Migrate workloads to the public cloud: an essential guide & checklist

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Migrating workloads to public cloud

Cloud adoption and migrations have continued to accelerate over the years. According to Flexera's 2021 State of the Cloud report, 31% of respondents spend at least $12,000,000 per year on public cloud, which is up from 16% in the same survey in 2020. Additionally, enterprises already run about 47% of their workloads and store 44% of their data in the public cloud. Organizations have come a long way, but we still have at least half way to go to full migration to the public cloud.

As the public cloud becomes a multi-billion dollar business and the IaaS market share of computing continues to grow, enterprises leverage the public cloud more and more each year. But even though self-provisioning of new workloads in public clouds is simple, migrating existing services to the cloud requires more preparation. A common perception is that migrating existing workloads to the public cloud, especially those with a lot of data, is complex, time consuming and risky. With the right planning, however, enterprise IT organizations can rapidly establish good migration practices to accelerate migrations and lower risk. Plus, migration technology is evolving quickly to support the enterprise.

Read on for essential tips to guide IT organizations through the four key parts of the migration process: Assess, Plan, Migrate, and Optimize.

Phase 1

Assess: Lay the migration groundwork

First, identify your migration team. It is likely you'll be working with other members of your organization, so determine who those stakeholders are now and what their respective levels of involvement will be. For example, involving people from the security and application teams early in the process can help you identify and remediate or bypass issues that might have otherwise occurred mid-migration. Educating these key players about your organization's cloud strategy will help teams identify their roles in the overall migration effort.

Once you've figured out your team of internal stakeholders, identify the applications slated for migration. It's likely that your enterprise has hundreds or even thousands of applications to migrate to the cloud, so where do you begin? Start by determining which applications should be moved to the cloud first.

There are many variables that will impact priorities, including identifying application dependencies, cloud-readiness, application SLAs, physical or virtual infrastructure, etc. Other variables that will also be crucial during the migration include server names, IP addresses, # of VMs per application, VM OS and service pack, CPU, memory, attached disk space, shared storage, databases (size and type), licenses, bandwidth usage, and integrations.

Due to all the information you'll need for your applications, we recommend preparing a thorough questionnaire that outlines all of these crucial pieces of information. You can send this to application owners to help evaluate migration readiness but also to have key information easily accessible during the migration itself.

It is worth noting, however, that application owners may not even know all the required information which is why it is often invaluable to rely on a discovery and assessment platform that can automate this process. The end result will be a detailed overview of your IT landscape and estimates of what your on-premise versus cloud costs will be.

Phase 2

Plan: Pick your strategies

Applications

If you research cloud migration you will find there are essentially three cloud migration strategies that IT can use when moving to the cloud:

1. **Rehost:** Redeploy applications to the cloud without making substantial changes.

2. **Replatform:** Start taking existing applications and modernizing them on-prem before migrating them into the cloud (e.g., convert workloads running on VMs into workloads running on containers in GKE; converting an on-prem SQL database to Google Cloud SQL).

3. **Rebuild:** Take existing applications that are too difficult to move and rebuild them from scratch in the cloud. In some cases, you might have an application that is simply too old to migrate, so rebuilding is your only real option.

All three options are viable, and in many cases you may end up leveraging all of them at different stages of your migration journey. Usually, though, the smartest and fastest strategy is to start with the first option and move applications into the public cloud first. Once apps have been migrated to the public cloud, IT can evaluate performance and optimize as appropriate. That could mean simple changes like adjusting instance sizes or changing some of the on-prem functionality to be more cloud centric (like the SQL to Cloud SQL example).

Data

Migrating an application usually involves migrating all of its data along with it. Consider the amount of data associated with each application, where it is currently stored, and how frequently it is updated.

If you are using the cloud for disaster recovery, it may be tempting to try and leverage those same disaster recovery solutions for cloud migration, too. But cloud migration is a significantly different use case. If you are moving live applications, consider solutions that were purpose-built to address the associated complexity of keeping application data synchronized during the migration and through cutover.

Migration tools

Migration tools all have one goal: to migrate your workloads safely to the public cloud. However, they often have interesting nuances in terms of functionality and architecture. As a result, it's important to have answers to the following questions before you begin your migration, to make sure that any given migration tool will work best for you and your migration:

1. **Agents:** Many tools require installing agents in each application and/or in your cloud target. Is this true for the cloud service you've chosen? Will you need access to each application's systems? This installation and removal can add time and complexity. If you're moving a lot of applications, an agent-less solution may be a better fit.

2. **Testing:** Does the solution offer a way for you to test applications before they are migrated without taking production and/or live systems offline? Without the need to transfer into data sets to the cloud first? Can you change cloud instances on the fly to test different configurations?

3. **Rightsizing:** Will you get analytics-based recommendations for how to map on-premises instances to cloud instance types, optimized for either performance or cost?

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4   **Migrating apps and data:** Does the system handle just the data migration or can it also handle moving the application? How much downtime will there be? Is it up front, predictable, and/or short? How will the system support multi-tier applications that require orchestrated shutdown and restart and systems being moved in a specific order?

5   **Monitoring:** What tools are available to track the migration process?

6   **Customization:** Can the solution automatically adapt the application for the targeted cloud? Will things like DNS configurations be maintained automatically?

7   **Cutover:** What needs to take place once the data is migrated and you're ready to go completely cloud-only? Do you need to shut down application services on the source or destination first? Will there be any downtime? Do you have to uninstall any agents when you've finished? Is there a chance that your data will be slightly out of sync and if so what is the Recovery Point Objective (RPO)?

8   **Rollback:** Can you revert the application back on-premises if needed? How long does it take? Is all the data from the cloud maintained?

