Data Centre Migration: Managing hidden business risks

Ensuring technology serves the business
“Complete the change without anybody in the business realising that it has happened”

—Rob Dagley, CTO, Global Technology Services, IBM
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Data Centre Migration, Data Centre Relocation, Data Centre Consolidation and Data Migration are often used as interchangeable terms. This paper relies on the following definitions:

- Data Centre Migration (DCM) and Data Centre Relocation (DCR) are fundamentally the same thing and represent the physical or logical relocation of IT services from one hosting location to another. This relocation could consist of no physical hardware moves at all, or it could consist of everything being loaded into a truck and driven to the new location, or anything in between.
- Data Centre Consolidation (DCC) is a DCM or DCR from multiple hosting locations into fewer hosting locations.
- Data Centre Transformation (DCT) is the process of bringing maximum technical, operational and cost efficiency to the Data Centre through a formal programme of review and technology change. DCT is not the primary focus of this whitepaper.
- Data Migration is the migration of data from one application, database or service to another, and a far simpler task, with many data replication technologies available to support such data movement. Data Migration is likely to be a component of a DCM, DCR or DCC programme.

Throughout this document, DCM, DCR and DCC will be collectively referred to as ‘Data Centre Migration’.

Executive summary

Data Centre Migration is often dismissed as a purely technical, almost trivial side-project, to be delivered by existing IT staff along side their day jobs. With core business services reliant on IT, a Data Centre Migration can expose the business itself to a significant degree of risk.

This paper presents the case that it is essential to plan, manage and execute a Data Centre Migration with the appropriate level of rigour and control, utilising proven methods and expertise to ensure the business can continue uninterrupted.

Written by Rob Dagley, CTO, Global Technology Services, IBM.

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How Hard Can It Be?
On the face of it, a Data Centre Migration may seem a fairly straightforward project, particularly if your mindset is focused on servers and infrastructure. After all, how hard can it be to move a number of servers and some storage devices from one location to another? If you do not need to use them during the move, it is relatively ‘easy.’ However, if you still require full availability of IT-enabled business services, then a Data Centre Migration is like replacing an airplane engine while it is in service.

The question is not “How do I relocate the servers?” but instead “How do I relocate this business, and keep functioning even during the relocation?” The critical success criterion is to be able to complete the change without anybody in the business realising that it has happened.

Why Adopt a Methodology?
Most mature IT organisations utilise methods. Methods provide a proven and repeatable approach to tackling a job, providing a check and balance to make sure that things are not forgotten or overlooked. One method, developed by IBM specifically for the job of Data Centre Migration, consists of six stages, analysed in five towers, over 50 specific activities. The method provides inherent flexibility, enabling stages and activities to be executed in parallel, and to be completed at different times by different parties.

Once a method or framework has been selected, the next tasks are to understand and define the programme, and highlight the constraints or limiting factors.
The Time, Cost and Risk Challenge
Typically, most projects operate under three constraints: time, cost and risk. Often, all three are fixed with a specific deadline, budget and low appetite for business and technical risk. Data Centre Migration programmes nearly always operate within these constraints, and the defined migration strategy must consider and address them.

For example, if there is a very firm deadline for completion, pre-migration optimisation activities could be minimised and the infrastructure migrated on an ‘as-is’ basis, placing the deadline as the highest priority and optimisation as the lowest.

Another significant challenge of the time, cost and risk dilemma is that of resourcing. The lowest direct cost approach is often to utilise existing, in-house, resources. However, few organisations have teams of highly skilled people just sitting around doing nothing, so a migration programme is often added to the day job.

Experience shows that this ‘add-to-the-day-job’ approach does not work. A Data Centre Migration programme requires significant and dedicated resources, and in some cases this means turning to independent contract staff. Whilst contractors provide an excellent way to achieve quick access to skilled resources, again experience shows that each contractor arrives with his or her own way of working.

The most effective approach is to partner with an organisation that can provide a core team that specialises in Data Centre Migrations, using standard and shared methodologies. Whilst this team could be augmented with contract staff, attention should be given to the role of Systems Integrator (SI). Without a defined SI contractually empowered to run the programme, the role of SI will default to your organisation. This is often a cause for concern. Whilst the use of an external SI might look more expensive, it will certainly deliver significant benefits and lower total costs in the long run.

