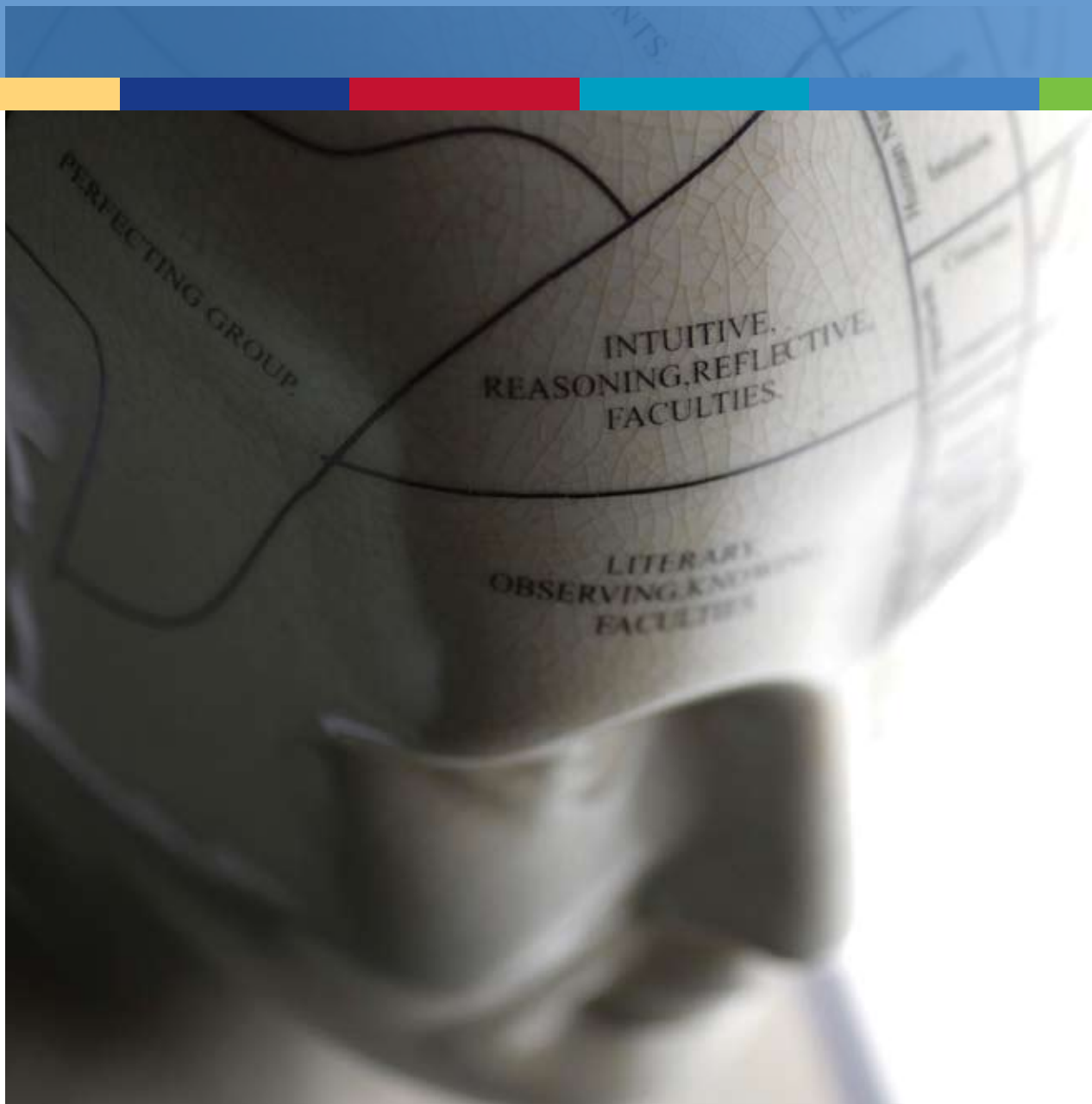


# Making information matter

Making sense of the information challenge in the UK public sector



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This paper on information management is the fifth in a series specifically focusing on IT in the UK public sector. The papers provide a strategic view from a technical perspective, drawing from the experiences and issues of IBM clients in the public sector. They address common problems and describe relevant technologies and techniques for effective delivery of IT to the public sector.



