliers on an ongoing basis to ensure they are updated throughout development

Empowered and informed individuals
We recognise the importance of motivating individual team members.

Each member of staff will be clearly aligned to a particular DDaT role and have a continuing professional development (CPD) plan in place.

We will encourage every member of staff to be an active end engaged member of their professional community and, wherever possible, to:

- work autonomously and use their discretion for the approach they take
- develop within a discipline they enjoy and with the right level of challenge (neither too difficult nor too easy) - we will offer support, training and constructive feedback to help them become experts in their field
- understand the practical impact of their work and how it will ultimately affect people, making day-to-day tasks more meaningful
- stay informed about current issues relating to their work and the wider organisation - these will be communicated through a range of channels, including newsletters, meetups and staff events

The DDaT heads of role will work with their communities to set standards and define best practice. They will also define role descriptions, career pathways, and training and development opportunities within the DDaT Professions Career Framework. This framework seeks to help the Home Office attract, grow and retain experienced specialists.

As an organisation, we will further support motivated individuals by creating an inclusive, diverse and tolerant organisation.

We will look at diversity and inclusion data, including information gathered from our annual People Survey, to understand how and where we can improve. Senior leaders will work openly to act on this data.

Our diversity and inclusion agenda will include targeted programmes to support

equal opportunities for all staff, make improvements to recruitment, and establish diversity and inclusion champions.

Improved understanding of individual needs and experiences will help us create an open culture where staff feel valued and confident about bringing their whole self to work.

Informed decision-making to reduce risk and improve quality

To produce high quality outcomes, teams will need to need to consider what decisions mean in terms of potential risks and likely trade-offs, particularly when it comes to agreeing the timescales and costs of a project.

Teams should:

- define how they will measure quality, particularly when making improvements to products or services - for example, they could measure user satisfaction scores or API response time
- prioritise the research and testing of new ideas, designs or technology ahead of other development - this will ensure teams identify and tackle risks as early as possible
- look sideways for technology, processes and best practice they can reuse before moving forwards - shared patterns and technology products may have been tested with users, allowing teams to deliver more accessible products faster
- adhere to agreed technical, research, design and accessibility standards and best practice
- assess lifetime cost, in addition to the financial impact of changes on other services or areas

We will encourage teams to publish code and design patterns in the open, after considering any security implications. This will promote collaboration, reduce duplication and support good decision-making. We will share our work using blogs and show and tells and communicate what has worked as well - as well as what has not.

Teams should be connected within the Home Office and with cross-government communities, using collaboration tools to help do this.

Research and testing throughout development

We will deliver products and services based on regularly testing and releasing small, incremental improvements. Throughout development, teams will follow a continuous delivery approach to ensure software can be released into production at any time.

We will aim to automate all repetitive testing to ensure systems perform as our developers intend, according to the identified needs. The build pipeline will test software automatically and deploy it to testing and production environments.

Exploratory testing will also be used to detect bugs or issues not found by automated tests, particularly to detect certain quality issues affecting the design, accessibility or usability of the system. This involves exploring a system manually and without a script to test a predetermined outcome. It's carried out by experienced testers, who explore the system as a user might.

These testers may work alongside developers, user researchers and business analysts who can offer further insights into system functionality. We will also adopt user-centred design methods and

processes to involve a wide range of users in the design and evaluation of products and services. This will ensure decisions are based on evidence and that products and services work for everyone who needs them.

It will also help teams assess the emotional, physical, social and financial impact of any decisions they make.

A commitment to accessibility

Teams will build inclusive services that can be used by everyone who needs them – including those with disabilities or who lack confidence, skills, trust or technology.

While our products and services are digital by default, teams will also explore ways to support those who are unable to use them, while still exploiting digital elements. For example, they may provide alternative contact methods, assisted digital support or additional guidance.

Research and testing will be carried out throughout development to minimise the risk of creating a service that does not meet our accessibility standard.
This user-focused accessibility standard, which goes beyond legal responsibilities and technical compliance, applies to all Home Office products and services. It

ensures we involve people with access needs in testing to make sure our services are usable in real life.

