

All Transformation Starts Here

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

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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 mergers and acquisitions (M&A,) the modern enterprise must transform its processes to remain current and competitive, and evolve to become an **Autonomous Digital Enterprise** that embraces intelligent, tech-enabled systems across every facet of the organization.

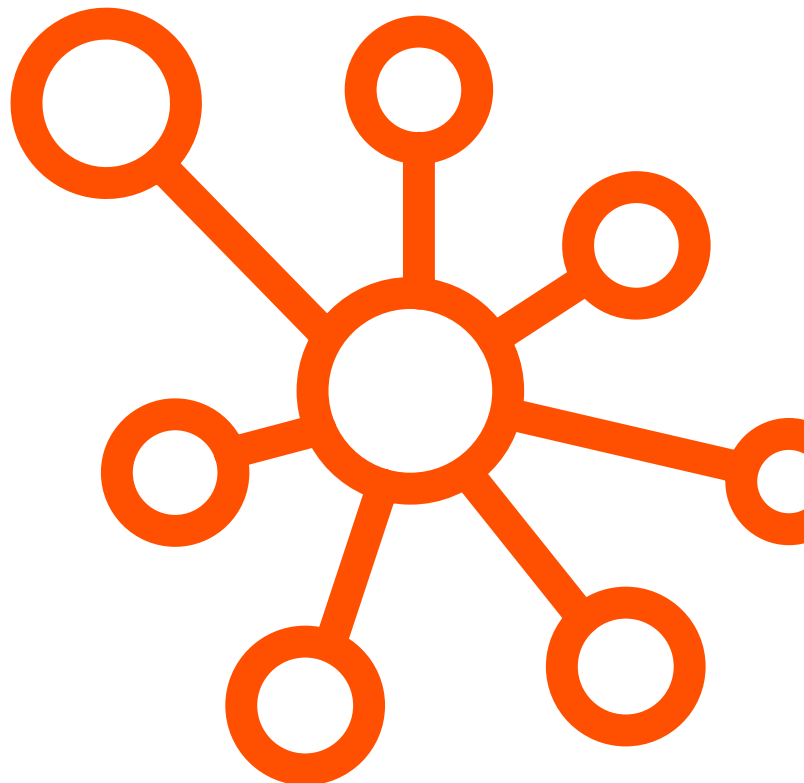
The process of cloud transformation, however, poses numerous challenges, including:

- Lack of visibility into applications and dependencies
- Insufficient migration planning
- Purchasing too much capacity
- Incurring excess costs
- Managing concerns about security, sub-optimal performance, and availability
- Inadequate IT service management (ITSM) integration

As a result, many application migrations and deployments have been unsuccessful, causing some IT leaders to declare they have failed to yield benefits from cloud computing.

In this white paper, we'll examine a key ingredient to the success of any transformation initiative: portfolio discovery and planning, which provides IT teams with the visibility and insight necessary to identify and migrate the right components at the right time and in the right way.

A full, up-front understanding of your environment builds the foundation for cloud transformation by informing every stage of the process, from the business plan to application modeling to migration, validation, operations, and beyond. With the right discovery strategy, you can set up your cloud environment for success before, during, and after your transformation project.



Not If, but When: Mapping the Move to the Cloud

Cloud transformation should be treated as a top-down, company-wide, cross-functional initiative with cross-team collaboration. It is likely that your organization has already initiated the cloud transformation process, from the line of business bringing in software-as-a-service (SaaS) applications, to IT testing the waters for larger-scale migration projects, to expanding and optimizing your hybrid cloud implementation. If so, you're not alone.

According to a recent **Deloitte** report, the move to the cloud is irreversible, with no signs of slowing down.

- More than 90 percent of global enterprises will rely on the hybrid cloud by 2022.

- CIOs expect on-premises workloads to decrease 41 percent from 2019 to 2021, while the public cloud portion of total workload is expected to grow from 23 percent to 35 percent in the same timeframe.
- In 2020, migrating to the public cloud and/or expanding private cloud was the top IT spending driver.
- 97 percent of IT managers plan to distribute workloads across two or more clouds to maximize resilience, meet regulatory and compliance requirements, and leverage best-of-breed services from different providers.

The momentum of the 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 environment laden with legacy applications and a large, complex footprint. For these organizations, migration isn’t as simple as spinning up existing infrastructure components to the cloud or just “ripping and replacing” them.



Four Phases of a Successful Cloud Transformation

Migrating to the cloud on time, on budget, and with the desired results doesn't happen automatically. The entire process 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, which makes careful planning and strategic execution especially important.

