Driving the right mix of hybrid cloud with application profiling

A blueprint for setting and achieving cloud platform priorities using data-driven portfolio evaluation methods and field-proven migration practices

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Executive summary

Organizations with large application portfolios continue to ask the question, "Where are the best-fit destinations for my application workloads to deliver against my business objectives?" With the maturity of public cloud services such as Amazon Web Services, Microsoft® Azure, and Google™ Cloud Platform and private or co-located clouds based on hyperconverged and composable infrastructure, the answer is hybrid cloud. With the HPE Right Mix Advisor (RMA) approach from HPE Pointnext, you can determine the best-fit application destinations from among your preferred combination of public and private resources. Choices are based on the unique price-performance, portability, operational, and business requirements of each workload.

Achieving the right mix can be challenging. This field-proven blueprint shows how the HPE RMA can help you identify the best destination for your applications based on data-driven analysis. With this automated IP, IT organizations can determine the optimal platform for every application. HPE RMA delivers a deep analysis of the technical and non-technical requirements, along with the level of effort and economic justification for each application's target destination. This blueprint shows how HPE RMA addresses the urgency and scale requirements of large organizations with hundreds or thousands of applications. In these cases, IT must make immediate progress to improve business agility and keep pace with the competition.

HPE RMA automated Intellectual Property (IP) provides a systematic and consistent data collection, assessment, and scoring process for the entire enterprise application portfolio. It is embedded within services from HPE Pointnext engagements to accelerate and help optimize results. The approach leverages HPE's vast experience successfully orchestrating thousands of complex migration projects and adeptly operating sophisticated cloud-based environments. It emphasizes standards, best practices, automation, and continuous learning to help maximize results.

HPE RMA leverages HPE Pointnext IP, bolstered from recent acquisitions, such as Cloud Technology Partners and RedPixie, HPE partnerships with leading public cloud providers such as AWS and Azure, and innovative tool providers such as iQuate and ServiceNow. It helps eliminate the constraints of the siloed tools, manual processes, and platform-specific processes that currently hamper large-scale cloud migration initiatives.

The blueprint reviews hybrid cloud migration challenges and provides guiding principles outlining best practices and technologies to help you accelerate your hybrid cloud migration. It helps you improve outcomes and streamline your transition by using the right mix of public and private resources for your enterprise application portfolio.

Challenges

Today's hybrid cloud deployment model replaces, but in some ways resembles, the dedicated IT hardware silos of the past. The enterprise application portfolio must still be deployed onto supporting infrastructure in a way that is efficient and cost-effective, and allows some level of portability. However, there are additional challenges as shown in Figure 1.

Figure 1. How to correctly map applications to the right mix of cloud platforms

Today's hybrid reality continues to get more complex
**The challenge is knowing the right mix of hybrid cloud for your apps**
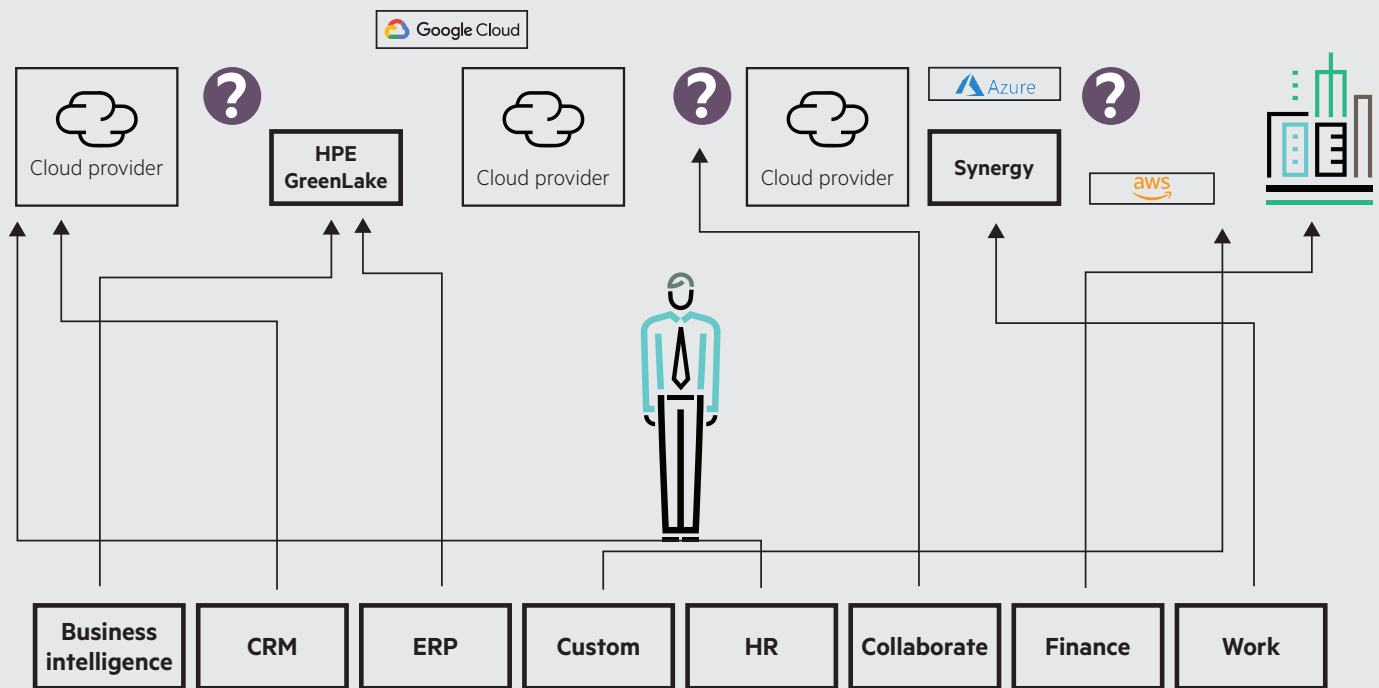
– Fastest path to migration?
– First-movers?