Setting exemplar ways of working

As part of our change programme, we've introduced workstreams that will support effective delivery.
The workstreams include:

- defining and embedding a product-centric way of working across DDaT to deliver accessible products that meet user needs
- creating a single tooling approach for DDaT roles to reduce duplication and fragmentation, and support transparent and collaborative ways of working
- establishing a Shared Applications Service (SAS) to recruit the right skills to develop and maintain Home Office applications
- developing Shared Technology Products (STP), addressing common problems for multiple use cases
- improving cost efficiency by consolidating and centralising our contracts and supplier landscape
- establishing and embedding a DDaT Profession Career Framework and continuous professional development (CPD) approach to support and inform professional development and career progression

Embrace innovation

We believe innovation cuts across people, process and technology. For us, it means using new products, technology or ways of thinking to turn different ideas into services that will help solve the challenges we face.

Often, when we talk about innovation, we are referring to the application of technology that already exists in the marketplace but which is new to the Home Office.

It's not always useful for us to try to be at the leading edge of change. Instead, we can look at innovation that's happening across government and elsewhere to understand how we can benefit or use it to our advantage.

At the same time, to tackle emerging threats and challenges, we need to create a culture that nurtures our workforce to become innovators. We want people to feel confident about proposing bold ideas, experimenting, learning through experience and designing creative solutions.

Innovation is not the sole responsibility of DDaT – great ideas can come from anyone at any time. We're focused on what the future looks like and exploring potential opportunities, so we can advise the organisation on the implications of technological change.

We've already shown that we can innovate in extremely challenging circumstances. For example, during the COVID-19 pandemic, we've continued to roll out CoLab, our Policy Innovation Lab. This brings together colleagues from policy, technology and operations to collaborate on solving shared problems and consider the end-to end user journey.

We've also supported the Department for Work and Pensions' Universal Credit service to manage an increasing number of applications by deploying automated robotic processing to help perform necessary checks on applicants' immigration status.

We want to make it easier for the Home Office to continue with innovative projects such as these, by creating the right environment, skills and processes to allow new ideas to be taken forward easily.

Benefits

We need to continually explore new ways of doing things so we can evolve and keep ahead of any technologies or people that might stand in the way of our core mission: to build a safe, fair and prosperous UK.

Our business areas are often faced with new challenges with a unique combination of people, needs and problems. This is where our product-centric teams, applying user-centred design methods to acquire an understanding of our users and data, can design and build innovative, high quality, cost efficient solutions that deliver value over the long-term.

This is a much more effective approach than passing our requirements to a

separate team or private company to develop for, where any resulting innovation is unlikely to meet user needs or our dependency and delivery requirements.

A successful innovation culture also recognises when we can benefit from innovations developed and shared freely by others. This will ensure our teams use a range of ideas and technologies to approach problems creatively to get more value.

Creating a supportive environment for innovation will also help:
- encourage a culture of experimentation and sharing, supported by the right governance to ensure ideas and technologies that can add value are built on
- connect teams together and build more collaboration around organisational priorities, reducing duplication
- scalable environment

How we plan to innovate effectively

An open and supportive environment
Innovation is not a profession but a mindset and culture that needs to be driven from the top. However, we know that when culture is forced on teams, it does not work.

We need to create a collaborative culture that encourages discussion, supports and recognises innovation, while taking a measured approach to risk.

People need to feel both comfortable and rewarded for acknowledging when things are not working, so we can learn from it. This means having processes in place for identifying problems and talking openly about concerns.

This supportive environment recognises that organisational failures are often due to the inherent uncertainty of our work. A particular combination of needs, people and problems may lead to a failed outcome, but it's also a unique opportunity for us to learn.

Learning from others
Our Innovation Design Authority (IDeA) is setting up an innovation community that will help people from across the organisation support and learn from each other and suppliers. Teams can share lessons, seek feedback and identify opportunities to collaborate on cross-cutting projects and goals.

Our staff also need to be outward facing and engage with cross-government communities of interest. This will help our engineers. researchers and designers discuss the challenges and opportunities that new technologies bring.

