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

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Migrating workloads to the public cloud

Cloud adoption and migrations have continued to accelerate over the years. According to Flexera's 2022 State of the Cloud report, 36% of respondents spend at least $12 million per year on public clouds, which is up from 31% in the same survey in 2021. Similarly, 83% reported yearly spend of more than $1.2 million. Additionally, enterprises already run about 50% of their workloads and store 48% of their data in the public cloud — up from 47% and 44% respectively — with organizations anticipating moving an additional 6% of workloads and 7% of data in the next 12 months. Clearly, organizations have come a long way, but most organizations still have about 40% left to migrate to the public cloud.

As the public cloud remains 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, including people from the security and workload 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 workloads slated for migration. It's likely that your enterprise has hundreds or even thousands of workloads to migrate to the cloud, so where do you begin? Start by determining which workloads should be moved to the cloud first.

There are many variables that will impact priorities, including identifying workload dependencies, cloud-readiness, workload SLAs, and physical or virtual infrastructure. Other variables that will also be crucial during the migration include server names, IP addresses, number of VMs or containers per workload, OS and service pack information, CPUs, 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 workloads, we recommend preparing a questionnaire that outlines all of these crucial pieces of information. You can send this to workload owners to help evaluate migration readiness, but also to have key information easily accessible during the migration itself.

It is worth noting, however, that workload 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 result will be a detailed overview of your IT landscape, recommendations on where and how to migrate and/or modernize your workloads, and estimates of what your on-premise versus cloud costs will be. Having this information will be crucial as you progress through your migration planning and execution.

Phase 2

Ask the right questions

Before you start migrating anything and before you even craft your migration plan, it's important to ask the right questions. Having answers for these questions and setting the right expectations across teams is often key for a successful migration. Here are some questions you should consider:

1. **Agents:** Are we okay installing agents on host systems as part of the migration process — in either discovery/assessment or the migration itself?

2. **Testing:** Is there an easy way to test workloads before they are migrated without taking production or live systems offline? Did we notice anything wrong while testing in the cloud that we have to remediate before the official migration, and if so, how can we fix it?

3. **Rightsizing:** Will we get analytics-based recommendations for how to map on-premises instances to cloud instance types, optimized for either performance or cost? Will we get post-migration recommendations to keep performance and spend under control?

4. **Downtime:** Will there be any downtime while migrating the workloads? If so, how much?

5. **Timing:** What, if any, time constraints do we have — such as data center exit or holidays — that might impact our migration? What is the estimate for how long it'll take to migrate any given workload and the data?

6. **Monitoring:** What tools are available to track the migration process while it is in progress?

7. **Rollback:** Can we revert the workload back on-premises if needed? How long does it take? Is all the data from the cloud maintained? What about recent changes?

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.

Get help (if you want it)

Another important question to ask before you embark on a migration is whether you want to do this entirely in-house, or if you'll want the help of a trusted partner. For the latter, you could use a boutique partner who specializes in migrating to your chosen cloud, a larger global partner — like a global system integrator— or even the cloud provider themselves, who often have their own in-house migration teams and professional services to assist. It's also not uncommon for organizations to mix-and-match these options, relying on in-house teams, partners, and the cloud provider for assistance during their migration.

Pick your strategies

Workloads

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 workloads to the cloud without making substantial changes.

2. **Replatform:** Start taking existing workloads and modernizing them, which you can do before migrating, or in some cases, during the migration itself with specialized migration software. Some examples include converting workloads running on VMs into workloads running on containers in GKE, or converting an on-prem SQL database to Google Cloud SQL.

3. **Rebuild:** Take existing workloads that are too difficult to move and rebuild them from scratch in the cloud. In some cases, you might have a workload that is simply too old to migrate, so rebuilding is your only real option. This is sometimes also referred to as "refactoring" or "rearchitecting."

All three options are viable, and in many cases you may end up leveraging all of them at different stages or for different workloads during your migration journey. Usually, though, the smartest and fastest strategy is to start by rehosting and move workloads with minimal changes into the public cloud first. Once workloads 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 a workload usually involves migrating all of its data along with it. Consider the amount of data associated with each workload, 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 workloads, consider solutions that were purpose-built to address the associated complexity of keeping workload data synchronized during the migration and through cutover.

Testing

Testing your workloads 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 workloads perform in the cloud and to make the appropriate adjustments before going live.

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

In some cases, especially early in a migration project, it's useful to run a proof of concept test for some of the workloads 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 workload requires, and your cloud vendor's capabilities and potential limitations — including number of VMs, storage types and size, and network bandwidth.

This information is particularly important with memory-intensive workloads. 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 workload in production.

Data-driven right-sizing is another capability to evaluate when considering migration. With these tools, the solution evaluates use and makes intelligent recommendations for both performance-optimized and cost-optimized operation in the destination cloud. This can help keep cloud budgets in line with expectations without degrading performance.

The more testing done in the beginning, the smoother the migration will be. We advise running tests to validate workload functionality, performance, and costs when running in the cloud, as well as the migration solution's features and functionality.

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

Phase 3

Migrate: Move to the cloud

We recommend that enterprises use a phased, agile approach for moving workloads to the cloud. After each phase, review the results and adjust your plan for lessons learned, if necessary. You may be surprised at how short this section is, and that's for two reasons:

1. Ultimately, every migration is going to be different. There is no "one size fits all" answer we — or anyone else — could give you in a white paper.

2. If you've completed a thorough assessment, planning, and testing, your migration project should be on track for success. Much like this document, most of your time and energy will actually be spent in those aforementioned sections. And, indeed, if you've done all the right planning, then your migration should go quite smoothly.

Phase 4

Optimize: Consider 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 intelligent recommendations, 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 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.

Wrapping up

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

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Your cloud migration checklist

1. Assess

- [ ] Define the resources and capacity your workload requires
- [ ] Create a list of your workloads, including who is using what and how often
- [ ] Identify key stakeholders and involve them early in the process
- [ ] Create a survey for workload owners to define requirements and prioritize your migration pipeline
- [ ] Determine which workloads are cloud-eligible and cloud-desirable
- [ ] Understand workload interdependencies and network configurations
- [ ] Specify security and compliance requirements
- [ ] Validate SLA and high availability requirements
- [ ] Use a software solution to perform a thorough, automated discovery and assessment

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2. Plan

Strategies / Tools

- [ ] Pick a strategy for each workload: rehost, replatform, or rebuild
- [ ] Plan and design the cloud infrastructure including services like networking and security
- [ ] Identify key capabilities for migrating workloads
  - [ ] Support for complex, multi-tier workloads
  - [ ] Pre-migration testing and validation
  - [ ] On-prem rollback
  - [ ] Post-migration customization
- [ ] Determine if you want or need help from partners or the cloud provider
- [ ] Create migration plan for both workloads and their data

Testing

- [ ] Test the migration tools with low-risk workloads
- [ ] 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 workload cutover
- [ ] Consider cloud right-sizing recommendations

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3. Migrate

- ☐ Migrate in phases according to the plan created
  - ☐ Execute migration wave
  - ☐ Validate in cloud
  - ☐ Apply lessons to next wave
- ☐ Apply lessons learned

4. Optimize

- ☐ Monitor workload and cloud usage
- ☐ Leverage automated recommendation platforms for post-migration insights and advice
- ☐ 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 by visiting

https://cloud.google.com/solutions/migration-center

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