– What confidence do you have?
– How ready are your applications?

- The very scope, scale, and urgency of the process are daunting. Rather than migrating relatively fixed assets like in the past, IT organizations are now challenged to rapidly migrate hundreds or thousands of applications that are scattered across many distinct platform environments and written in many different styles. To meet pressing executive mandates, IT organizations must identify "first-movers"—applications that yield significant benefits and can be migrated quickly, efficiently, and with minimal risk/disruption.

- Legacy application migration tools and processes have not kept up with modern software development practices. Unlike traditional mainframe or client-server applications, today's applications distribute compute and processing functions across data centers (east-west inter-process communications flows). Organizations must consider distributed application relationships and interdependencies when planning a migration, but most lack the tools to intelligently assess and act on them.

- Organizations must risk significant time and effort to achieve the objectives of hardware-independence, workload portability, and consumption-based costing. The hybrid cloud challenge is that cloud environments vary in capability and cost and exist in both on-premises and public or off-premises forms. Organizations are often faced with many competing options, as shown in Figure 2.

Figure 2. Right mix of hybrid cloud
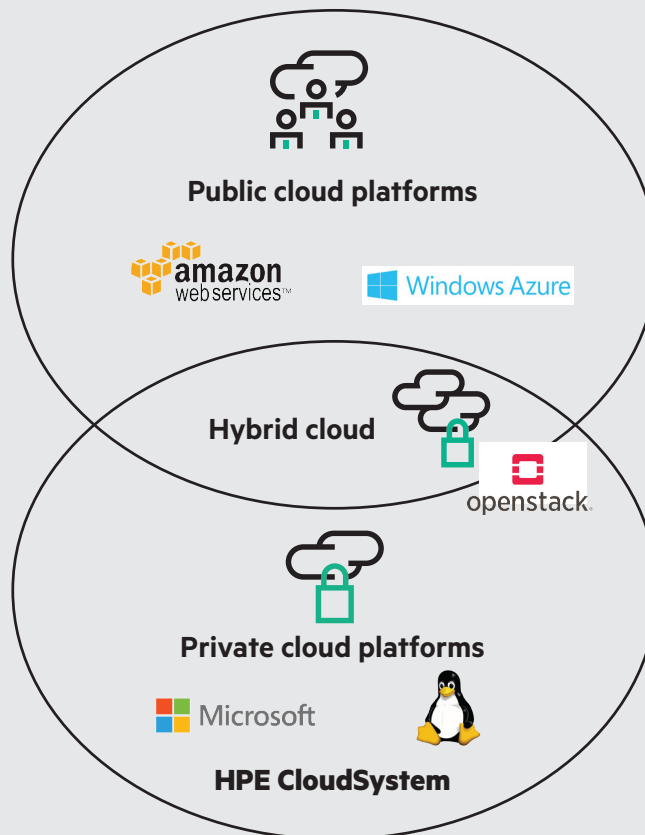
To guide that cloud platform selection process, organizations face challenges at two levels:

Understanding the big picture: Organizations lack methodologies and tools to capture the data on which to make sound, consistent decisions on migration effort and destination selection. This hampers the ability to easily meld business and IT needs for informed decision-making. The key challenges to overcome include:

- Inconsistent investment and migration decisions leading to investment risk

- Difficulty finding suitable reference configurations to base assessments

- Lack of methods for evaluations and comparisons

- Incomplete understanding of the application portfolio

- Insufficient skills, methodologies, and tools

- Poor data quality hindering the ability to safely plan and execute migrations

Making migration decisions: Organizations are often limited by manual portfolio capture processes that cannot keep up with application churn and growth. Manual processes and tools are unable to address management questions such as:

1. How cloud-ready are applications?

2. What applications can be moved to cloud?

3. Are there inter-application dependencies to consider?

4. Which applications should be moved first?

5. What applications need to be refactored before moving to cloud?

6. What is the most suitable cloud destination?

7. What applications can be retired?

Recommended approach

Hybrid cloud adoption requires a change in mindset from the application and hardware IT silos approach of the past, where applications were hosted on dedicated compute, storage, and networking stacks purchased on a per-project basis. With a hybrid cloud, you select from well-defined cloud destination options based on technical, business, operational, or functional requirements.

HPE RMA offers a data-driven approach to evaluating applications and selecting the right cloud destination for each application. This approach enables organizations to manage the migration of the enterprise application portfolio to hybrid cloud with governance and cost control. It embraces the concept that one size does not fit all, providing a data-based framework as shown in Figure 3, that helps eliminate guesswork. HPE RMA enables these key elements of migration to cloud:
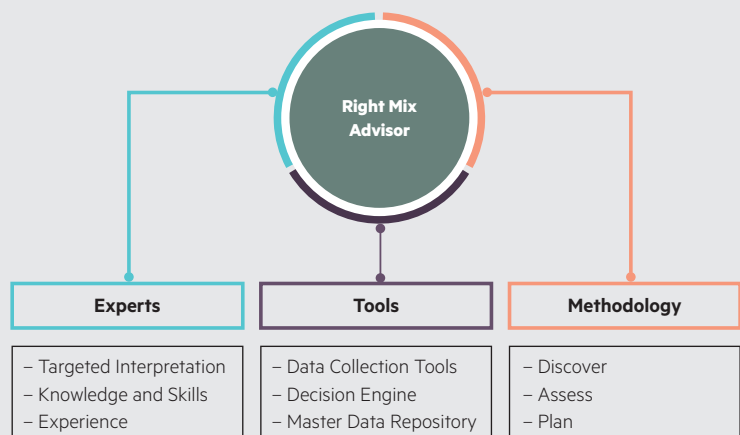
1. Identify the best destination (public cloud, private cloud, or on-premises) for your applications based on data-driven analysis

2. Determine a migration approach for each targeted application taking business, technology, and operational factors into account

3. Recommend applications that should be the first-movers based on ease-and-impact analysis

4. Create an actionable road map for continued successful application migrations

Figure 3. The HPE RMA approach

HPE Right Mix Advisor

Brings together the experts, tools, and methodology necessary to develop a sound, strategic, yet practical migration plan.