We will encourage those in DDaT to devote more of their time to learning about industry research and emerging best-practice and technology.

A central DDaT innovation team
DDaT has a team based in its Chief Technology Office (CTO) dedicated to innovation. The CTO Innovation Team will provide advice on emerging technology and:
- support innovation and collaboration across the department, for example through training, events and CoLab (our Policy and Innovation Lab)
- provide assurance through the Innovation Design Authority (IDA) - this will ensure different parts of the organisation are talking to each other and collaborating on experiments

ahead of approving technology for wider use
- run an Innovation Lab in Sheffield that experiments with emerging technology and proofs of concept
- take forward valuable learnings from supplier-led projects to build up civil servant skills

Taking ideas forward openly

As part of our innovation strategy, we've set up a central Innovation Pipeline to help us identify, test and take forward ideas that will create the most impact for our users. The project pipeline will be available to all development teams and promoted through regular communications. This will help us centralise our innovation governance. It will:

- raise awareness and prevent duplication of new ideas
- make sure new ideas and technology meet Home Office goals and priorities
- monitor the value of innovation activities by openly defining the success criteria for each and the benefits for users
- stop or pause ideas that are not demonstrating value and take forward those that are

- showcase successful case studies to encourage the right type of innovative ideas

Supportive technology and tooling

We will review how we can make it easier for teams to collaborate on early ideas and ensure our technology architecture and tooling is supportive. This will be reinforced by our move to technology convergence.

Any technical controls should be proportionate to the scale and phase of an initiative. For example, mocking up an idea will not need the same controls as when running that idea in a test environment. We will explore technologies that can help our development teams test new ideas and innovate at pace.

We will also encourage regular knowledge-sharing events and hackathons to support teams with prototyping and seeking feedback on ideas.

Assuring these principles

Within DDaT, we are establishing a new quality, standards and assurance (QSA) framework that will be visible, accessible and clear for everyone to follow.

The framework is based on HM Treasury's 3 lines of defence model. It aims to improve quality and ensure products and services meet the government's Service Standard and DDaT professional standards by identifying and reducing risk throughout the development lifecycle.

The first line of defence is set at an operational level, with essential management controls monitored and assured against standards and processes that are critical to delivery. A mature first line will feature a range of advice and assurance processes, and include our Technical Design Authority and Business Design Authority.

Second line assurance will be delivered by independent teams within DDaT, who will conduct assessments to make sure first line management controls are adequate and effective, provide recommendations for improvement and offer support where needed.

While the majority of assessments will be planned, they can be requested by anyone at any time or triggered by management control data in the first line.

The third line will sit with external functions, for example the Government Internal Audit Agency, Government Digital Service or Equality and Human Rights Commission. Their role is to check that second line assurance activities are in place and effective, and will drill down to assess first line controls if necessary.

The DDaT technology and business design authorities

All technology, digital and data decisions in DDaT are overseen by a Home Office Technical Design Authority (TDA). This provides technical strategic direction to help us develop consistent ways of working and identify where we can converge technology solutions, and share tools, resources and capabilities.

We've introduced more transparent governance processes to support the TDA and help colleagues understand how and why decisions are made. This governance also promotes a product-centric delivery approach that's led by data and the needs of our users.

This is reinforced by the Home Office Business Design Authority (BDA), which reviews major projects and programmes. It is guided by the Home Office Business Design Principles, which helps teams focus on user-led outcomes and consider the wider impact of decisions.

Conclusion

This Home Office DDaT Strategy sets out a principle-based approach for how we tackle the challenges we face in becoming a more contemporary, automated, technology-enabled digital organisation.

Our ambition is to create an organisational culture where digital, data and technology are part of our DNA. We will do this through becoming product-centric in our operations, and data-driven in our design and decision-making.

We need diverse and inclusive multidisciplinary teams that work with users and colleagues to explore problems and act on evidence to deliver better policies and outcomes for the people we serve.