## Introduction

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*“Effective use of information is absolutely central to the challenges facing the Government today – whether in improving health, tackling child poverty, or protecting the public from crime and terrorism. Those in public service need to keep that information secure, in order to build public confidence. This is essential to underpin greater data sharing to deliver personalised services and make us more effective.”*

Sir Gus O'Donnell, Data Handling Procedures in Government, June 2008

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**Information is the lifeblood of our age. Yet in government, as elsewhere, its sheer ubiquity can confound us.**

Information is endlessly volatile and duplicated, usually residing in separate systems and in different formats. It cannot be easily aligned, interrogated, consolidated or managed, and it arrives faster and via more channels than ever before.

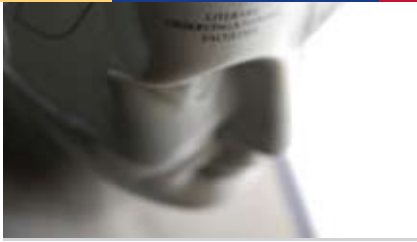
Despite £16bn being spent annually on ICT in the UK public sector (equivalent to over £265 per year for every man, woman and child in the country), government agencies are still struggling to exploit the full potential of their data. Delivering services built on that data in a joined-up and cost effective way remains a challenge.

At the same time, the government's *Power of Information Taskforce Report*<sup>2</sup>, which makes recommendations for internet usage and development within government, paints a clear picture: “Data and information are the lifeblood of the knowledge economy. The report's recommendations on liberalising non-personal government information would provide an information stimulus if implemented.”

In addition, the Taskforce found that “recent developments on the web have increased the potential for reusing public information to improve public service outcomes and create new businesses. How information is published and licensed for re-use is central to these benefits being realised.... Further reform and better communication to potential reusers would increase the national benefit.”

As a result, the government is striving to adopt best practice: modernise systems; enhance its ability to protect private data; comply with regulations; and manage employee productivity. Effective information management is central to this transformation. It is essential for any organisation that wants to take full advantage of existing processes and explore new models – in other words, to do more with less.

To succeed, the government must continue to develop a strategy for information management and establish a roadmap that will enable departments to use trusted, single versions of data entities while deriving intelligence from the mass of information that they hold.



## The trouble with information: volume, variety, velocity and version

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*Data quality issues cost U.S. businesses more than \$600 billion annually<sup>3</sup>, and a recent Harris Interactive survey of European information workers shows that respondents spend as much as 30% of their week verifying the accuracy and quality of their data. Their lost productivity translates to a cost of over £200,000 per week by some estimates<sup>4</sup>.*

**Master Data Management:  
the key to leveraging information**

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Information comes in many forms, from text documents and emails to databases and spreadsheets. Moreover, the volume of information, its variety and the speed at which it arrives is increasing – and won't slacken any time soon. Much of this information is volatile, changing all the time, and yet most of it must also support processes that could withstand point-in-time legal scrutiny.

Nonetheless, the UK government still needs to capture data then validate, normalise and organise that data according to the needs of a wide range of users. It must handle greater volumes and types of data more effectively to allow for more processing at less cost and to make certain that information can be accessed on demand in myriad different ways. It needs to optimise the cost of keeping data, and exploit the most cost effective ways of storing it. The data also has to be managed in order to meet regulatory requirements, all within strict boundaries of ownership, security, privacy and governance.

It is in the interests of government bodies to establish and maintain a single version of the truth, especially in the context of different information silos and sources. Often there is no common understanding of information governance or meta-data policies describing what data exists, its currency or accuracy. This is nowhere more important than in identity resolution.

The government needs to know which data are reliable, how to identify and propagate the “correct” records and how to ensure that any future changes or updates to that data are processed.

These challenges need to be mastered in the context of how IT business applications have developed over the last two decades. They are now complex silos of information that hold data in different formats and contexts. Identifying and merging data to handle even the simplest request, such as “get citizen details”, is challenging. Data integration frequently suffers from poor data quality. This can have an impact on operational efficiency, data privacy, business decisions, customer satisfaction and support of new services for citizens.

Such inconsistencies have led to a lack of trustworthy information. As a result, citizens can be confounded by inaccurate and incomplete data, which could make the government appear inconsistent and inefficient. Moreover, government users may not be confident in their information, or miss out on or use inappropriate information in decision making.

Ideally, government departments need to move away from the previous business application-focused systems to a model that recognises the value of information and delivers trusted information for better decisions.