- Data sources: Asset inventories, code repositories, and application dependencies

- Master Data Repository (MDR): Provides a single, comprehensive repository as the basis for further actions

- Assessment criteria: Library of questions and application profiles to ensure completeness, accuracy, and focus

- Analysis and scoring: Provides scoring relative to business and technology facts and strategy

Experts
– Targeted Interpretation
– Knowledge and Skills
– Experience

Tools
– Data Collection Tools
– Decision Engine
– Master Data Repository

Methodology
– Discover
– Assess
– Plan

HPE RMA enables organizations to:

- **Capture strategic requirements:** These can include destination priorities, preferred first-mover selection criteria, and other criteria.

- **Automate application discovery and profiling:** Enterprises typically host hundreds to thousands of applications. The sheer number of applications, the volume of ongoing change, the critical nature of interdependencies, and the mixture of sources limit the value of manual or spreadsheet-driven approaches. HPE RMA includes a discovery subsystem that unobtrusively probes the entire environment, capturing application profiles and interdependencies. The results of the discovery process are loaded by HPE RMA onto an MDR.

- **Create a single version of the truth for the portfolio:** The MDR maintains critical data about the entire environment, providing the basis for assessment and scoring. The MDR can be updated periodically to enable course corrections to the migration plan.

- **Evaluate migration effort based on real-world data:** Here is the 6Rs model, in Figure 4, describing six common options for migration. A consistent process, explained later in the document, is used to determine the best option for each application. HPE RMA gives the IT organization the information required to make these decisions.

Figure 4. Application profiling—the 6Rs

6Rs migration options model

Three options (rehost, replatform, and refactor) require varying levels of re-engineering to be suitable for a hybrid cloud environment. Of the remaining three (replace, retain, retire), only replace needs to be considered in the overall hybrid cloud portfolio plan.

Migration Pattern Description

Rehost	• Lift and shift • Application migration to target cloud
Replatform	• Up-version of the OS and/or Database onto the target destination • Moderate architectural changes
Refactor	• Minor technical refactoring to the application • Major refactoring to optimize the application for cloud
Replace	• No vendor supported path forward for application stack • Migrate to SaaS alternative
Retain	• Client will keep host/application in their source environment • Dependency on integrating service management
Retire	• Functionality no longer needed within organization. No migration to target • Data is archived for historical access and legal requirements

- **Score all applications consistently:** All applications are evaluated according to a consistent methodology and criteria. Decisions adhere to a standard model that aligns with the overall hybrid cloud strategy as shown in Figure 5. HPE RMA automated IP includes an advanced decision engine that applies proprietary algorithms reflecting years of real-world cloud migration experience of HPE. A scorecard is generated for each application, enabling planners to evaluate the level of effort and together with the confidence score that can be assumed for that projection. Typically, confidence and effort measures are provided for multiple platform destinations. Each platform options includes a suitability score to address the expected level of effort.

Since HPE RMA is highly automated, the destination suitability scoring process can be repeated as often as required to provide course corrections that address an evolving hybrid cloud strategy. HPE RMA deliverables include:

- MDR to drive further insights and subsequent migrations

- High-level migration road map for all discovered applications

- Targeted application list:

  - Guidance on destination suitability across platforms (public cloud, private cloud, or on-premises)

  - Identification of migration approaches for all applications based on the 6Rs model

  - Recommendations for first-mover applications

Figure 5. HPE Right Mix Advisor phases
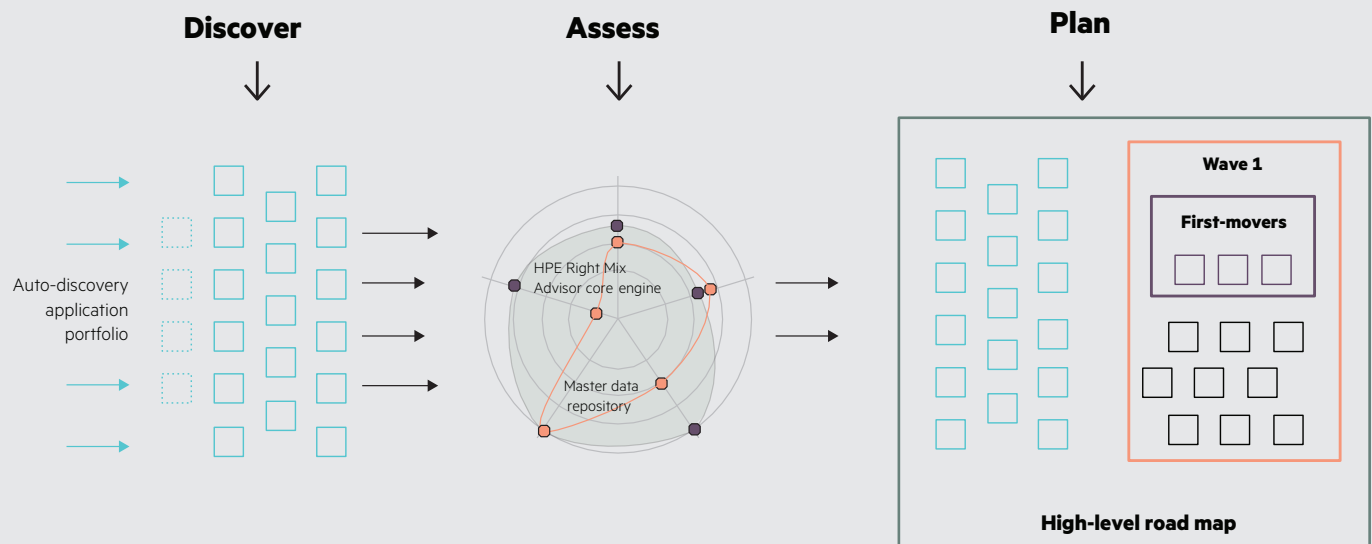
Blueprint to cloud migration decision-making

HPE Right Mix Advisor helps organizations realize their best-fit hybrid cloud combination. Based on years of experience, HPE Pointnext has developed a blueprint for successful hybrid cloud migrations. This blueprint includes five guiding principles that help organizations automate and optimize cloud migration decisions.