This strategy ensures:
- users will have an improved experience interacting with the department and its services, often being able to self-serve at their convenience
- our staff will become more efficient, productive and happier as they turn their attention to work that really creates value for our users
- we use data to strategically improve policy and outcomes
- we can implement policy quickly and continuously
- we lower delivery risk through continuous improvement

The digital environment will continue to bring significant and unpredictable challenges. This strategy will help us build resilience through establishing a digital mindset and workstyle. It's about how we as a department can achieve more with less, to serve our users better and be a great place to work.
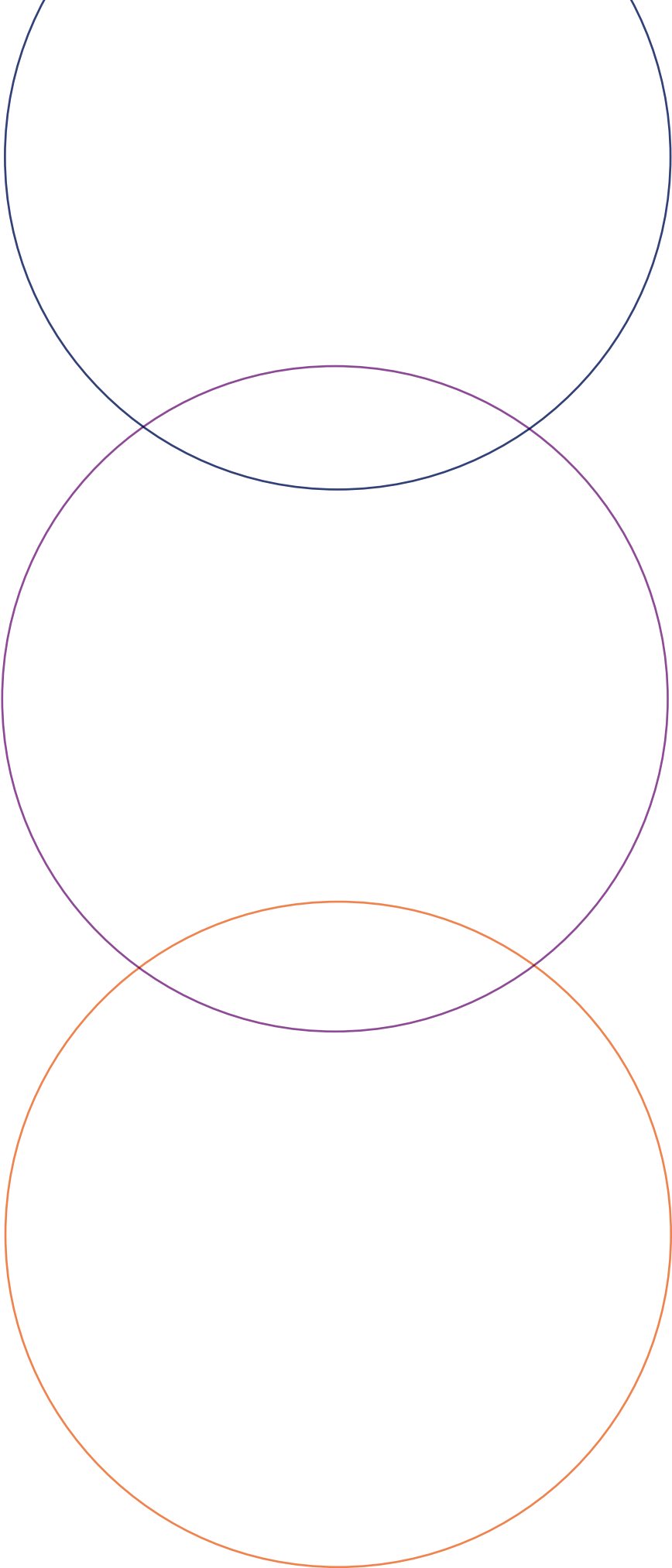
