

# All Transformation Starts Here

How to Provide a Complete and Accurate Foundation  
with Discovery and Dependency Mapping



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## Executive Summary

Digital transformation is a reality for almost every business today. From migrating to the cloud to data center consolidation to the complexities of M&A, the modern enterprise must transform to remain current and competitive.

The process of cloud transformation, however, poses numerous challenges. A lack of understanding of its phases and required tools can be a significant barrier to success, leading to schedule slips, budget overruns, compliance violations, and other disruptions. Further, IT teams often lose sight of the end goal: becoming more service aware to the lines of business, not just updating technology.

In this white paper, we'll examine a key ingredient to the success of any transformation initiative: portfolio discovery and planning.

**Portfolio discovery and planning** provides IT teams with the visibility and insight necessary to identify and migrate the right components, at the right time, in the right way. It builds the foundation for cloud transformation by informing every stage of the process, from the business plan to application mapping to migration, validation, operations, and beyond. With the right discovery strategy, you can set up your cloud environment for success through every step of its lifecycle – pre, during, and post – of your transformation project.



## NOT IF, BUT WHEN: MAPPING THE MOVE TO THE CLOUD

Cloud transformation needs to be treated as a top-down, company-wide, cross-functional initiative with cross-team collaboration. It is likely that at your organization the cloud transformation process has already begun, from the line-of-business bringing in SaaS apps to IT testing the waters for larger-scale migration projects. If so, you're not alone.

The following statistics demonstrate that the move to the cloud is irreversible, fully in flight with no signs of slowing down:

- Cloud computing spend has been growing at 4.5 times the rate of IT spending since 2009, and is expected to be six times more than that of IT spending from 2015 through 2020.
- Worldwide spending on public cloud computing will increase from \$67B in 2015 to \$162B in 2020, attaining a 19% CAGR.
- More than \$1.3 trillion in IT spending will be directly or indirectly affected by the shift to cloud by 2022.

The momentum of the rapid shift to cloud computing is obvious, but the “how” isn’t as straightforward. While a startup may enjoy the luxury of creating a cloud environment from scratch, most enterprises face a more daunting brownfield environment laden with legacy applications and a large, complex footprint. For these organizations, migration isn’t as simple as spinning up an instance or just “ripping and replacing.” It requires a strategy and the tools to get it done right.

## 5 PHASES OF A SUCCESSFUL CLOUD TRANSFORMATION

Migrating to the cloud on time, on budget, and with the desired results doesn’t happen automatically. It requires a comprehensive, multi-phase plan that includes checkpoints for operational adjustments. Additionally, this type of initiative typically falls within the scope of a larger transformation effort rather than occurring in isolation, making careful planning and strategic execution especially important.

Large-scale migrations that meet or exceed expectations commonly follow a five-phase approach:



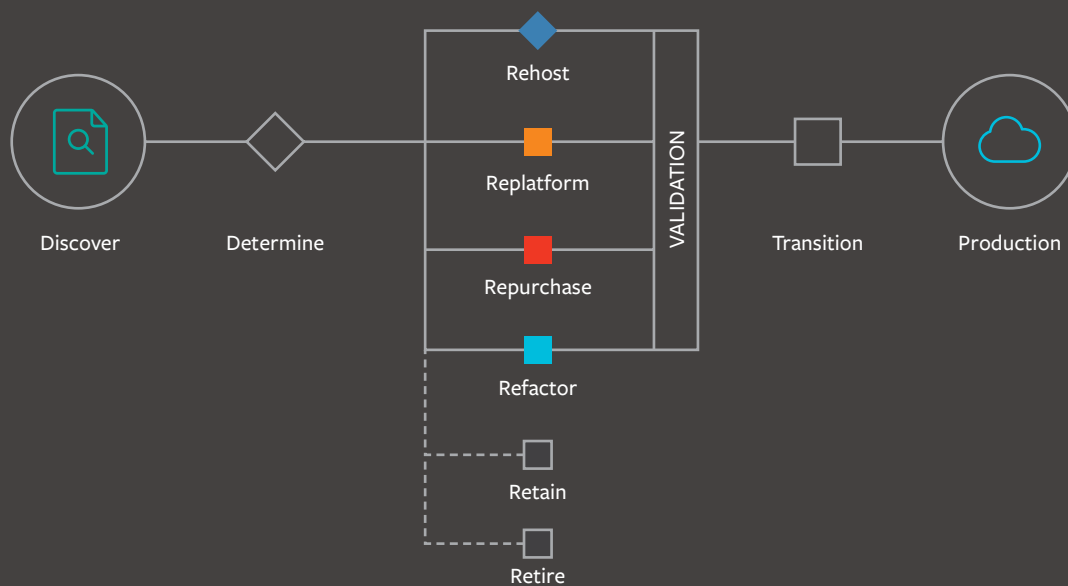
- **Phase 1: Migration Preparation and Business Planning**  
Crystalize your objectives and build your business case. Factor in the age and architecture of your existing applications and constraints. Review any “lessons learned” from earlier forays into the cloud.
- **Phase 2: Portfolio Discovery and Planning**  
Gain an in-depth understanding of your IT portfolio, the dependencies between applications, and based on this knowledge, the type of migration strategies that you will need to meet your business objectives.
- **Phases 3 and 4: Designing, Migrating, and Validating Applications**  
Shift from the portfolio level to designing, migrating, and validating individual applications. Start with your least complicated use cases to build foundational knowledge and organizational support.
- **Phase 5: Operate**  
Iterate on your new foundation, turn off old systems, and refine your new operating model. Review and revise your plans around people, processes, and technology to create a migration model that constantly improves.