## The way forward: laying the foundations to transform the information infrastructure

The key is to move from business automation – transaction processing – to business optimisation where intelligent use of information is embedded in systems to improve outcomes. Some organisations have made this journey, drawing insight from data and turning it into better information. This calls for new approaches, including cultural and process change, and governance and information stewards.

Not everything can be done at once – it is simply too difficult to build the business case. However, IBM's experience suggests breaking the problem down into a number of functional areas in order to begin the transformation and gain benefits quickly. Among the areas, two are particularly important to underpinning the new information infrastructure.

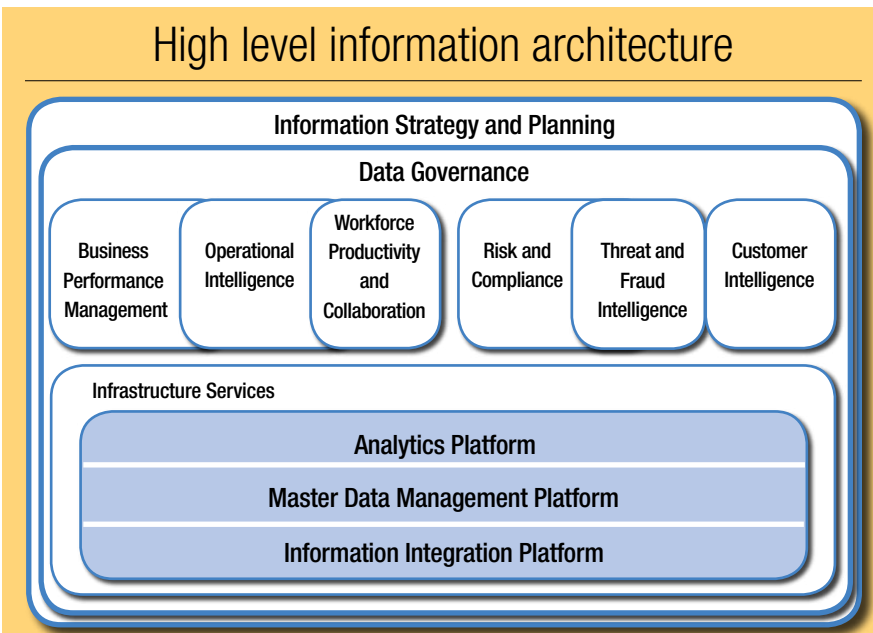
### **Master Data Management (MDM):**

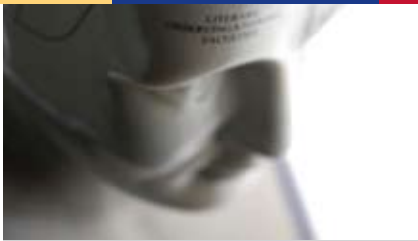
A set of disciplines, technologies and solutions used to create and maintain consistent, complete, contextual and accurate business (master) data for all stakeholders, across and beyond the enterprise. This helps ensure that users are working with a single view of the subject, with no duplication or errors within the data. It requires rationalisation of multiple master sources and infrastructure to manage changes to master data distributed across applications through its lifecycle.

### **The Analytics Platform:**

Disciplines, technologies and solutions used to provide timely and contextual access to relevant information for all stakeholders. For example, it requires analysis of unstructured content through text analysis and entity resolution (eg to enable semantic and contextual searching). This supports scenario modelling and visualisation.

The long-term aim is to join up all of the data so that anyone can make decisions. Within the next five years, as data capture and management become more automated and information is infused into its nervous system, people working in the public sector may be able to identify data flowing around their organisation or in its processes. They should be able to do so using tools they are given, enabling them to respond to stimuli. Even these may be automated at some point via complex event processing.





## The roadmap for transformation

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*“The central truth is that information security is a means, not an end. Information security serves the end of trust. Trust is efficient, both in business and in life; and misplaced trust is ruinous, both in business and in life. Trust makes it possible to proceed where proof is lacking. As an end, trust is worth the price. Without trust, information is largely useless.”*

Dan Geer, IT security pioneer

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How can government departments transform information management? Drawing on IBM's experience, there are four major steps:

### 1. Establish an information management strategy

First the department or agency must appoint someone to be responsible for its information management, often a Chief Information Officer (CIO). Then there should be an information management strategy with a comprehensive, enterprise-wide plan. A CIO creates and implements the plan to achieve both short- and long-term strategic changes, working with line of business colleagues and CIOs in other departments.