Our product-centric teams will have autonomy to make decisions, working within our environment of convergence, governance and enterprise views of design.
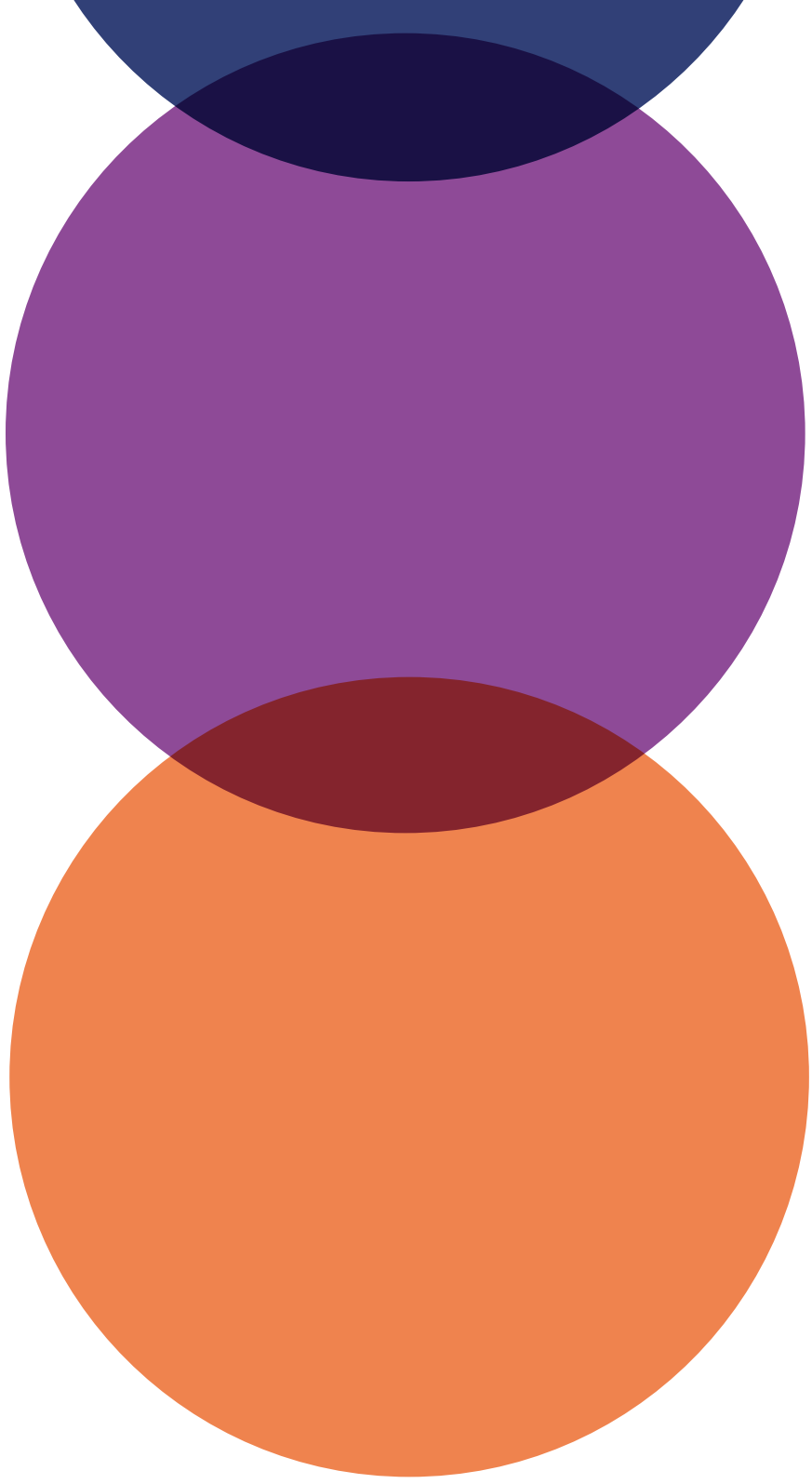
Our focus on data will improve how we operate and ensure we are a workplace that is transparent and encourages collaboration. Data is transforming how we work, deliver products and services, and engage with our users and other departments. We look to harness the opportunities this brings as we move forward

Much of our transformation, such as our becoming data-driven, will also need cooperation from the whole of our organisation.

We'll create an environment and culture that is collaborative, courageous, compassionate and informed by the needs of our users.

This strategy is a living document and we may continue to update it once it's published.

Home Office