Getting the Foundation Right First Time
At the outset, it is important to create a Programme Definition Document (PDD) that articulates the key objectives, providing a single reference point for the entire programme:

- Objectives and scope, to define the ‘why and what.’
- Guiding principles, to steer the decision-making framework.
- Risk Assumptions Issues Dependencies (RAID) analysis, to cover control and mitigation.
- Baseline discovery data, to define the programme scope in terms of assets to migrate.
- Organisational breakdown structure, to identify how people will be organised and their responsibilities.
- Work Breakdown Structure, to allocate the work to the teams.
- High-level plan and milestones, to control activity start and end times, combined with progress measurement.

While Data Centre Transformation activities can be included within a Data Centre Migration, it is important to understand the rationale for their inclusion:

**Pre-migration transformation** – there are instances where performing transformational activities prior to the migration itself can aid the migration. Such activities could include server virtualisation, data separation or server platform upgrades. From a DCM point of view, it is worth restricting pre-migration transformational activities to only those that make the migration easier, faster or less risky.

**Migration transformation** – in a few instances, performing transformational activities during the migration events themselves might be required. However, to reduce complexity and risk, these activities should be kept to an absolute minimum. Where activities are performed, it is imperative that the ability to back out from the migration is retained should significant problems occur during the migration weekend.

**Post-migration transformation** – performing transformational activities after the migration has completed is a common requirement. However, once the migration services have been successfully transitioned to Business as Usual (BAU), the Data Centre Migration programme should wind-down. Any post-migration activities should be managed not as a programme extension but as a separate project.

The potential added complexity and extended timescales that transformation activities bring should not be underestimated.
Dividing the ‘Job’ into Chunks
Detailed and accurate planning is key to the success of any project, and Data Centre Migration is no different. Without effective management, control and strategic direction, any complex programme can become troubled very quickly.

As with all complex tasks, the easiest way to tackle it is to break it down into smaller, manageable pieces, commonly called ‘chunking down,’ a well-recognized technique.

One chunking down technique is the creation of a Work Breakdown Structure (WBS). The WBS takes the abstract Data Centre Migration method and creates a number of discrete, inter-related work packages that together deliver the entire programme.

Work Breakdown Structure
An example Work Breakdown Structure is provided below. As can be seen, it divides the programme into work packages and its scope addresses source and target data centres, sequenced in a classic lifecycle way.

Each Work Package is further described in detail, including objectives, scope, milestones, deliverables, RAID analysis (see next section) and resources. Together, the consolidated work packages define the end-to-end programme, and it is important that these work packages can be managed in a top-down way. Formal top-down reviews of the work packages’ content make sure there is consistency across the programme, with gaps and overlaps resolved.

Swimlane diagrams also provide end-to-end traceability of project actions, to enable the programme managers to tease out and identify the work packages and deliverables that sit on the critical path.
Challenges and Revelations of Discovery

Often the most underestimated and over-looked activity within a Data Centre Migration programme is the discovery process. When faced with the design and planning challenge of a complex data centre migration project, it is vital to work from a common, shared base of information.

Even when this is available, such information is often fragmented, incomplete and siloed across the business and IT organisation. Additionally, IT services are often delivered by several organisations, and outsourced to managed service providers and vendors. The data required to plan and design a Data Centre Migration could be held by many different agencies, each with its own way of working, individual contractual arrangements, data sources and standards, and different Service Level obligations.

A single version of the truth should be the goal for baseline data, and should encompass inventories of hardware and software, application information, interfaces, middleware, shared services, support and the organisations responsible for each business and technical area. This data needs to be discovered, organised, mined, sifted, reported on and assessed for completeness. The objective is to create a cohesive set of management information that can be relied on for planning and for quantifying the risks of gaps in the data.

The true test of value of this information should be its ‘consumability’, determined by the teams who actually use the information wherever they are in the lifecycle – designers, infrastructure builders, testers, migration planners and eventually the delivery organisation.

Discovery Data Model

The Discovery Data Model provides a focal point for consistency and completeness across all of the components related to Discovery Baseline Data.

The purpose of the Discovery Data Model is to:

- Regulate the collection from the data sources.
- Organise the data into mandatory and relevant classifications.
- Identify the applicable import mechanisms of data sources whether automated or by manual entry.
- Drive the standards and formats for presented data sources.
- Identify the requirements for ongoing maintenance processes throughout the migration period.
- Provide the yardstick for data quality reporting and management information.

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The business benefits of discovery relate directly to:

- Developing the plan and estimating the size of the job.
- Developing the design and specifying the target technology and build approach.
- Applying the method, and remaining consistent throughout.

