



### Business challenge

To achieve equity and maximise utility within the UK's organ donation structure, the NHSBT needed to optimise its organ allocation schemes and ensure those schemes are quickly adaptable.

### Transformation

Using IBM Business Process Manager on Cloud, Operational Decision Manager on Cloud and IBM® Blueworks Live™ the NHSBT built a rules-based platform for agile development, capturing workflows, simplifying processes and enabling the organisation to develop, implement and change allocation scheme rules on an ongoing basis.

## Business benefits

### Streamlines delivery

of improvements and modifications to organ allocation schemes

### Maximises utilisation

of donated organs in the UK and the equity of organ allocation

### Frees

resources to focus on NHSBT's mission rather than technology by leveraging the cloud

# UK National Health Service Blood and Transplant

## Maximising patient outcomes with IBM business process software

The United Kingdom's NHS Blood and Transplant (NHSBT) is an arms length body of the United Kingdom's Department of Health. Its responsibility is to provide a reliable, efficient supply of blood, organs and associated services to the National Health Service. Since NHSBT was established, the organisation has maintained or improved the quality of the services delivered to patients, stabilised the rising cost of blood, and centralised a number of corporate services.

*“Surgeons certainly understand it when I tell them we can adapt allocation schemes incrementally and routinely based on new data or research; we don't need years anymore.”*

—Sally Johnson, Director of Organ Donation and Transplant, NHSBT

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## Controlling organ donations nationwide

Thousands of patients on waiting lists for organ transplants across the UK may not know it, but the NHSBT is just as important to them as their transplant surgeon. Before a single life can be saved with a donor organ, a complex chain of events has to be coordinated.

This responsibility falls to the NHSBT, which operates the transplant waiting list and provides the matching and allocation processes identifying potential recipients of every donated organ—heart, lungs, liver, kidneys, pancreas, small bowel and more.

While the number of organs donated for transplantation has been growing in the UK, an average of three people each day die while waiting for a transplant, according to Sally Johnson, NHSBT Director of Organ Donation and Transplant, whose team coordinates with donor hospitals and transplant surgeons and supports families as they make decisions regarding donating their relatives' organs. "Making the most of our donor pool is absolutely critical to saving more lives, and improving our processes for making allocation decisions means we can use more organs than we would otherwise."

A range of factors influence those allocation decisions—or allocation schemes, as they're called—everything from the age, size, and clinical

condition of the donor and recipient to the unique physiology of each organ type. Medical determinants shaping the development of a successful kidney allocation scheme, for example, are entirely distinct from those of a heart or liver.

Regardless, all schemes are developed at NHSBT with the intent of maximising equity of access and utility of organ transplantation overall, and all schemes are intended to reflect the latest in research and medical advances. This need to stay current—to constantly modify allocation schemes and develop and implement new rules and processes—manifests itself primarily as a technology challenge within the agency.

"We've been updating our schemes every 2 - 3 years, and one of the problems we had was that we'd built those schemes and the associated business processes into our existing IT environment, which was extremely complex," says Aaron Powell, chief digital officer at NHSBT. "We became less and less able to make changes safely over time because we'd lost institutional knowledge due to personnel turnover and we didn't have a full grasp of what was happening where within the depths of the system."

Mr. Powell says it was taking an unacceptably long time to implement changes in the allocation schemes—several years in some cases; longer than it took to develop an entirely new, improved scheme. "We had to

find a way to capture workflows, simplify processes and develop, implement and change rules quickly."

## Using a rule-based platform for organ allocation and process automation

This ability to develop and implement rules and to make changes to them quickly forms the foundation of the allocation scheme. "Being able to make use of these rules effectively is where IBM Business Process Manager on Cloud comes into play," says Mr. Powell. "We've found the tool not only integrates well with Operational Decision Manager on Cloud, it also integrates well into our existing systems, which is really important to capturing workflow and implementing changes quickly. We recapture both the workflow and the decision-making capability in Operational Decision Manager to actually enable the allocation to happen."