Guiding principle 1: Use an application-in approach to create a right mix of hybrid cloud strategy

C H A L L E N G E : Create a framework for effective migration decision-making

A right mix of hybrid cloud strategy brings together customer priorities and application portfolio migration planning. Application-in reflects the foundation principle—understanding application profiles relative to cloud destination options.

The strategy must capture the aspirations of how the organization intends to use hybrid cloud to support the business. And it must provide a means of profiling the applications that make up the portfolio to see where they best fit. This combination enables the organization to set priorities and then facilitates efficient, fast, and cost-effective transition. The following case study illustrates the value brought by HPE RMA as part of the planning engagement.

Case study: Application assessment for cloud readiness on AWS or GCP

Business need: How does a rapidly growing, highly recognized personal finance company determine the best cloud platform to migrate its mission-critical applications?

Cloud adoption challenges

- Rapidly growing organization looking to leverage the agility of cloud

- Evaluating AWS or Google Cloud Platforms to host its legacy PHP application and associated microservices

- Existing non-production environment already on AWS and a Big Data application in GCP

Solution

1. Conducted a discovery workshop for application

2. Evaluated the readiness of essential components that will eventually comprise a deployment of application on either AWS or GCP

3. Identified architecture constraints and required points of modernization or redesign

4. Provided a high-level comparison of GCP and AWS

5. Evaluated a hybrid strategy with consideration of latency concerns

Results

- Provided an AWS and GCP platform comparison, plus suggestions for application remediation

- Delivered readiness assessment of internal components and suggestions for application remediation

- Internal team ready to begin the journey to a minimum viable product deployment of its mission-critical applications on the cloud

Checklist

1. Executive commitment to hybrid cloud adoption as an ongoing infrastructure

2. A short list of cloud environment targets

3. Short-term list of highest priority applications/clusters

4. Guidance on criteria for destination choices and migration approaches decisions

5. Expectations for cost savings or other efficiencies

Expected results

• Decision criteria set for destination choices and migration approaches

• Criteria for suitability scoring defined

• Governance model in place to guide decision-making and reporting

Guiding principle 2: Use a consistent, high-quality set of data and collection processes for the assessment

CHALLENGE: Understand the application portfolio in the context of application migration to cloud

HPE RMA begins discovery with automated application profiling. The HPE Pointnext consultants install and run the discovery tool at the customer site. HPE RMA unobtrusively captures characteristics such as:

- Development profile (codebase, data storage)

- Performance profile, including application usage/usage consistency

- Interdependencies for tight integration with other applications

- Application usage and expectations for future scaling

- Current and expected costs relative to cost objectives

HPE RMA then creates the portfolio snapshot (the MDR) based on the profile and library of questions. The specific questions are selected based on the application portfolio under consideration and the hybrid cloud strategy already determined. Later, the answers are weighed and assigned logical relationships to fine-tune the scoring methodology. The general process is defined in Figure 6.

Figure 6. The HPE Right Mix Advisor assessment phase

Assessment elements

- Questions in the catalog are attached to profiles relevant to classes of applications

- A cluster is a set of workloads that shares a common set of questions from the catalog

- Each assessment is one instance of the question and a member of the cluster

Profiles and questions

Catalog
(Library of questions and profiles)

Assessments are comprised of questions from the Catalog

Assessments

Evaluation groups

Cluster
(Group of objects)

Clusters are group of objects (servers, workloads, and so forth) on which assessments are performed

HPE RMA integrates the tools and processes required to populate the MDR to drive the assessment model, as depicted in Figure 7.

Checklist

1. Identify a cluster of applications (or set of clusters) to be assessed as a group

2. Define the question set that will be used to assess each group member

3. Capture sufficient data to provide a complete view (MDR) to support the assessment step

Expected results

- Data capture model to support assessments

- Complete set of information stored in the MDR for evaluation of migration process and effort

- Extension of benchmarking model to encompass additional evaluation cycles with new groups