It aligns the use of information to match the business or departmental strategy, and recognises that the solution is about people, process and culture as much as it is about technology. It identifies the most vital information, and how it should be made available and governed. It leads to a detailed business assessment of requirements and priorities.

At this stage, an organisation should start to define and set up governance mechanisms. Information governance is the orchestration of people, processes and technology to enable an organisation to use information as an asset. Expected improvements from the implementation of such mechanisms might include:

- consistent, comparable and quality data that improves decision making;
- quick analysis and answers to business questions instead of one-off “projects”;
- efficient investment in common technical infrastructure, elimination of distributed data marts and reduced support costs;
- improved understanding of our citizen data across lines of business for targeted services;
- analytical resources that are freed from preparing and “scrubbing” data, enabling them to perform higher order activities; and
- a data infrastructure that meets regulatory requirements and can respond to further changes and expectations.

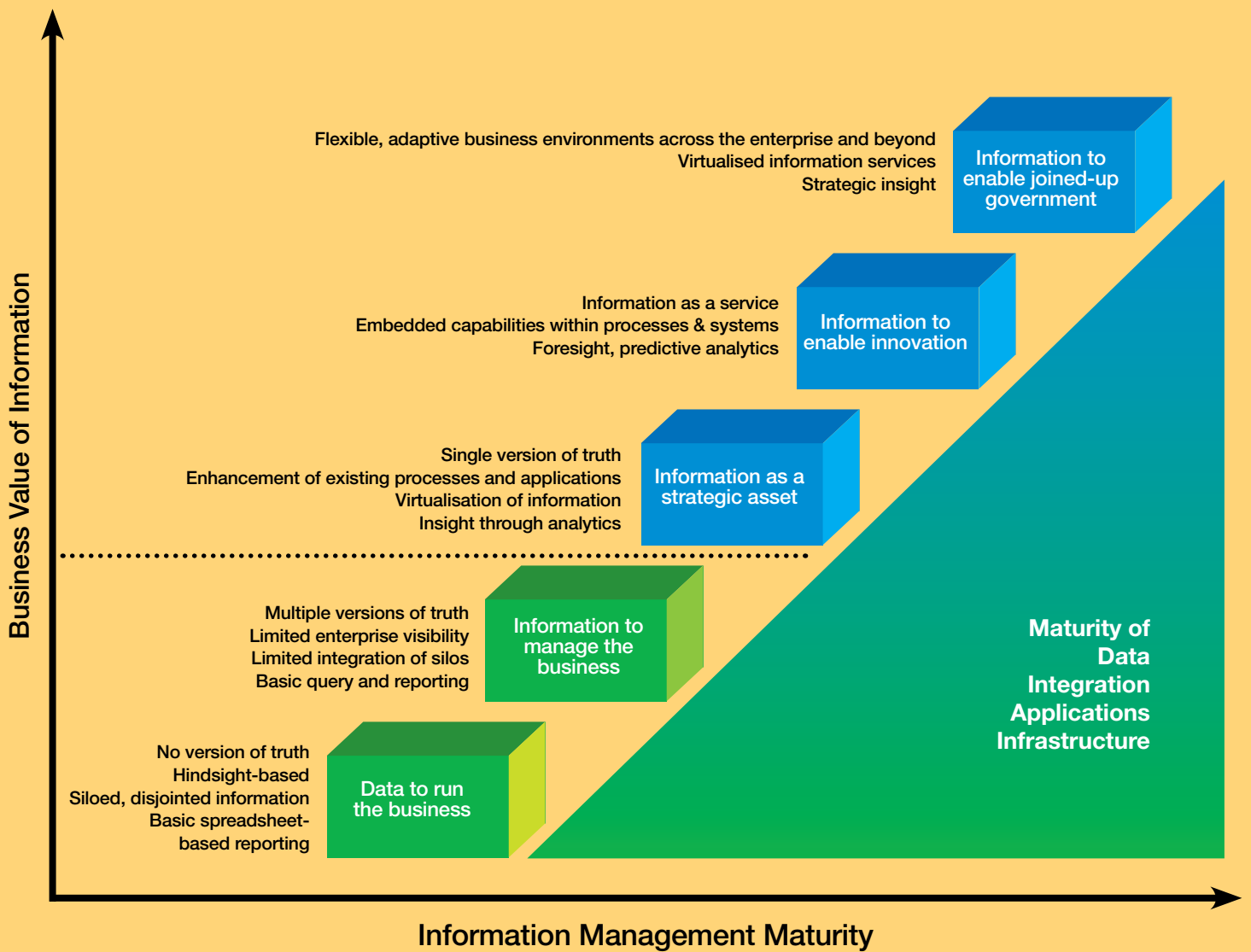
### 2. Prioritise high value areas for improvement