NHSBT recently reached a critical milestone: the first transplant of an organ—a heart—allocated according to a new scheme developed using IBM Business Process Manager on Cloud (BPMoC) for process optimisation and IBM Operational Decision Manager on Cloud (ODMoC) as the rules engine for the allocation scheme itself.

Mr. Powell and his team built the heart/lung allocation scheme workflow in BPMoC, which enables

NHSBT's 24-hour operational centre to monitor the status of an organ offer—whether it's been accepted or rejected—and manage the subsequent workflow. In the case of a rejection, that means moving rapidly from one potential recipient to the next until a suitable recipient is identified.

And where BPMoC and ODMoC operationalise rules and processes, the IBM Blueworks Live (BWL) software, a SaaS offering, allows NHSBT to constantly evaluate new processes and models. "Blueworks Live has enabled us to capture workflow information in an accessible and understandable format so that we can both improve implementation planning and articulate to a wider audience how the actual allocation scheme works in practice." That wider audience includes statisticians, analysts, those with regulatory responsibilities and the NHSBT operational centre, as well as stakeholders in IT.

BWL, BPMoC and ODMoC are the first business-critical applications NHSBT has moved to the cloud, a move Mr. Powell attributes to his organisation's need to focus on its mission—making sure that as many people as possible receive needed organ transplants—rather than technology. "For us, the cloud is about letting other people worry about things like how many virtual machines we need to run in which data centre."

# Optimising transplant outcomes

On average, four to five donors become available each day in the UK, and each of those donors will donate between 2.5 to 4 organs, so NHSBT is looking to utilise its cloud-based platform for more than just heart and lung allocation schemes. Next is a national transplant waiting list that can be accessed by clinicians from their mobile devices, enabling them to register a new patient or change a patient's status in near real-time.

Also in development is a liver allocation scheme, which is expected to increase the number of liver transplants by approximately fifty annually. "That's fifty lives saved or significantly transformed," says Ms. Johnson, who interacts with surgeons in the development of allocation schemes. She credits newfound agile development capabilities facilitated by BPMoC and ODMoC platforms with improving responsiveness to surgeons' input.

"It's the clinicians who design the schemes, and then we work with them to turn that into something

that's implementable," she says. "If I talk to them about cloud platforms they have no clue what I'm talking about. But surgeons certainly understand it when I tell them we can adapt allocation schemes incrementally and routinely based on new data or research; we don't need years anymore. That's enormously valuable to them."

On the IT side, Mr. Powell envisions an expanding role for data in the development of allocation schemes and, in the long term, the emergence of a self-learning IT environment. "Will the nature of the data going into the system inform the way we design allocation schemes in the future? Could we get to a point where the system is almost learning for itself and helping us achieve the competing demands of equity of access and organ utility over time? I think yes. We absolutely see this as being a step towards more intelligent allocation schemes over time."

"We seek balance," says Ms. Johnson. "We seek to ensure that everyone has equal access or equal opportunity for a transplant

should they need one. Every improvement we make to our allocation schemes ensures that we make best use of all the organs that are available and maximise the number of years people will live with a transplant. That matters profoundly."

The recent heart transplant represents the start of a technology-driven business process management journey at NHSBT. It just so happens that, in this case, the outcomes are literally life-and-death. But the challenge of doing more with less is universal, with organisations in both the public and private sectors grappling with how to allocate scarce resources to achieve their own set of critical outcomes. Regardless of whether an organisation operates in the public or private sector, whether a life, an application delivery deadline or the on-time delivery of a customer's order is at stake, business process management—leveraging technology to identify, understand and optimise both internal and outward-facing processes—is critical to setting any organisation up for success.

## Solution components

- IBM® Blueworks Live™
- IBM Business Process Manager on Cloud
- IBM Operational Decision Manager

### Take the next step

To learn more about IBM's business process management software as a service—IBM Blueworks Live™, IBM Business Process Manager on Cloud and IBM Operational Decision Manager on Cloud—please contact your IBM marketing representative or IBM Business Partner, or visit the following websites:

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