Discovering and establishing the planning baseline is a difficult subject in its own right, and needs to be addressed as a vital part of the programme management system. Discovery also needs to be initiated and supported by a dedicated set of tools and techniques, which are integrated into the overall Data Centre Migration Methodology.
Using Discovery to Drive Planning

Once a trusted discovery baseline has been established, discovery management information (MI) can be extracted and detailed planning can commence.

The diagram shows some of the potential inputs into migration planning. Some inputs will act as enablers, such as migration patterns, while others will act as constraints, such as budgets and deadlines.

Designing and Building The Infrastructure

Design and build of the infrastructure typically falls into three categories:

- **Migration Facility** – this is a temporary ‘service’ that enables operating systems, applications and data to be migrated from one location to another. Typically, this would consist of dedicated high speed network connections, staging storage, and data transfer technologies, tools and processes. This service would be required during the build, rehearsal and migration phases of the programme and is typically decommissioned when the programme has completed.
- **Server Infrastructure** – this provides all physical hardware in the target Data Centre(s). Typically, this would consist of procurement, installation and infrastructure verification testing (IVT).
- **Shared Services** – this provides all Infrastructure, Systems Management and Business Shared Services. Typically these would include components such as databases, management tools, and security and authentication functions.

Rehearsals and Migration Events

Just like any major performance, rehearsals are key to the overall success. Prior to a rehearsal, preparatory work should be completed and fully documented procedures and work-instructions, known as Run Books, should have be fully developed.

Run Books provide step-by-step instructions, and rehearsals provide the opportunity to shake down the Run Books and amend them with lessons learned. Three or four rehearsals will likely be required, and these should operate as full, end-to-end migrations.

Rehearsals and migrations are typically difficult to resource, with 24-hour cover required, often in three shifts from close of business on a Friday until the rehearsal or event is completed early on Monday morning. Post-migration support will also be required immediately after migration events.

Drive planning through combining Discovery with Project Planning

Often, hidden programme constraints exist within the business. These could include business critical availability periods, other major business or application change programmes and imposed periods of change freeze. Therefore, it is imperative that the business is fully engaged in a Data Centre Migration programme. Data Centre Migrations are not technical IT programmes that can be planned and executed in isolation of the business.

Ultimately, the intention is to apply a number of techniques to the available information in order to derive a series of migration waves. Migration waves represent a logical grouping of applications or services that can be migrated in the same migration event. Migration events typically occur during a scheduled outage over a weekend.

The entire Data Centre Migration programme should be executed in a number of thoroughly planned and well-executed migration waves. In some cases, a single ‘big bang’ migration – a single wave – could be the most expedient and least risky option.
Where Are The ‘Gotchas’?

Learning from years of delivering successful Data Centre Migration programmes, the IBM team is able to identify a number of common ‘gotchas,’ as a demonstration of how experience is critical to success.

As technical issues are bound to arise, it is imperative that the Programme’s Technical Design Authority (TDA) is established early in the programme and tasked with investigating and making recommendations for the resolution of technical decisions. The ‘gotchas’ are typically in the areas of:

- Poor programme management.
- Inadequate baseline discovery.
- Software licensing and compliance.
- IP addressing and hardcoded IP addresses.
- Too much parallel change.
- Uncontrolled change and scope creep.
- End-user access and security.
- Confusing a Data Centre Migration programme with a full infrastructure transformation programme.

Change introduces complexity and risk to the programme. Experience shows that Data Centre Migration programmes tend to fail when they attempt to fix other business and technical issues at the same time.

Why IBM?

As one of the leading technology companies in the world, IBM has a wealth of experience in managing, planning and performing Data Centre Migrations, gleaned from actual projects with many clients worldwide. IBM is able to offer an end-to-end single integrated method and approach, delivered by highly experienced Programme Managers, Project Managers, Architects and Subject Matters Experts.

- No two Data Centre Migrations are the same.
- All Data Centre Migrations are inherently challenging.
- All Data Centre Migrations introduce business risk.

IBM has vast experience in completing complex projects successfully, based on established discovery methodologies and a hard-nosed attitude to delivery on the key objectives.

Additionally, IBM offers worldwide resources, covering hardware, software, services and support, alongside the IBM consulting teams whose focus is on managing risk and delivering business success, enabled by technology - which is where we started this paper.

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For more information
To learn more about IBM Global Technology Services, contact your IBM sales representative or visit:
ibm.com/

About the author
Rob Dagley, CTO, Global Technology Services, IBM, has 26 years’ experience in IT and acts as the Chief Technology Officer in the infrastructure services division of IBM Global Technology Services, and as an Executive Consultant working with many of IBM’s largest clients on a daily basis.

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