Best Practice Guide

Application Migration to On-Premises Cloud

Best Practices for the Modern Data Centre

Hewlett Packard Enterprise

Today's IT organisation is expected to play a leading role in increasing revenue and margins, improving employee productivity, differentiating from the competition, and enhancing customer experience. In the modern enterprise, IT is a driver of business growth.

Traditional, siloed IT infrastructures can create barriers to achieving these objectives. The lack of flexibility inherent in traditional IT silos is costly and increases the time required for IT service delivery. Business growth can also be constrained by poor application workload performance, which impacts employee productivity and degrades the customer experience.

Public cloud provides an alternative to traditional data centre architectures with flexible infrastructure and on-demand availability that provides the agility to accelerate time-to-value. Many enterprises are reluctant to place data assets in the public cloud due to concerns about security and control of those assets, and latency that can degrade application performance. Additionally, the cost of public cloud can become prohibitive as workloads grow.

By the end of 2016, 56 per cent of application workloads will be deployed in private or hybrid clouds[1]

Private cloud

As an alternative, many enterprises are migrating assets to private cloud infrastructure, providing the same agility as public cloud but on-premises and under IT control.

- By the end of 2016, 56 per cent of application workloads will be deployed in private or hybrid clouds[1]
- By 2018, more than 60 per cent of enterprises will have at least half of their infrastructure on cloud-based platforms[2]
- For the period 2014-2019, IT spending on private cloud will grow at a 14 per cent CAGR, versus non-cloud IT infrastructure spending which will decline at 1.4 per cent CAGR[3]

Successfully leveraging cloud technology is a matter of finding the right mix of public and private cloud environments. A hybrid approach, providing a mix of public, private, managed, and traditional services will allow IT to provide faster time-to-value and improved efficiency from the enterprise data centre. At the centre of this hybrid approach is your own private cloud, providing the advantages of ownership, control, security, and economics. The technology is readily available, and with best practice solutions, time-to-value for cloud migration is much shorter today than it was just a few years ago.

Migrating workloads to private cloud empowers IT to achieve significant business outcomes:

- **Redefine compute economics**—Reduce IT costs by up to 40 per cent,[4] freeing up investment for new services that drive growth for the business
- **Accelerate service delivery**—Deliver application changes 55 per cent faster,[5] accelerating IT's time-to-value for a more responsive business

[1] Voice of the Enterprise Cloud Computing Customer Insight Survey, 451 Research, Q4 2014

[2] Digital Business - Rethinking Fundamentals, Cloud Business Summit, Nov 2014

[3] Worldwide Quarterly Cloud Infrastructure Tracker, IDC

[4] The Key Benefits of Deploying Private Clouds, Aberdeen Group, July 2014

[5] The Key Benefits of Deploying Private Clouds, Aberdeen Group, July 2014

- **Enable continuous delivery**—Utilise a DevOps approach for agile lifecycle management of applications within the data centre that power the business
- **Minimise "shadow IT"**—Where needed, regain secure control of applications and data, and improve overall ROI by offering a better experience for the lines of business
- **Deliver on Service Level Agreements (SLAs)**—With better control, predictability, and efficiency, IT can confidently exceed SLAs and evolve beyond a traditional, cost-centre relationship to a strategic partner with the business. The benefits are clear and proven, but the pathway to migration may not be as clear. Application migration involves many complex tasks, such as determining the right type of cloud for each workload, performing the actual migration process, and validating the migration to ensure connections, service levels, security, and performance are all maintained or enhanced

Best practices for cloud migration

Enterprise IT Leaders face myriad choices and decisions for cloud delivery models. There are several cloud alternatives: public, private, and hybrid (utilising a combination of public and private). Each has its merits, so it is important to find the optimal strategy that delivers the right outcome for the business and the right operational efficiencies for IT. Here are some critical questions for enterprise IT to explore:

- What is the best infrastructure for each workload?
- Are there workloads that should be "off imits" for cloud migration?
- How do we quantify the benefits of cloud migration?
- How do we prioritise workload migration?
- How do we conduct migration without disrupting current business?
- Is there a methodology that makes sense for untangling these questions?