Large-scale migrations that meet or exceed expectations commonly follow a four-phased 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**

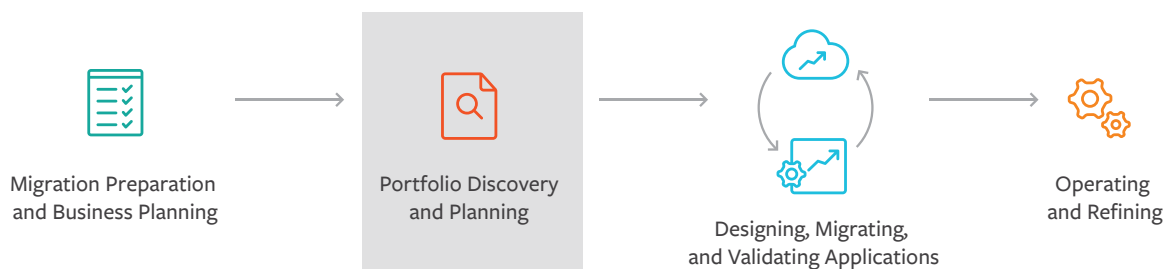
Gain an in-depth understanding of your IT portfolio, the dependencies between applications, and the type of migration strategies required to meet your business objectives.

- **Phase 3: 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 4: Operating and refining**

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.



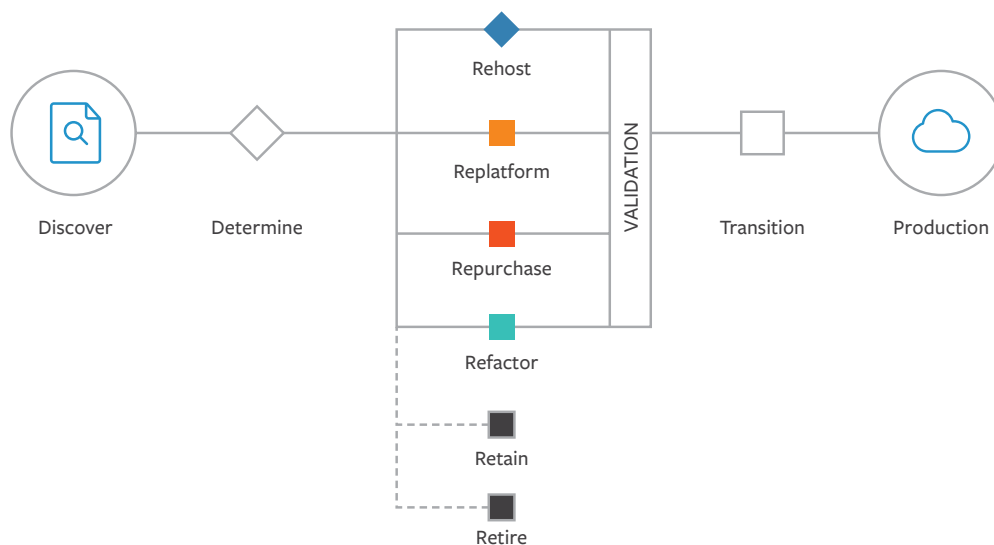
Spotlight – Phase 2: Portfolio Discovery and Planning

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 modeling is no surprise to IT teams managing the shift to cloud; you need to know what you have in order to move it effectively. A comprehensive discovery phase provides the information required to build a data-driven business case and migration plan so you can migrate and operate your infrastructure most efficiently at the portfolio and application levels. Cost visibility and modeling are also critical, allowing alignment with commercial public cloud providers such as Amazon Web Services (AWS), Microsoft Azure, or Google Cloud.

For public clouds, 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 (switching middleware), repurchasing (platform as a service (PaaS) or SaaS), refactoring, retaining on-premises, or even retiring. With in-depth knowledge about IT assets across your data center and private, public, and hybrid cloud infrastructure, you can choose the best migration for your environment.

With proper source environment documentation that includes detailed dependencies, architects and their teams gain the data they need to design cloud-based applications that will 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 challenging to pin down subject matter experts to perform in-depth analysis of existing application deployments. When such analyses are performed manually, they often result in errors such as incorrect or incomplete output. When application owners and infrastructure teams work in silos, there are also gaps in skillsets. In the absence of a more formal, rational process, portfolio knowledge tends to be tribal rather than institutional, making it vulnerable to a loss of knowledge through staff turnover.



Processes

Migration goals such as the scale of change and data quality are often not correctly documented, making them difficult to guide, measure, and assess their success. The lack of an application portfolio can make it impossible to establish a coherent overarching strategy, whether for mass migration, application-by-application, or defined-application-batch approach. Without establishing each application's dependencies upon other processes, organizations can 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 don't reflect the business context of infrastructure components. They're also typically neither scalable nor fast enough to guarantee the accuracy of their data at the moment of migration in dynamic IT environments.

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 components on which they are deployed. 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 existing information and investments, and enrich available data to optimize migration, a discovery tool must integrate—or at least co-exist well with—existing application performance management (APM), network monitoring, and configuration management database (CMDB) tools in the environment.