Once a management strategy is in place, the government needs to identify, validate and prioritise the areas where information can be used to support key departmental strategies and drive improvement.

There are a selection of techniques which IBM has employed to do this: by identifying one or more candidate high priority areas, analysis of business improvements in using information can be undertaken and the results subjected to quantified cost analysis, via Process Improvement Workshops and Business Value Assessment.



## A model for information maturity: essential to beginning the transformation





**Process Improvement Workshops (PIW)** use industry best practice to model and review departmental use of information, both data and content, in order to optimise business processes. This is carried out using quantifiable data. The PIW then recommends solution initiatives which help improve decision making by injecting timely, trusted information into service delivery to provide process cost and duration benefits.

**Business Value Assessments** should be used to quantify return on investment for top priority areas.

They explore potential investments in the implementation of information services by linking them to business value and strategy. In quantifying the results over time, priorities by value and risk can be assessed.

### 3. Establish a Centre of Excellence (CoE) for Information Management

A CoE is an area of concentrated expertise and skilled resources. It takes business requirements and refines the information architecture to fulfil them. It also designs models that maximise flexibility for the future, taking account of previous and parallel initiatives that can be re-used.

Finally, it provides the capacity to implement, test and deploy the solutions, and to reflect changes to requirements over time.

CoEs reduce the time, cost and risk of information management initiatives, and share best practice. They increase business alignment, project prioritisation, re-use and the information management skills that facilitate cultural change.

CoEs manage and control the sharing of information as well as improving the delivery quality of Information Management projects.

## Establishing a strategy and information architecture at DEFRA

Defra's IT strategy includes a focus on the delivery of common solutions which include shared information repositories encompassing customer, land, animal, environment, rural and corporate data. Activity was subdivided into programmes representing the high priority areas of information: land, livestock and customers. The approach was to collect requirements from the impacted business areas, design and implement the software components which meet those business requirements and deploy the systems into a production or pre-production environment. This business-led approach ensures responsiveness to business needs, while breaking the programme down into a set of projects that can run in parallel. This enables the required systems to be delivered in a reasonable timescale with minimal bottlenecks.

A common set of business processes and other related aspects of the "to-be" business (roles, locations and organisation) was considered, along with consistent data access, alignment of software components across projects and an underpinning technical infrastructure. This resulted in IBM creating an "information architecture" for defining, storing, using and sharing data and integration of information and application architecture components. The outcomes included: a target data model for the Customer and Land Database integrating multiple data sources and providing access for a variety of business purposes; reduced timescales and costs on the delivery of a target data model for the Animal Health Data Warehouse; and identification and specification of information services to maintain and access Customer data for the Animal Health Business Reform Programme.





Governance sits across systems and drives the overall strategy, prioritisation of projects, data quality, etc. that feeds into what the CoE does. The CoE is an operational team that builds and runs the information management systems. Ideally it contains business people – the data champions that sit in the business – as well as IT people.

#### 4. Implement the top priority areas using the CoE

This starts with developing the target business information architecture and the transition steps necessary to achieve the identified priority. It is achieved in relation to a reference architecture template.

IBM's Information Reference Architecture groups areas of similar capability together, and allows for separation between different components.

This leads to simpler exploitation of information for business benefit and greater flexibility when responding to change in the future.

The target architecture must recognise that many of the functional components will already be in place. Future investments should embrace, enhance and preserve legacy technology where appropriate.

However, IBM strongly recommends that the architectural layers (Data & Content Management, Trusted Information Management, Search & Discovery, and Business Intelligence & Performance Management) are separated, so that they can be re-used in subsequent projects, with incremental extensions being based on the existing infrastructure.