The **HPE cloud workload portability** methodology offers a set of five connected services that leverage proven expertise and best practices to help you determine how to build the best cloud for your business. The services—Discovery, Suitability, Mapping, Migration, and Enablement—provide detailed analyses of existing server workloads and decisions regarding the right mix of cloud services for your business. Services can be executed individually or as an all-inclusive, end-to-end review, depending on the specific needs of the business. Hewlett Packard Enterprise can also perform a tool-assisted and automated workload migration for organisations that need it.

Discovery

The first phase is Discovery, consisting of a set of processes, tools, and procedures that create a comprehensive view of the end-to-end IT environment. The Discovery process identifies workloads and the servers on which they run (physical and virtual), storage devices and databases used, resource-consumption patterns, networks and components, relationships and dependencies among all these entities, and finally the associated costs of ownership and operations.

Discovery answers three important questions:

- Are we ready for the cloud?
- What is the current application workload and technology landscape?
- What are the business priorities (i.e., the relative importance of applications)?

The Discovery process goes beyond simple asset identification through the use of simple on-site installed discovery tools (like HPE Universal Directory or similar tools). Data is gathered and analysed to provide input into the next step of the process (Suitability Assessment). Tool capabilities include:

- Dependency mapping with flexibility to provide multiple maps based on varied criteria
- Groupings of workloads by affinity, protocol, and other factors
- Network density planning (capacity needed)
- Definition of cloud-migration drivers (performance, lifecycle, etc.)
- What-if scenarios (for example, price modelling)
- Cloud cost comparison and optimisation

In addition to creating an inventory of workload information, Discovery accomplishes three additional objectives: First, it detects any “shadow IT” activity, such as unsanctioned public cloud use by individual business units and any corresponding networking components. This allows a more comprehensive view of the existing environment. Second, the Discovery process engages stakeholders from outside IT in the transformation process and provides early insight into potential project risks. Third, it identifies the relative importance to the business of each application, which helps in understanding the operational and strategic advantages of moving specific application workloads to the cloud.

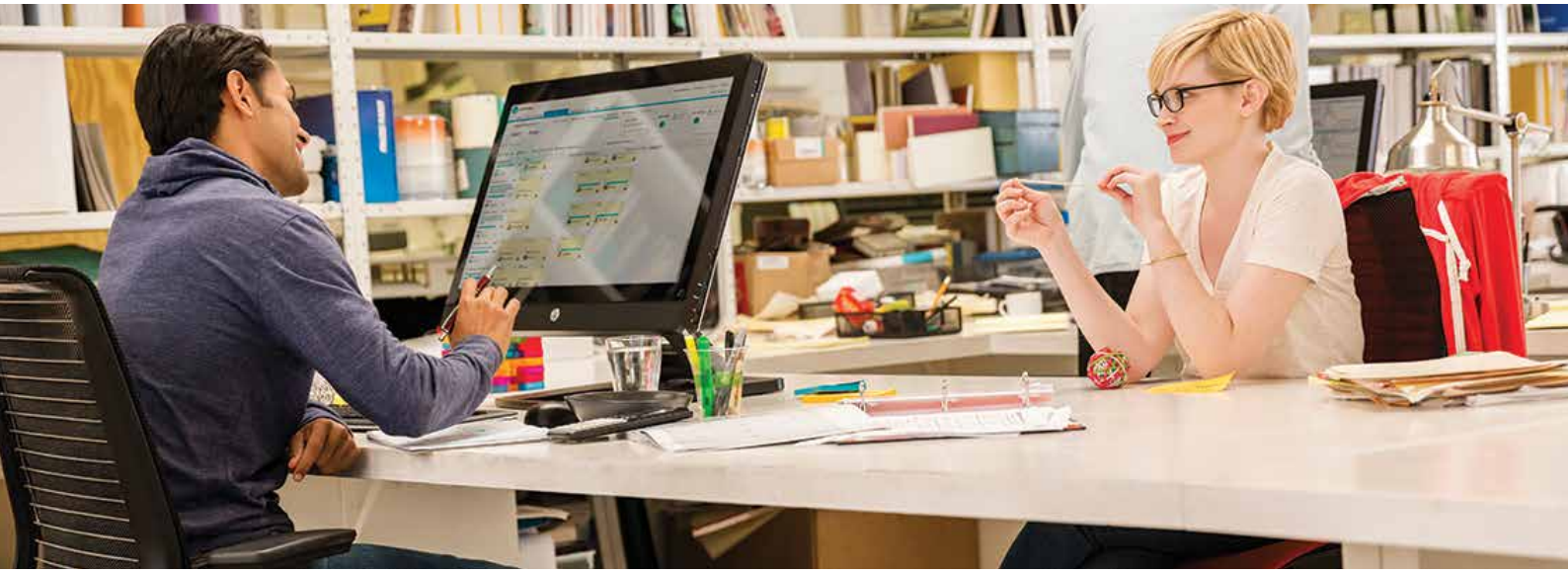
Discovery provides a transparent view of the full scope of potential private cloud migrations with roughly an 80 per cent degree of confidence, and a foundation for well-informed and confident migration decisions.