Figure 7. The HPE Right Mix Advisor core engine for analytics
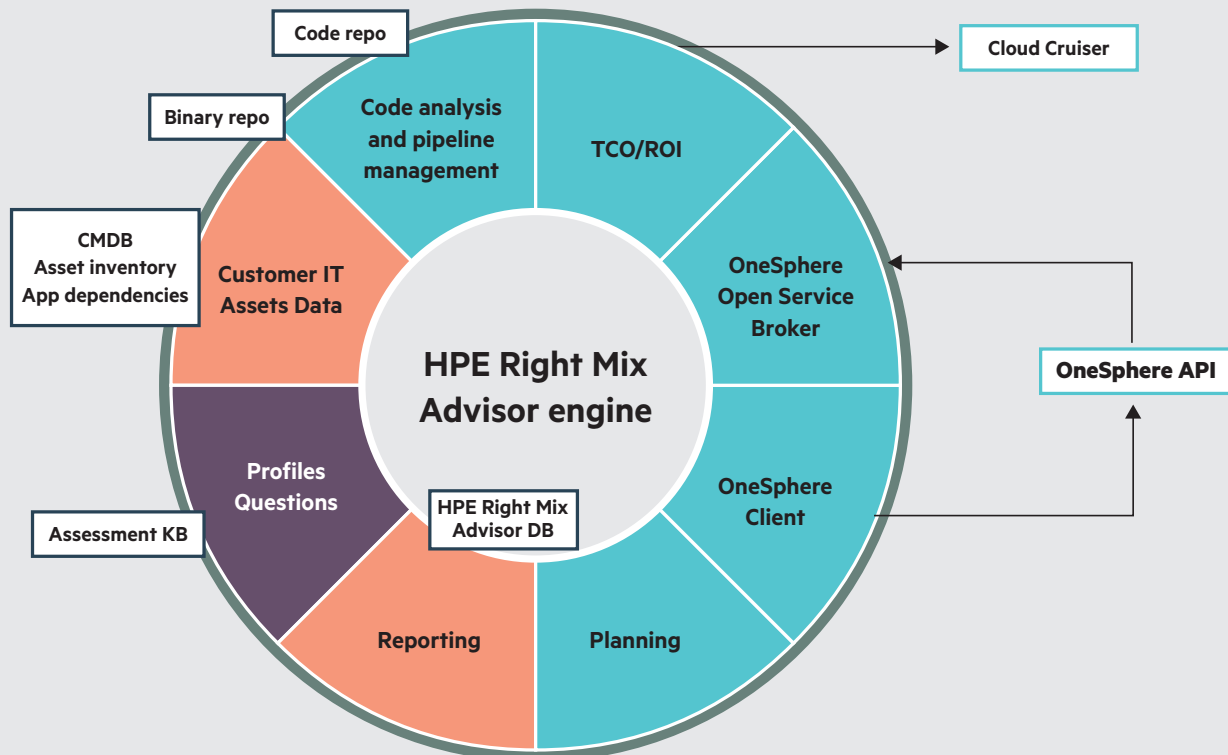
Guiding principle 3: Make decisions based on a scoring methodology

C H A L L E N G E : Evaluate migration options based on a complete understanding of the portfolio and the hybrid cloud strategy

Sound decision-making is central to executing a broad systematic change, such as moving to hybrid cloud. The HPE RMA scorecard model enables fact-based, data-driven decisions. For a successful hybrid cloud migration, you need:

1. The data driving the HPE RMA scoring engine to be consistent based on the MDR.

2. An agreement for the scorecard development process by all participants to avoid disputes and implementation delays later on.

3. A scoring model that provides an exact comparison within a cluster or group to build context for executing decisions. An example is shown in Figure 8.

**Figure 8.** Sample individual application score

Profile scores

Scores for profiles are calculated based on weights of questions

Question	Question 1	Question 2	Question 3	
Weight	8	6	4	Ideal score = 8 + 6 + 4 = 18
Response	Yes	Yes	No	Response score = 8 + 6 + (-4) = 10

Score 55.55%
(10/18)*100

Scoring reflects integration of the 12-factor analysis and application quality, as shown in Figure 9. These fold into the HPE RMA scoring algorithm to support the cloud destination suitability score and the best-fit 6Rs approach.

**Figure 9.** Visual presentation of scoring detail
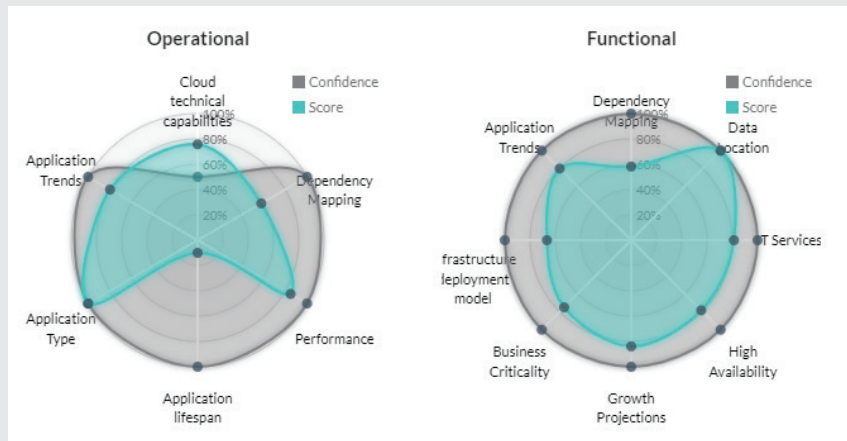
The HPE RMA scoring model reflects lessons learned across 1000s of HPE migration projects. The scorecards, such as shown in Figure 10, provide a holistic view of the migration opportunity because they address key factors such as these:

- Business priorities such as compliance and governance
- Technology demands such as data security, performance capacity usage fluctuation
- Financial profile such as hosting costs, applicable application licenses (users, cores)
- Functional dependencies on other workloads or non-x86 code

Figure 10. Summary scorecard

Typical scorecard

- Provides dashboard-style scoring of key elements
- Gives detail that can guide follow-on discussions
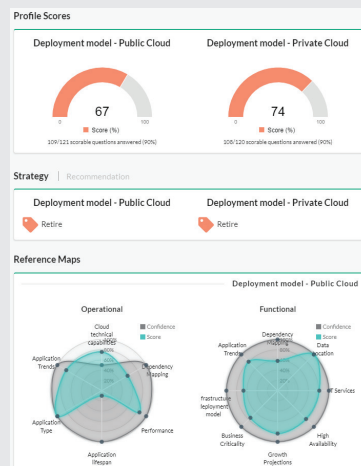
HPE RMA provides flexibility in how the scoring is applied so scorecards can be tailored to each group. It uses iQCloud, an automated discovery tool from iQuate, which extends the flexibility of the scoring model shown in Figure 11. Together, HPE RMA and iQCloud enable evaluation of:

- Suitability relative to a single cloud or multiple cloud environments

- Tradeoffs for on- and off-premises location

- Weighing in questions and logic to reflect dependencies that affect real-world decisions

- Merging of external data not captured in the assessments

Checklist

1. Invest the time required to develop a comprehensive scoring model that accurately reflects business needs and fully complies with the hybrid cloud strategy.