## SPOTLIGHT – PHASE 2: PORTFOLIO DISCOVERY AND PLANNING

Each of the stages defined above plays a critical role in the success of a cloud transformation project. Let's take a closer look at phase 2: portfolio discovery and planning.

The need for thorough discovery and dependency mapping is no surprise to IT teams tasked with the shift to cloud; you need to know what you have in order to move it effectively. A comprehensive discovery phase influences the process up and down the ladder and sets the tone for the migration. It feeds back into phase 1 of the migration process, providing the information required to build a data-driven business case and migration plan, as well as feeding into the subsequent phases—informing the approach for how to migrate and operate your infrastructure most efficiently at the portfolio and application levels. Cost visibility and modeling are also critical, allowing alignment with the commercial model of public cloud providers like AWS, Azure, or Google Cloud.

In its latter role, sophisticated discovery data allows IT to make informed decisions about the most appropriate strategy for each application, such as re-hosting (a.k.a. “lift-and-shift”), re-platforming (such as switching middleware), repurchasing (such as using PaaS or SaaS instead), refactoring, retaining on-premises, or even retiring. With in-depth knowledge about IT assets across your infrastructure—from the data center to public, private, and hybrid clouds—you can better decide among your various migration options.



Finally, with proper documentation of the source environment including detailed dependencies, architects and their teams gain the data they need to design the cloud-based applications to help operations teams sequence the migration.

## TYPICAL CHALLENGES OF PORTFOLIO DISCOVERY

Although portfolio discovery is a critical element of successful cloud transformation, this capability remains underdeveloped in many organizations. The resulting difficulties fall into three broad areas: people, processes, and tools.

### People

A shortage of cloud skill sets can have a major impact on migration success. Given the fast pace and competing demands of modern IT, it can be hard to pin down subject-matter experts to perform in-depth analysis of existing application deployments. When such analyses are performed, the manual processes typically used often result in errors such as incorrect or incomplete output. Application owners and infrastructure teams work in silos, leading to gaps in skills and misunderstandings. In the absence of a more formal, rational process, portfolio knowledge tends to be tribal rather than institutional, making it vulnerable to loss through staff turnover.

## Processes

Migration goals are often not correctly documented, for example in terms of the scale of change, data quality, etc., making it difficult to guide, measure, and assess the success of the effort. The lack of an application portfolio can make it impossible to establish a coherent overarching strategy, whether for mass migration or for an application-by-application or defined-application-batch approach. Without establishing each application's dependencies with other processes, organizations run into challenges with software licensing (license models and ownership for migrated applications), compliance (requirements may be similar or different as applications move to the cloud), and service management (change windows and procedures, incident response, and so on).