This may cost more initially, but the Business Value Assessment approach will have taken this into account and demonstrated the payback as part of the ROI/TCO.

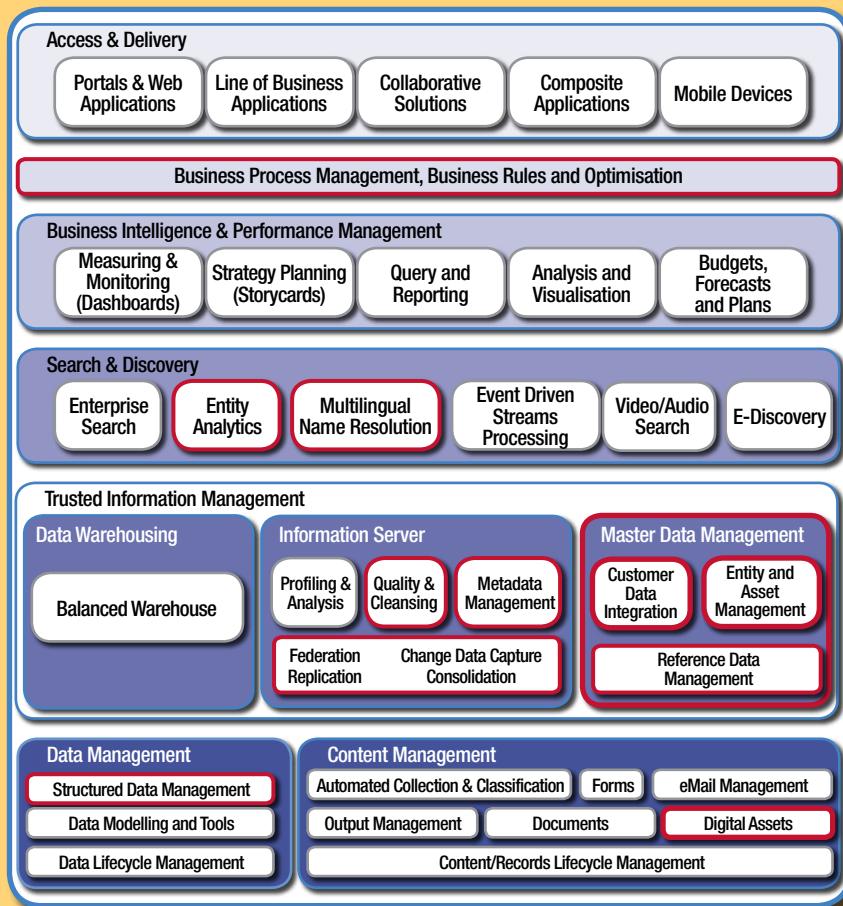
## Case study: Association of Chief Police Officers In Scotland (ACPOS)

IBM provided hardware, software and services to deliver against an ACPOS contract for the delivery of a Common Performance Management Platform (The Platform) covering the eight Scottish Police Forces and the Scottish Crime and Drug Enforcement Agency (SCDEA). The solution deployed the same architecture as that used by New York Police Department (NYPD) to support their Crime Information Warehouse (CIW) and Real Time Crime Centre (RTCC), which has been proven over a number of years, though in the case of ACPOS, this will be via an Extract, Transform and Load (ETL) process into a Data Warehouse which will not be an RTCC.

The NYPD solution now deploys a data warehouse containing up to 25 years of data in some subject areas and has won several awards for its contribution to crime reduction. When completed, the ACPOS solution will support nine Business Subject Areas, including Crime, Custody, Command & Control, HR, Fixed Penalties, Finance, Warrants, Road Traffic Collisions and Intelligence, and will enable a wide range of sophisticated analyses to be performed on this and other related data. Furthermore, it is envisaged that the same architecture will be extended to support new solutions being developed by involving the collection, cleansing and transformation of large amounts of data from a wide range of sources.