2. Ensure the clusters contain groups of applications that make sense to compare.

3. Evaluate the suitability scoring carefully so the best 6Rs approach is chosen.
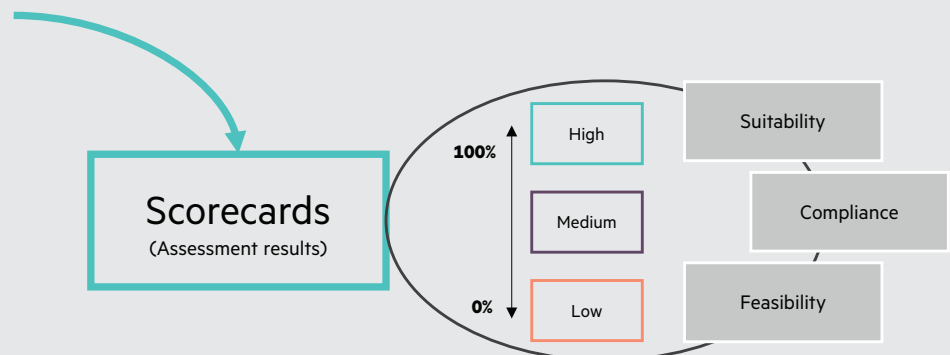
Expected results

- Scores that are accepted as valid and actionable for all group members.

- Set of validated migration approach scores that can be used to make well-informed funding and priority-setting decisions.

Figure 11. Suitability score

Guiding principle 4: Create a high-level plan for your application portfolio

CHALLENGE: Optimize migration investments to generate real business results and demonstrate short-term progress

The purpose and value of HPE RMA is to systematically drive change—move the enterprise portfolio to an appropriate and well-understood hybrid cloud environment. The first three guiding principles establish the strategy, application portfolio MDR, and application-level assessments. Once applications are evaluated and assigned their best-fit 6Rs migration option, the next step is to sequence the migration to help maximize business benefits. The following case study illustrates the approach.

Case study: Dev/test environment on AWS (Phase I)

Business objectives: How does one of the world's largest telecommunications providers accelerate software development?

Customer challenges

- Replace/adapt current IT infrastructure technologies that do not support rapid development at the scale demanded by the market

- Identify the cloud providers that are the best fit for the current technology landscape and the estimated cost of each

Solution

HPE Pointnext met the challenges facing the customer with a comprehensive approach that included:

- Assessing 800 IT applications using HPE RMA to identify immediate fits for the first wave of migration (lift-and-shift) and those that need refactoring or rebuilding

- Developing a business case to identify TCO/ROI and destination cloud

- Creating both a conceptual reference architecture and a security reference architecture to achieve future state cloud architecture

- Implementing a functional and reliable minimal viable cloud to support dev-test workloads and scale across thousands of developers

Results

- Selection of cloud service provider and successful implementation of a minimal viable cloud

- Projected cost savings of 30%–70% per year on dev/test environments

- Development of a standard framework that the entire organization can use for future deployments

The process generates a suitability score that maps the effort forecast to the 6Rs options to determine the most suitable migration approach. The HPE RMA suitability scoring lets planners evaluate the ease and impact of each platform option for each application or interdependent cluster. The immediate benefit is to identify first-movers who can demonstrate success and business return. The remaining applications can be phased in based on the ease and impact of the approach, coupled with the suitability scoring and 6Rs rating.

Because HPE RMA is automated, the assessments and scoring can be rerun periodically to adjust priorities relative to evolving business needs.

Checklist

1. Apply suitability, effort, and impact to determine first-movers

2. Prioritize remaining applications based on ease and impact

3. Rerun the assessment periodically to evaluate and reprioritize plans

Expected results

- Efficient migration of cloud-ready applications to meet business priorities

- Ongoing quality and process improvements to reduce costs and accelerate cycle times

- Continuing evaluation of migration priorities to meet business needs

Figure 12. Application approach
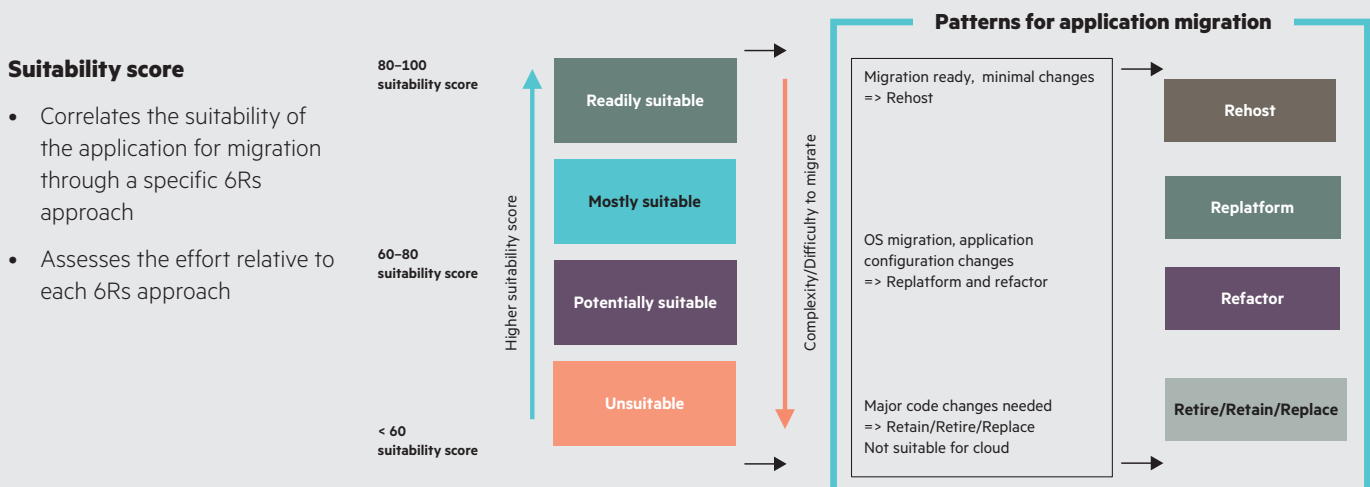
Guiding principle 5: Update your plan regularly based on refreshes to the MDR

C H A L L E N G E : Stay abreast of changes in the portfolio and migration options to continuously improve decisions

Migrating the enterprise portfolio to hybrid cloud is a significant effort. The destination cloud platforms continue to evolve and new hosting options appear regularly. For this reason, HPE Pointnext recommends you consider the hybrid cloud as evolving. Governance and review of application placement should take place periodically, by rerunning HPE RMA, creating a new MDR snapshot, and assessing the latest application scoring.