Cloud migration technologies and tools have come a long way. It's important to identify the requirements that are important to your enterprise and then select the appropriate solutions.

Testing: Evaluate how applications perform in the cloud

Testing your applications in the cloud before you officially migrate them is an important way to save time and mitigate risk. It gives enterprises the opportunity to easily see how applications perform in the cloud and to make the appropriate adjustments before going live. As mentioned previously, some migration tools provide a way to run clones of live environments in the cloud so you can do realistic testing without impacting data or uptime of the live system.

While testing in the cloud, identify the key managed services you should be using from the cloud provider (e.g., Database as a Service (DBaaS), DNS services, backup). Review all the cloud environment prerequisites for supporting the migrated workloads like networking (e.g., subnets, services), security, and surrounding services.

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In some cases, especially early in a migration project, it's useful to run a proof of concept test for some of the applications you plan to migrate. These pilot projects will help you get a feel for the migration process. They also help validate two key migration metrics: The resources and capacity your application requires and your cloud vendor's capabilities and potential limitations (e.g., number of VMs, storage types and size, and network bandwidth).

This information is particularly important with memory-intensive applications. You need to run the proper performance testing by simulating real-world load on the system so you can choose the right-sized instance with enough memory to run your application in production.

Data-driven cloud instance right-sizing is another capability to evaluate when considering migration solutions. With this feature, the migration solution evaluates on-prem usage and makes intelligent recommendations for both performance-optimized and cost-optimized instance sizes in the destination cloud. This can help keep cloud budgets in line with expectations without degrading performance.

Ideally, a cloud migration tool will provide built-in functionality to run application tests directly in the cloud. This is powerful because it allows enterprises to see how that application will run with real data but without impacting the live system's uptime or data. When testing is done, simply dispose of the test clone. This can also help you understand which storage services will replace your traditional repositories.

The more testing done in the beginning, the smoother the migration will be. We advise running tests to validate:

- Application functionality, performance, and costs when running in the cloud

- Migration solution features and functionality

Ultimately, this testing and right-sizing will help you capture the right configurations (settings, security controls, replacement of legacy firewalls, etc.), perfect your migration processes, and develop a baseline for what your deployment will cost in the cloud.

Phase 3

Migrate: Move to the cloud

If you've completed a thorough assessment, planning, and testing, your migration project should be on track for success. We recommend that enterprises use a phased, agile approach for moving applications to the cloud. After each phase, review the results and adjust your plan for lessons learned, if necessary. Having a migration solution that lets you revert back to the on-premises configuration can be a huge benefit at this phase, too. It removes risk from the migration process by providing a safety net to return to, adjust, and retry the migration deployment.

If you're leveraging a replication tool for migration, be sure to validate data synchronization and consistency throughout migration. It is not uncommon for large data sets to end up out of sync during the replication process or as a result of the cutover.

Phase 4

Optimize: Consider all ongoing operations

Once you've migrated, finetune your cloud environment by changing your operational usage habits to meet the cloud's highly dynamic environment. For example, in the cloud you have more flexibility to provision and adjust instance type and size based on real demand. Track your cloud vendor's product updates and don't be afraid to experiment as you continue to optimize. Also, optimize for cost by using capabilities like cost controls and governance tools as well as built-in cloud reports on predicted usage to help keep budgets in line.

As your migration continues, build the maintenance and transparency layers in parallel so that IT can properly manage things like security, performance, availability, backup, disaster recovery, and cost. Learn which management tools are provided by your cloud vendor and learn how to use APIs to tailor your own solutions. Evaluate the marketplace to find third party vendors that can support you with operations such as monitoring, backup automation, and cloud firewall management, as needed.

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Wrapping up

Those four key phases will help ensure a successful cloud migration. To help guide your cloud migration journey, the following cloud migration checklist outlines the phases and associated tasks.

Your cloud migration checklist

1. Assess

- ☐ Define the resources and capacity your application requires
- ☐ Create a list of your applications (e.g., who is using what and how often)
- ☐ Identify key stakeholders and involve them early in the process
- ☐ Create a survey to send to application owners to define requirements and prioritize your migration pipeline
- ☐ Determine which applications are cloud-eligible
- ☐ Determine which applications are cloud-desirable
- ☐ Understand application interdependencies and network configurations
- ☐ Specify security and compliance requirements
- ☐ Validate SLA and high availability requirements

2. Plan

Strategies / Tools

- ☐ Pick a strategy for each application: rehost, replatform, or rebuild
- ☐ Plan and design the cloud infrastructure including services like networking, security, etc.
- ☐ Identify key capabilities for migrating workloads
  - ☐ Support for complex, multi-tier apps
  - ☐ Pre-migration testing & validation
  - ☐ On-prem rollback
  - ☐ Post-migration customization
- ☐ Create migration plan for both apps and their data

Testing

- ☐ Test data migration and synchronization

- ☐ Measure performance

- ☐ Validate security controls required

- ☐ Evaluate your cloud footprint costs

- ☐ Document necessary changes to be done as part of the actual migration

- ☐ Plan the time required for application cutover

- ☐ Consider cloud instance right-sizing recommendations

3. Migrate

- ☐ Migrate according to the plan created

- ☐ Use a phased approach, and for each phase:

    - ☐ Execute migration wave

    - ☐ Validate in cloud

    - ☐ Apply lessons to next wave

- ☐ Apply lessons learned

4. Optimize

- ☐ Monitor application and cloud usage

- ☐ Implement bursting or scaled-usage to optimize user experience

- ☐ Empower IT to successfully manage ongoing operations

- ☐ Monitor cloud costs and adjust as needed

Find out more: Data center migration into cloud