Suitability

Discovery is followed by a Suitability assessment, a formal study of the application workloads applying industry standards and best practices to determine which workloads should move to the cloud, which should not, and why.

Suitability answers the questions:

- Which workloads should we move to the cloud?
- What can we expect the costs and benefits to be?
- What technology is required for migration?
- Where is the “low-hanging” fruit?



The Suitability phase uses a combination of automated and manual approaches to assess workloads across four dimensions:

- **Business suitability**—prioritise business and IT needs to gauge cloud-adoption feasibility at an organisational level
- **Financial suitability**—establish the financial feasibility of cloud adoption and justify the ROI of application workload migration to the cloud
- **Technical suitability**—map application characteristics to characteristics of cloud platforms to determine technical fit
- **Application functionality mapping**—map application workload functionality to the cloud platforms of choice (mapping includes IT environment and application-dependencies, workload categorisation, automation of development and operations, reference architectures, and infrastructures)

The Suitability assessment will determine one of four possible outcomes for each application workload reviewed:

- No benefit from moving the workload to the cloud
- Workload cannot functionally, technically, or economically move to the cloud
- No business or economic priority to move the workload to the cloud
- Workload is a migration candidate

The assessment will also determine the degree of difficulty in completing each workload migration, from simple one-step migration processes to more complex and phased approaches. The end result of this phase is a qualified list of workloads capable of running in target clouds and ready for a physical migration, including a predictable scale of migration scope and effort, the hardware requirements to host migrating workloads, and a clear view of costs, benefits, and ROI for each migration.

Mapping

The suitability assessment provided a list of candidate workloads for cloud migration. Successful decisions regarding their final workload targets require further reviews of the best migration-delivery models—in-house traditional delivery, private cloud, hybrid cloud, or public cloud. Mapping combines automated approaches with manual review to map workloads to their target platforms.

Suitability answered the question, "Which workloads are candidates to move?" Mapping takes that a step further and answers:

- Which workloads should we move to the cloud?
- What type of cloud should we move them to (private, hybrid, public)?
- What are the hardware/software requirements to make the move?

Mapping takes inputs from the suitability assessment and uses analytic algorithms to evaluate the best target for each workload. For workloads that would be best suited to public cloud, the process also identifies potential cloud providers that would best meet workload requirements. A compliance component of the review ensures that the recommendations meet privacy and security requirements. There will be cases in which workload targets will be pre-determined. This can be driven by an enterprise's strategy (e.g., a desire to bring everything in-house), compliance and regulatory requirements (e.g., security for government projects or HIPAA for healthcare), or other business reasons. Even in these special cases, applying mapping may reveal conditions that will advise the enterprise to reconsider their previous decisions for the ultimate business benefits.

Get assistance from Hewlett Packard Enterprise during the migration process to answer these key questions:

How do we move these workloads to the cloud efficiently?

How do we mitigate risk in the process?

The mapping process validates the assumptions made during the Suitability phase, providing IT with confidence in decisions on workload cloud-migration targets and ensuring strict compliance with privacy and security regulations. The end result is an ordered set of workloads and workload groups along with recommendations on the computing environment (including specific hardware requirements and configurations for private cloud hosting) that can best meet the workload/group requirements.

Migration

The fourth phase, Migration, moves the workloads from their sources to their target destinations. This activity requires the use of specialised software and results in intact and operational workloads at the destination locations (data centres or clouds) that can be immediately used. The Migration process answers the questions of how to move the targeted workloads to the cloud efficiently and how to mitigate risk in the process.