Hybrid cloud adoption is an ongoing effort. For that reason, organizations should commit to capturing lessons learned and drive process improvements back into every stage of the process. There is always room for innovation. The cloud development and operations community are a vibrant source of new options. These lead to improvements in business performance, costs, and customer satisfaction. Keeping the MDR up-to-date is a critical part of ongoing migration planning.

Checklist

1. Develop criteria for determining when to review applications destinations or adopt new technologies

2. Conduct reviews periodically based on the latest MDR

3. Create a process for lessons learned to be worked back into the core processes

4. Set aside time for evaluating new technologies, process alternatives, and hosting platforms

Expected results

- Continuous improvement in operational processes

- Nonstop enhancement of application economics and performance

- Minimal exposure to business risk due to technology acquisition gaps

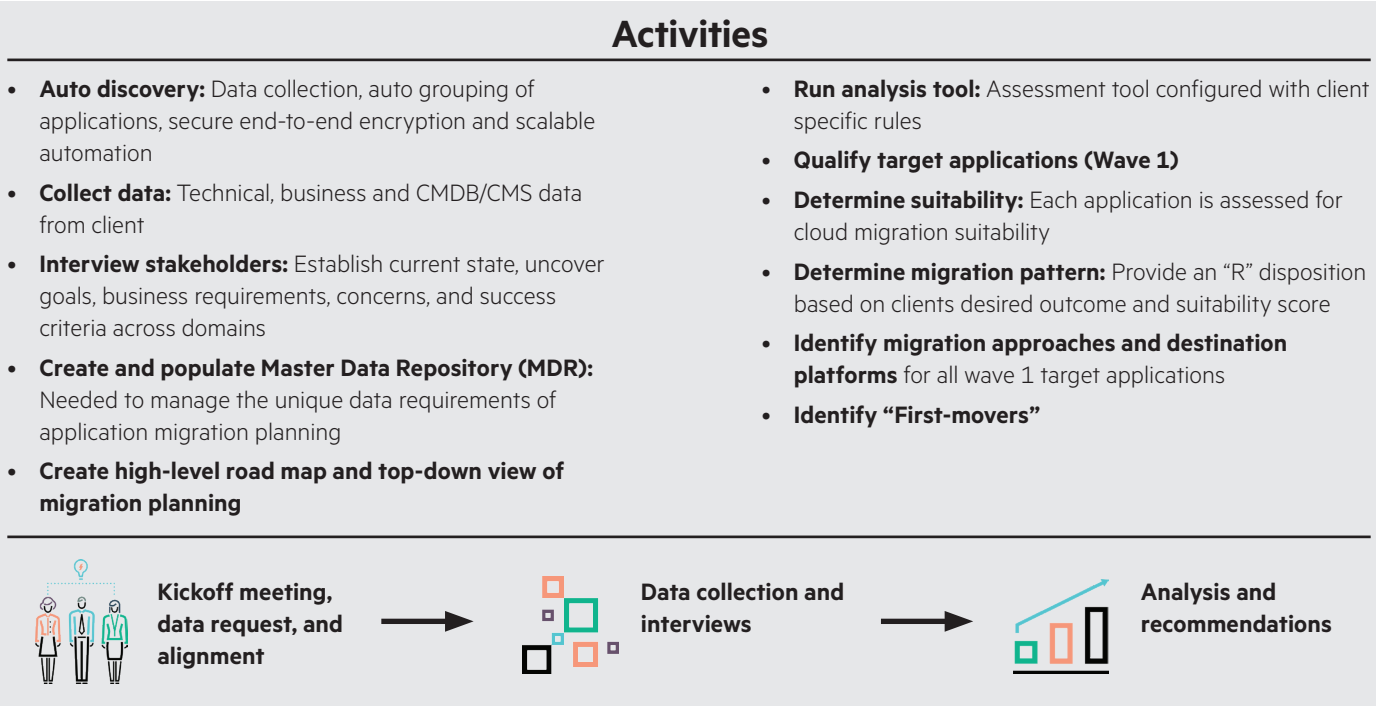# HPE approach to helping optimize application migration decisions

HPE Pointnext has a wealth of experience helping businesses adopt hybrid cloud. HPE Right Mix Advisor automated IP takes full advantage of this extensive knowledge and rich services capabilities. It complements the wide-ranging cloud technology portfolio of HPE, which spans hyperconverged and composable infrastructure platforms, converged edge systems and intelligent gateways, IT infrastructure management and automation software solutions, and partnerships with leading cloud providers (AWS, Microsoft, and Google).

Consistent with the guiding principles outlined in the blueprint, HPE Pointnext recommends that you:

- Develop a phased hybrid cloud migration strategy. With a hybrid cloud, you can choose from a variety of platforms with distinct price-performance, service level, and security characteristics. Prioritizing applications to transition and selecting the appropriate cloud platform for each workload pays big dividends for efficient operations, security, cost management, and scalability.

- Automate processes whenever possible. HPE RMA enables organizations to adopt best practices tailored to their unique operating environments and business requirements.

- Leverage best practices whenever possible. Based on real-world experience, HPE Pointnext can help you define and then accomplish complex tasks such as dependency mapping while simplifying and integrating processes to support aggressive schedules.