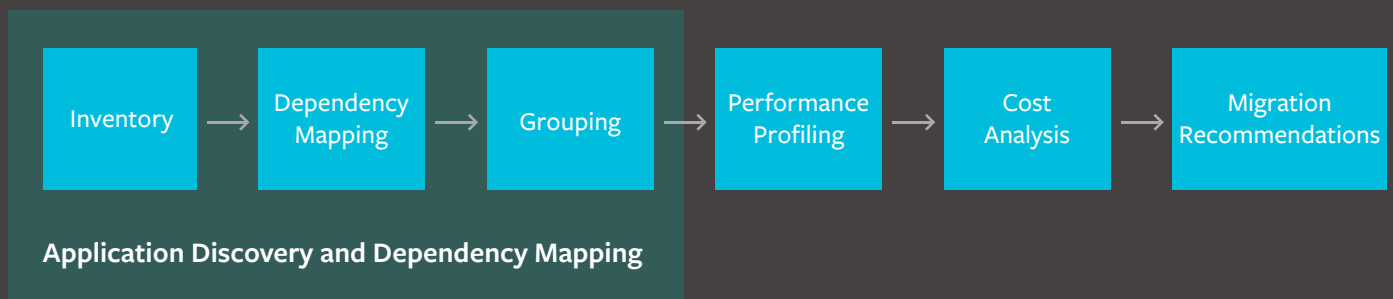
## Tools

Inventory tools generally fail to capture or accurately represent dependency information, especially when they rely only on observed communications, and are unable to reflect the business context of infrastructure components. Given the fast pace of change in modern IT environments, these tools are typically neither scalable enough nor fast enough to guarantee the accuracy of their data at the moment of migration. Solutions limited to point-in-time discovery are unable to fulfill the requirements for ongoing post-migration management. Agent-based solutions are heavier to deploy and their knowledge is limited to the component on which they are deployed, though some organizations favor this approach because they feel more secure running everything in their own environment before opening up to the right cloud platform. On a fundamental level, to leverage the information and investments already present in the organization as well as to enrich the data available to optimize migration, a discovery tool must integrate or at least co-exist well with existing application performance management (APM) and configuration management database (CMDB) tools in the environment.

## ANATOMY OF AN ENTERPRISE-GRADE DISCOVERY SOLUTION

The right tool can help you avoid these pitfalls and actively contribute to the success of your cloud transformation. What does that look like for phase 2 of your migration project: portfolio discovery and planning?

As the name of the phase suggests, this step in the process can actually be broken down into two parts: discovery and planning.



Discovery solutions play in the first half of the process. The most basic solutions begin and end by taking an inventory of your IT assets. More sophisticated tools continue by identifying dependencies and grouping components together via application maps to understand the various “buckets” within your infrastructure.

Planning, the second half of the process, requires an understanding how your applications perform and what they cost in order to provide a recommendation on what should be migrated and how.

## HOW TO CHOOSE THE RIGHT DISCOVERY TOOL FOR YOUR CLOUD TRANSFORMATION

Let's look at the required functionality for each of the three steps within the discovery portion of phase 2. In other words, what does your discovery tool need to do to successfully support your cloud transformation?

### Step 1: Inventory

The inventory aspect of discovery and dependency mapping is theoretically the “easy part”—except even at this stage, many tools lack the breadth and depth to provide the visibility you need. To achieve a comprehensive and accurate inventory of your IT infrastructure, your discovery solution must cover:

- Servers: physical and virtual, hypervisor, OS, CPU, RAM, disk
- Software: all software assets, including end of life, plus databases and websites
- Network devices: switches, load balancers, etc.
- Storage: devices and their logical partitioning

A complete application inventory is essential as well, of course. Because applications in the cloud can choose to use elastic resources that auto-scale, mapping performance objectives to resources and their utilization makes it possible to optimize resources while meeting performance requirements. For this reason, utilization metrics for each of the components listed above must be understood on an application-by-application basis.

A complete inventory sets up the scope of what needs to be understood and managed across your migration project. But it's important not to stop there.

### Step 2: Dependency Mapping

To fuel your cloud transformation project, you need to understand not only what you have, but how it all works together. Documenting these relationships enables you to identify migration sequences, ensure minimal downtime, guarantee comprehensive test plans, and map redundancy and availability, among other benefits.

Key dependency data provided by your discovery solution should include:

- Software dependencies—e.g. web, application, and database tiers, and clustered software configurations
- Containers and microservices
- Server-to-storage relationships to understand how the data flows
- Hybrid application deployments
- Host-to-edge network relationships
- Hardware and software load balancing
- Disaster recovery setups

This list may be longer depending on the complexity of your infrastructure. Dependency data at scale is particularly critical at the enterprise level, where clarity into the many interconnections can make or break the success of your cloud transformation.