Anatomy of an Enterprise-Grade Discovery Solution

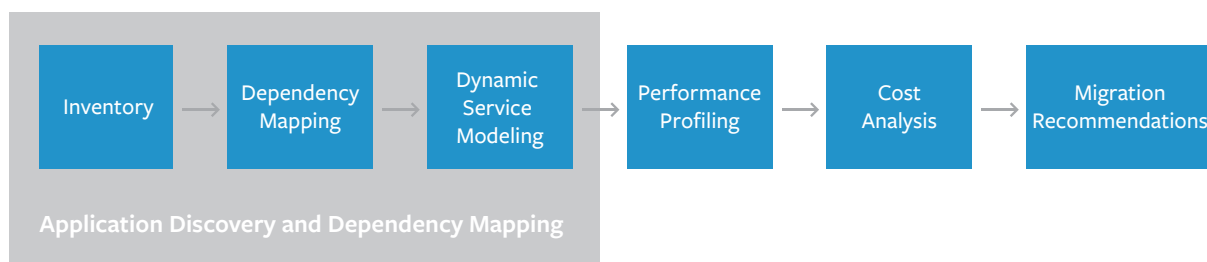
The right tool can help you avoid these pitfalls and actively contribute to the success of your cloud transformation. What does that look like for Phase 2 of your migration project: Portfolio discovery and planning?

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 models to understand the various “buckets” within your infrastructure. This enables IT

teams to support an ever-growing array of applications, services, data sources, and learning models that are deployed on various platforms, including on-premises, hybrid, and multi-cloud environments.

Planning, the second half of the process, requires understanding how your applications perform and what they cost in order to recommend what should be migrated and how. This step relies on a discovery solution that **automatically, continuously determines how these applications map to infrastructure and services. In cloud-based implementations, applications spin containers up and down dynamically. As a result, service models must convey real-time information that reflects this behavior.**



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 modeling 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
- Cloud providers and services
- Converged infrastructure
- Containers and orchestration tools

A complete application inventory is also essential. Applications in the cloud can choose to use elastic resources that auto-scale, mapping performance objectives to resources and their utilization, which makes it possible to optimize resources and meet 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 establishes 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 modeling

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.

Your discovery solution should include the following dependency data:

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

This list may be longer for your organization, depending on the complexity of your infrastructure. Dependency data at scale is particularly critical at the enterprise level, where clarity into the many interconnections is essential to a successful cloud transformation.

Step 3: Dynamic service modeling

Given the dynamic nature of cloud resource management and scheduling, development and operations teams need automatic, up-to-date asset and dependency modeling that reflects the continually changing configurations produced by hybrid and cloud-based solutions.

With the faster pace of IT, businesses require immediate access to the latest information about assets and their attributes and relationships. The ideal picture includes enriched application and network information from trusted, third-party source providers, such as APM tools or network management solutions.

Dynamic service models work as the single source of truth by automatically mapping infrastructure to applications and services at any time. This ability to perform deep discovery and intelligent integrations helps IT teams evaluate workloads and applications that are candidates for moving to the public cloud.

Migration Approaches

By understanding and dynamically modeling assets and their dependencies, teams are able to proceed with a migration approach that maintains business continuity and meets objectives, while giving IT teams the information they need to determine which applications need to be re-hosted, transformed or consolidated.

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 for a specific benefit, i.e., making application code or configuration changes such as transforming the applications to be more cloud native without making major changes to their core architecture. For example, you could swap out a database server for a cloud-hosted 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 cloud-hosted services. In addition, mainframe and mid-range 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. Achieving your goals could be a matter of upgrading the application to a more current version.

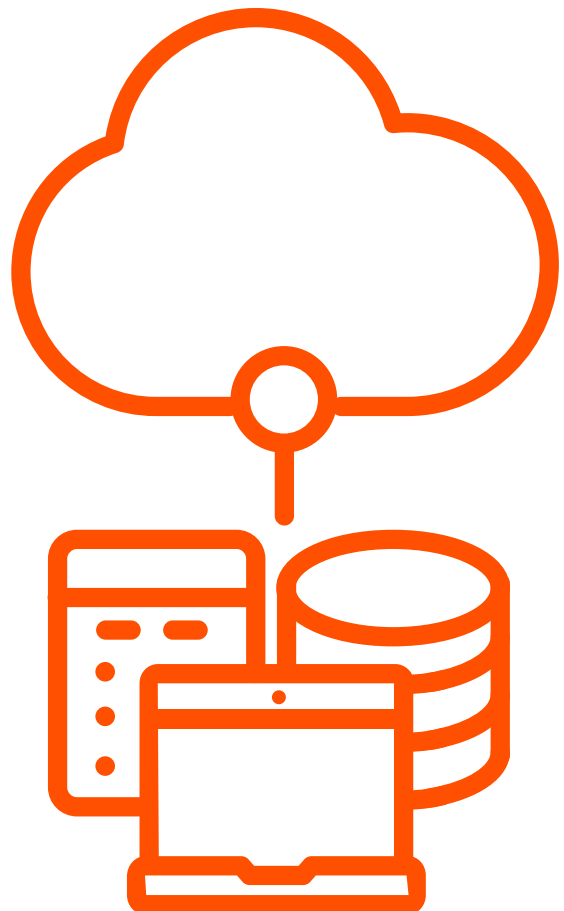
Retain

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 or that are 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.