## Information Reference Architecture in Use

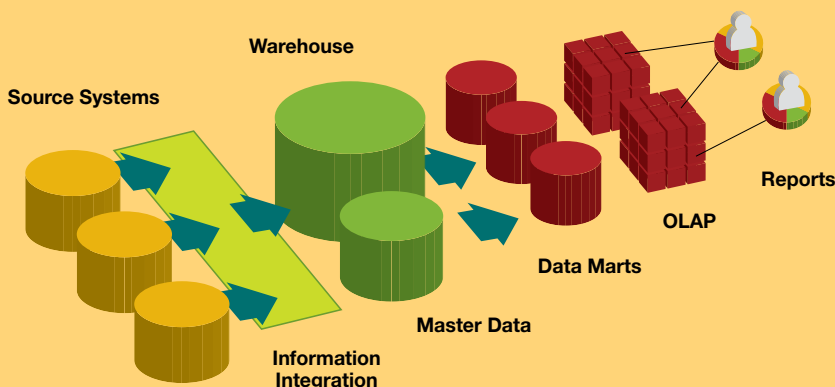


This architecture, developed by IBM, groups areas of similar capability together and allows separation between different components to be realised. This leads to simpler exploitation of information for business benefit and to greater flexibility to respond to future change. The reference architecture illustrates the selection of architectural components to support a solution for master data management (MDM – the boxes highlighted in red).

An MDM solution will need to provide data definition and management capabilities for its owners, the ability for applications to interact with accurate and consistent master data, and to provide analytical services to understand the relationships between entities (eg associating two entities as the same). The components of an MDM solution are as follows:

- The system provides business services that can be consumed by applications and business processes. The system manages access to both structured and unstructured master data and contains workflows to enrich content automatically and manage events.
- Integration of master data with applications using standards-based technology both within and beyond the organisation.
- Best practices and industry-specific standards for master data must be accommodated by the data modelling and in the architecture of the solution. These include data transformation and the control of data quality as master data moves between source systems, the MDM repository and other applications.

The business goals which drive the requirements for master data management can be used to establish the implementation style of the solution, and the governance zones for the information – essential to understanding and managing trust.





## Conclusion

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*The Taskforce recognises that when mainstreaming any innovation, systemic culture and behaviour change is required. It believes firmly that now is the time for the innovative approaches that it recommends to be brought into the mainstream of UK government. The report therefore calls for action to help the public sector to acquire the new skills and practices required to support this.*

Power of Information Taskforce Report, February 2009<sup>5</sup>

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The factors that inhibit successful implementation of information management are nearly always organisational. Technology can help overcome some of these, but the real challenge is overcoming resistance to change and overcoming resistance to information sharing.

Civil servants must have a clear objective in mind; appropriate governance and active business sponsorship are essential to success. It is necessary to focus on the transformation in light of its benefits, taking a strategic view of the process. Government is not buying a package, but a solution to a range of challenges that exist around information management.

It is essential to create and deploy an information infrastructure that meets both immediate and future needs. Project owners need to push departments to ensure their active involvement and that they take responsibility. Otherwise the technology may succeed but overall change will not happen.

Without information, the public sector cannot deliver services to citizens. With well-managed information, customer services can be delivered more seamlessly, costs can be reduced, return on investment can be improved, new channels can be created and exploited faster, deeper insights into needs and requirements can be mined, and regulatory compliance can be more easily achieved.

Rising citizen/customer expectations can be met, innovation can more readily be adopted and fraud can be more easily detected. Finally, established policies, principles and standards can be instituted and best practice can be shared.

### Where next?

To realise the vision, IBM believes an organisation requires the governance, culture and the will to change to treat information as a valuable asset.

We have deep experience in helping organisations to move towards this goal. We facilitate workshops to identify key information requirements and any gaps in the current provision. We bring expertise to deploy the best technology and processes to deliver it.

Our information software capabilities and techniques develop and encourage a lasting partnership with the customer, with IBM coaching the user organisation as they develop their ideas. Using IBM's reference architecture and collateral that IBM has harvested around it, organisations can cut down on the risks involved in the first steps to deliver early business benefit.



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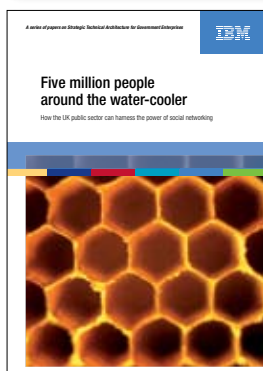
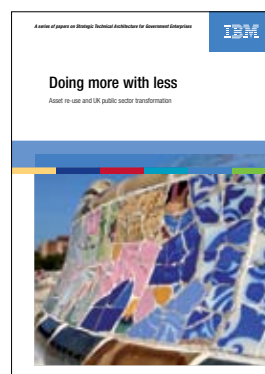
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