### Step 3: Grouping

Now that you know what you have and how it works together, you need to be able to visualize and consume that information. This is where application mapping comes in. Your discovery solution should be able to easily group components into application maps or models that articulate dependencies, so you can:

- Ensure that business impact is duly assessed
- Support business continuity objectives
- Make more informed decisions continually as to what can and cannot be migrated

Grouping also helps with the essential process of evaluating the workloads and applications that are candidates for moving to the public cloud. When assessing the readiness for running applications in the public cloud, all the options need to be considered, from lift-and-shift to re-architecting the solution into a more cloud friendly form. The considerations must be measured against the goals of your cloud strategy and potential business risk incurred. The key is to examine all applications and workloads under a consistent framework—not on an ad hoc basis.



## Re-host

With this “lift-and-shift” approach, an application is redeployed to a cloud-based platform without modification of its code. This can be a good way to achieve rapid scale to meet a business need. However, established applications that were not designed for efficient use of infrastructure will most likely cost more to run in a public cloud. Because of this, a simulated migration is recommended for re-hosting applications to prevent cost surprises.

## Refactor/Re-architect

Refactoring/re-architecting involves modifying the application, application framework, or runtime environment. This can include making application code or configuration changes to attain a tangible benefit from transforming the applications to be more cloud native without making major changes to the core architecture of the applications—for example, swapping out a database server for a cloud service equivalent to reduce the amount of time you spend managing database instances.

## Rebuild

For applications written in-house, redesigning and rebuilding a cloud-native application on a provider’s PaaS may be worth the investment. This can be the right choice for applications that are business-critical, but not designed to take advantage of the services offered on a cloud platform. In addition, non x86-based applications such as mainframe and midrange applications that rely on operating systems other than Linux and Windows will need to be rewritten. This is the most expensive option, but the investment to rewrite an application may be worthwhile if your goal is to boost agility, improve performance, reduce costs, and improve business continuity.

## Replace/Repurchase

For commercial, on-premises applications, replacement with a SaaS version from the same vendor may be the best solution. Even if the preference is to run on-premises, many ISVs have upgraded their applications to run better on cloud platforms, and achieving your goals could be a matter of upgrading the application to a more current version.

## Retain

Sometimes, it makes good business sense to keep some applications on-premises for reasons of cost, security, or compliance. Additionally, not every application can benefit from a cloud platform; those with static workloads and no need for agility, and currently running on stable systems, are good candidates to retain on-premises.

## Retire

The application evaluation phase also provides an opportunity to identify applications and workloads that are no longer needed or lack the business justification to warrant the ongoing cost to support them. This is a great time to rationalize your portfolio.

Grouping is not a one-size-fits-all activity. Your tool should be able to derive an application model from any piece of information about that component for optimal flexibility and time savings. It should also be customized to your organization with application maps built for business value. This includes the ability to define rules, and to query and visualize the discovery and dependency data in the way that best enables your stakeholders to understand and act on the information.

## Steps 4, 5, and 6

While discovery solutions don’t explicitly address the second half of the Portfolio Discovery and Planning Phase (planning), they ideally feed data into steps 4-6 so that other solutions can more effectively deliver their analysis and recommendations.

The number one requirement here is the mature use of exports and APIs. Once you’ve grouped your applications and gained visibility into their dependencies, you can export that information and overlay it with cost and performance data. This adds another layer to your analysis for deeper insight into the overall state of your environment.

## Post-migration

Finally, consider your post-migration needs when selecting a discovery solution. Discovery tools not only provide valuable insight before and during a move to the cloud, they also play a key role in iteratively optimizing and improving your ongoing operations.

Consistent, clear visibility is especially imperative in today’s multi-cloud environments. As evidenced by the six strategies for cloud migration listed earlier, you can take different approaches for different applications and services. The completion of all cloud migration projects does not result in everything-in-the- cloud; some components may remain in the data center, some may shift to a hybrid approach, and even those workloads that do move to cloud will do so in a variety of ways.



Comprehensive discovery and dependency mapping ensures that the new way a service or application is being delivered is optimal. It benefits operations teams by providing always up-to-date application model documentation as well as application support around incident, problem, and change management. It improves service-aware monitoring, capacity optimization, and automation capabilities.

Finally, thorough, ongoing discovery and dependency mapping can be used as a source of information to validate efforts and results across IT, such as:

- Developing security models – network access, component versions, subnets, etc.
- Creating performance and availability models – load-balancing, elasticity, resilience, monitoring
- Ongoing management – configuration management, continuous delivery, etc.