Your discovery solution 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

The ideal discovery solution feeds data into Steps 4 through 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 identified 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 modeling 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 modeling can be used as a source of information to validate efforts and results across IT, such as:

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

For security, with automated discovery and dependency modeling, you can formulate and execute a plan to resolve known vulnerabilities with the least amount of risk. According to Check Point Research, in the first six months of 2020, 80% of attacks used vulnerabilities that were at least two years old.* Effective 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 modeling 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 is a SaaS-based, cloud-native discovery and dependency modeling solution that provides instant visibility into hardware, software, and service dependencies across multi-cloud, hybrid, and on-premises environments. Each scan discovers information and dependencies for all software, hardware, network, storage, hyperconverged infrastructure, and cloud services, which provides organizations with the context they need to create an application map from any piece of information about it. This allows cloud migration projects to leverage robust inventory data, dependency information, and dynamic service models.

These same capabilities also support additional use cases beyond cloud migration since discovery and dependency modeling is the foundation for any type of transformation. Whether you're navigating M&As or undertaking a 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 modeling your new environment, creating an always-accurate blueprint for future activities.

In addition, discovery and dependency data generated from BMC Helix Discovery can be used as input for IT Operations Management (ITOM),

IT Service Management (ITSM), and advanced analytics and machine learning processes such as anomaly detection, probable cause analysis, and faster incident resolution.

BMC Helix Discovery also acts as the primary data source for capacity planning, security, and compliance. Its ability to establish how elements connect and their dependencies gives IT operations teams a complete, context-based inventory from any point in the infrastructure. It models all of your dependencies in minutes, serves them up from a single pane of glass, and delivers an average 549 percent ROI in the first five years, including a typical payback period of just five months.*



*"The Business Value of BMC Helix Discovery," International Data Corporation (IDC), Sept 2019

What makes BMC Helix Discovery different?

Agentless, lightweight, and scalable: BMC Helix Discovery is a ready-to-run, SaaS-based application. All credentials and firewall rules are local to the customer and under the customer's complete control, which enables rapid onboarding and minimal support.

Unlimited depth and breadth: Perform rapid asset discovery and dependency mapping of any number of devices and applications across complex cloud and hybrid environments. The intuitive, optimized user interface provides direct control and complete visibility to discovered data via a high-performance, graph-based database.

Dynamic service modeling: Generate detailed datasets and topologies so IT teams can fully leverage AIOps and machine learning to perform anomaly detection, root cause analysis, cost optimization, and service management.

Deep content library: BMC Helix Discovery provides automatic updates to its library of over 15 years' worth of asset data, including support for containers and cloud computing.

Multi-cloud support: Map assets and their dependencies to ITSM, ITOM, SecOps, and AIOps processes across data center and multi-cloud environments, utilizing APIs and agentless protocols.

Complex infrastructure support: Discover dependencies across containers, container orchestration tools, hyper converged infrastructures (HCI), and traditional compute and storage systems.

Security and compliance: Perform blind spot detection and change impact and audit assessments to enable IT teams to identify out-of-date software, back-door entry points, and other vulnerabilities before they impact infrastructure security.

Configuration Management Database (CMDB) integration: Get seamless integration into BMC Helix CMDB with out-of-the-box, continuous data synchronization and third-party CMDB tools through web services and database integrations.

Flexible deployment options: Configure BMC Helix Discovery to run as an SaaS-based, hybrid cloud, or on-premises deployment, which provides the right solution for each stage of your business

Conclusion

As companies continue—or begin—their evolution to an Autonomous Digital Enterprise, large-scale transformation projects are already or will soon become a top priority for most organizations in 2021 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. By providing comprehensive visibility, scale, and insight to accelerate and optimize every part of the cloud lifecycle, a discovery and dependency modeling tool like BMC Helix Discovery is essential to the effective digital transformation of the enterprise.



For more information

To learn more about BMC Helix Discovery, visit bmc.com/trydiscovery.

About BMC

From core to cloud to edge, BMC delivers the software and services that enable over 10,000 global customers, including 84% of the Forbes Global 100, to thrive in their ongoing evolution to an Autonomous Digital Enterprise.

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