This blueprint reflects the tasks and capabilities packaged in the HPE Application Migration Plan for Cloud service, shown in Figure 13.

Figure 13. HPE Application Migration Plan for Cloud utilizing the RMA approach

Activities

- **Auto discovery:** Data collection, auto grouping of applications, secure end-to-end encryption and scalable automation
- **Collect data:** Technical, business and CMDB/CMS data from client
- **Interview stakeholders:** Establish current state, uncover goals, business requirements, concerns, and success criteria across domains
- **Create and populate Master Data Repository (MDR):** Needed to manage the unique data requirements of application migration planning
- **Create high-level road map and top-down view of migration planning**

- **Run analysis tool:** Assessment tool configured with client specific rules
- **Qualify target applications (Wave 1)**
- **Determine suitability:** Each application is assessed for cloud migration suitability
- **Determine migration pattern:** Provide an "R" disposition based on clients desired outcome and suitability score
- **Identify migration approaches and destination platforms** for all wave 1 target applications
- **Identify "First-movers"**

Kickoff meeting, data request, and alignment → Data collection and interviews → Analysis and recommendations

HPE Pointnext offers a variety of complementary consulting services, as shown in Figure 14, to assist with your hybrid cloud journey. We have vast experience helping businesses plan, design, execute, enhance, and manage hybrid cloud transitions and ongoing management of the solution. We can help you streamline your hybrid cloud migration, identifying the right mix of public and private cloud resources for your specific application portfolio.

Figure 14. HPE Right Mix Advisor central to expertise
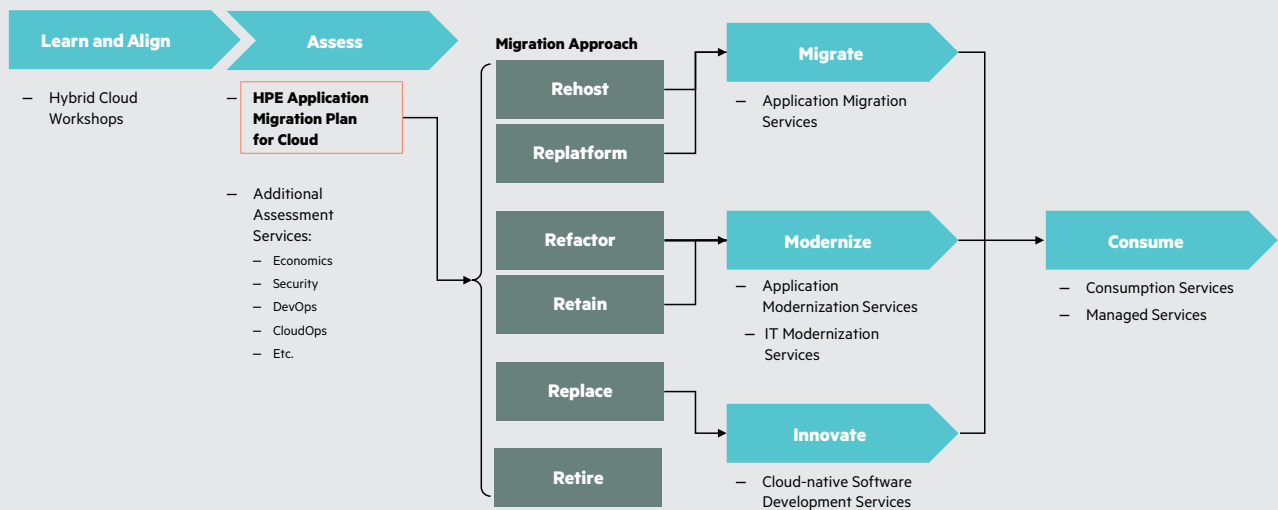
Conclusion

Enterprises around the world are migrating applications to the cloud to increase business agility and accelerate the pace of innovation. Forward-looking businesses are pursuing hybrid cloud strategies by leveraging a mix of public and private cloud infrastructure. This approach addresses the mix of price performance, functional, and operational requirements found across the portfolio.

Formulating an effective hybrid cloud migration plan—prioritizing applications to move, determining the right destination, and migration method for each workload—can be a time-consuming, resource-intensive, and risky proposition for many companies. Most organizations lack the experience, tools, and resources to plan a fast and non-disruptive transition on their own.

Driving the right mix of hybrid cloud with application profiling blueprint helps businesses confidently move their application portfolio to hybrid cloud based on data-driven decisions. By following the blueprint's field-proven and five guiding principles, you can identify the best private or public cloud destination, along with a migration approach for each application based on real-world data and your particular operational needs and business requirements.

Advantages of the HPE RMA methodologies and automated IP include:

- **Simplicity:** It is lightweight and efficient, helps minimize imposition on IT organizations, and yields results in weeks not months.

- **Intelligence:** It uses a data-driven approach to develop an actionable plan for the migration of targeted first-mover applications, providing quick wins that achieve the business goal.

- **Confidence:** It delivers a trusted recommendation based on automated data discovery, industry-leading expert-system IP, and proven experience gained through thousands of customer application migration engagements.

- **Methodology:** It provides a scalable, repeatable plan and execution approach to address an enterprise's entire application portfolio.

In summary, driving the right mix of hybrid cloud with application profiling blueprint can help you:

- Create a strategic approach to setting cloud migration priorities.

- Set up a consistent process for capturing relevant data.

- Establish a consistent scoring process to determine the right destination and right migration approach for each application.

- Institute an integrated and ongoing management program to help optimize results.

- Accelerate time-to-value, help minimize risks, and streamline your hybrid cloud transformation plan.

- Continue to refresh strategy and governance so that hybrid cloud investments are continually enhanced to meet the organizational goals.

Additional resources

Contact HPE Pointnext for a scoping discussion or to go deeper on the concepts provided in this blueprint.

Learn more at
hpe.com/services/cloud

Hewlett Packard Enterprise