For security, with automated discovery and dependency mapping, you can formulate and execute a plan to resolve known vulnerabilities with the least amount of risk. According to WhiteHat Security, 80% of attacks go after a known vulnerability. Discovery solutions not only ensure that you're aware of all risks, but that you're armed with the information you need to address them.

360-degree visibility enables faster response to security threats as well. A comprehensive discovery tool helps you evaluate business impact more quickly and conclusively, then respond to critical events with reduced risk of incorrect assignment and assessment. That means you can proactively identify trends, abnormalities, and security vulnerabilities, and automatically remediate them before they impact the business.

### **BMC SOLUTION FOR SUPPORTING CLOUD TRANSFORMATION AT SCALE**

One discovery and dependency mapping tool meets all the criteria necessary to support the scale and depth of an enterprise cloud migration project, such as the move to cloud: **BMC Helix Discovery**.

BMC Helix Discovery automates asset discovery and dependency mapping to better gain visibility into management of digital services in cloud and on-premises environments. It provides the trusted foundation for building application maps that enable digital transformation to be more aware, secure, and cost-transparent.

Each scan delves into the information and dependencies for all software, hardware, network, storage, and cloud services, providing IT with the context needed to create an application map from any piece of information about it. This allows cloud migration projects to rely on robust inventory data, dependency maps, and automatically updated component groupings.

These same capabilities also support additional use cases beyond cloud migration. Discovery and dependency mapping, in fact, is the foundation for any type of transformation. Whether you're navigating mergers and acquisitions or undertaking data center consolidation, you need a baseline to make informed decisions. Once those decisions are executed and you consolidate or add resources, BMC Helix Discovery continues to add value by mapping your new environment, creating an always-accurate blueprint for future activities.

No matter what your objective, from cloud migration to M&A, BMC Helix Discovery enables streamlined operations by offering multi-cloud dependency maps to ITSM, ITOM, and SecOps processes. It models all of your dependencies in minutes, serves them up from a single pane of glass, and offers **an average of 470% ROI in the first five years, including a typical payback period of just eight months**.

### **What makes BMC Helix Discovery different?**

- **Start anywhere application mapping.** Unlike other discovery solutions, which dictate a specific starting point for application maps that often leads to gaps and misrepresentations, BMC Helix Discovery discovers assets from every angle: top down, bottom up, and/or middle out. It then visualizes those results with application maps created from any starting point. Whether your environment is heavily clustered, highly segmented, has shared DB, web, and middleware software, or applications spanning multiple cloud regions, we can understand it and visualize it.
- **Continuous content updates.** For 15 years, BMC Helix Discovery has provided the broadest data center and cloud coverage, currently detecting 4,000+ types of assets and 1,000+ types of relationships. Its Technology Knowledge Update (TKU) content is updated monthly, providing extensive documentation of every supported technology including mainframe, servers, storage systems, network devices, software, hardware, and new technologies like containers and multi-cloud services.
- **Cloud-native service offering.** BMC Helix Discovery is now available as a cloud-native service, making it easy to size and stand up large appliances, configure clusters, upgrade, apply TKUs, and backup and maintain your data store.

- **Open and secure.** As a critical part of your overall infrastructure, BMC Helix Discovery offers RESTful APIs that enable other systems to take advantage of its rich data. It also enhances security by integrating with enterprise credential vaults like CyberArk. And its Discovery-as-Code framework lets you plug Helix Discovery right into your CI/CD pipelines.
- **User-friendly.** Customers consistently rave about how easy BMC Helix Discovery is to deploy and use. To browse customer feedback and case studies, visit our [TechValidate case study portal](#).

## CONCLUSION

Large-scale transformation projects either already are or will become a top priority for most organizations in 2019 and beyond. Ensure that your migration project is fueled by the data and analysis necessary to make the move a success—from implementation through ongoing operations. Providing comprehensive visibility, scale, and insight to accelerate and optimize every part of the cloud lifecycle, a discovery and dependency mapping tool like BMC Helix Discovery is an essential element of effective transformation for the digital enterprise.



## FOR MORE INFORMATION

To learn more about BMC Helix Discovery, visit  
[bmc.com/trydiscovery](https://bmc.com/trydiscovery).

### About BMC

BMC helps customers run and reinvent their businesses with open, scalable, and modular solutions to complex IT problems. Bringing both unmatched experience in optimization and limitless passion for innovation to technologies from mainframe to mobile to cloud and beyond, BMC helps more than 10,000 customers worldwide reinvent, grow, and build for the future success of their enterprises.

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