Typical workload migration can be a time-consuming, costly, and high-risk process. In enterprise environments, there may be thousands of workloads to move. Often workloads must be migrated one at a time and even taken out of production, disrupting business. Manual processes require highly skilled data-centre resources. In addition, compliance and security can be compromised if software agents are installed or if workloads are shipped off-site to be re-platformed, which are both common practices.

A best-practice approach uses automated workload-migration service tools to migrate workloads or workload groups to their targets. Features to consider when selecting migration tools include:

- Agentless vs. agent-based approach
- Support for live migrations and bulk transfers
- Support for source and target platforms and hypervisors (hypervisor agnostic)
- Properties such as speed, reliability, scalability, usability, and security

Best-practice tools provide the capabilities for moving workloads quickly and in bulk (which is essential for tightly coupled applications) and can also move live application workloads without disrupting business operations.

Benefits of an automated approach using the right toolset can include:

- Any-to-any environment migrations
- No disruption to operations
- No need for scarce skill sets to support migration
- Migration behind a firewall

The end result of this process is a reliable migration of application workloads to the right type of IT environment.

Enablement

The final activity, cloud enablement, validates the connections, service levels, security, and performance considerations of the newly migrated applications. The enablement phase answers the questions were all the target workloads migrated successfully and did we achieve the expected value?

Once the designated workloads have been migrated, the next step is to validate that the migration was successful by answering these questions:

- Are all linkages and connections between applications the same after migration as they were before?
- Are all SLOs/SLAs being met at the same level or better than before migration?
- Are all security and compliance requirements being met?
- Have all risks and threats been considered, analysed, contained, and managed?

This ensures that the cloud-based applications perform at the same level of IT maturity or higher than before migration and that the applications continue to maintain and enhance the same business functionality that they supported before migration.

The Enablement phase introduces the next stage of IT planning to optimise operations in the cloud-computing environment. This can include optimising workloads, refreshing IT processes to support DevOps, and enabling the developer community with continuous integration and continuous delivery (CI/CD) processes to adapt agile application lifecycle management processes.

Finally, Enablement should set-up the business to measure the effectiveness of their cloud initiative and to assess its ongoing value. That assessment includes:

- Did we achieve operational advantages in terms of cost, ease of use, etc.?
- Did we achieve strategic advantages (e.g., are we in position to build better products and services, have we improved sales capabilities, and do we serve customers better)?
- Did we achieve an economic advantage in terms of profitability?

Enablement guarantees that things work today and puts the business in position for continuous improvement moving forward.

Summary

Use a proven cloud migration methodology that's both comprehensive and flexible. Start with the discovery of existing workloads and their characteristics. This information will feed into an analysis of migration feasibility to determine the most suitable workload delivery models (in-house private cloud, hybrid cloud, or public cloud). The next step is to map your effective tangible migrations that save time and money and reduce business risk. Since improvement is a continual process, Hewlett Packard Enterprise supports ongoing validation of migration results and benefits.

How Hewlett Packard Enterprise can help with application migration to the cloud

Hewlett Packard Enterprise offers the industry's most complete, end-to-end solution for application migration to a secure private cloud. We bring together an unmatched portfolio of **HPE ProLiant Gen9 Servers**, **HPE 3PAR StoreServ Storage**, **HPE FlexFabric networking**, and software delivered by experienced and trusted experts who provide guidance throughout your cloud journey. As you move to build your cloud infrastructure, we offer a full range of innovative professional services, repeatable customer engagements, and deep knowledge of Hewlett Packard Enterprise and partner technologies, data centres, and cloud capabilities that help you accelerate your project and reduce risks along the way. Of course, Hewlett Packard Enterprise will support your cloud environment as you move into operations, with global proactive services to help you get the most out of your cloud.

Hewlett Packard Enterprise has the proven expertise and experience to help ensure you select the right cloud solution and have the right capabilities in place for your application migration to succeed. We can help you reduce application migration risks with the right mix of technologies, consulting, and migration services.

This solution offers:

- Increased agility and flexibility to leapfrog your competitors
- Accelerated IT services to exceed SLA requirements
- Improved productivity with optimised application and workload performance
- Reduced inefficiencies and redefined compute economics for rapid return on investment (ROI)

Move to the cloud with confidence by partnering with Hewlett Packard Enterprise.

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