



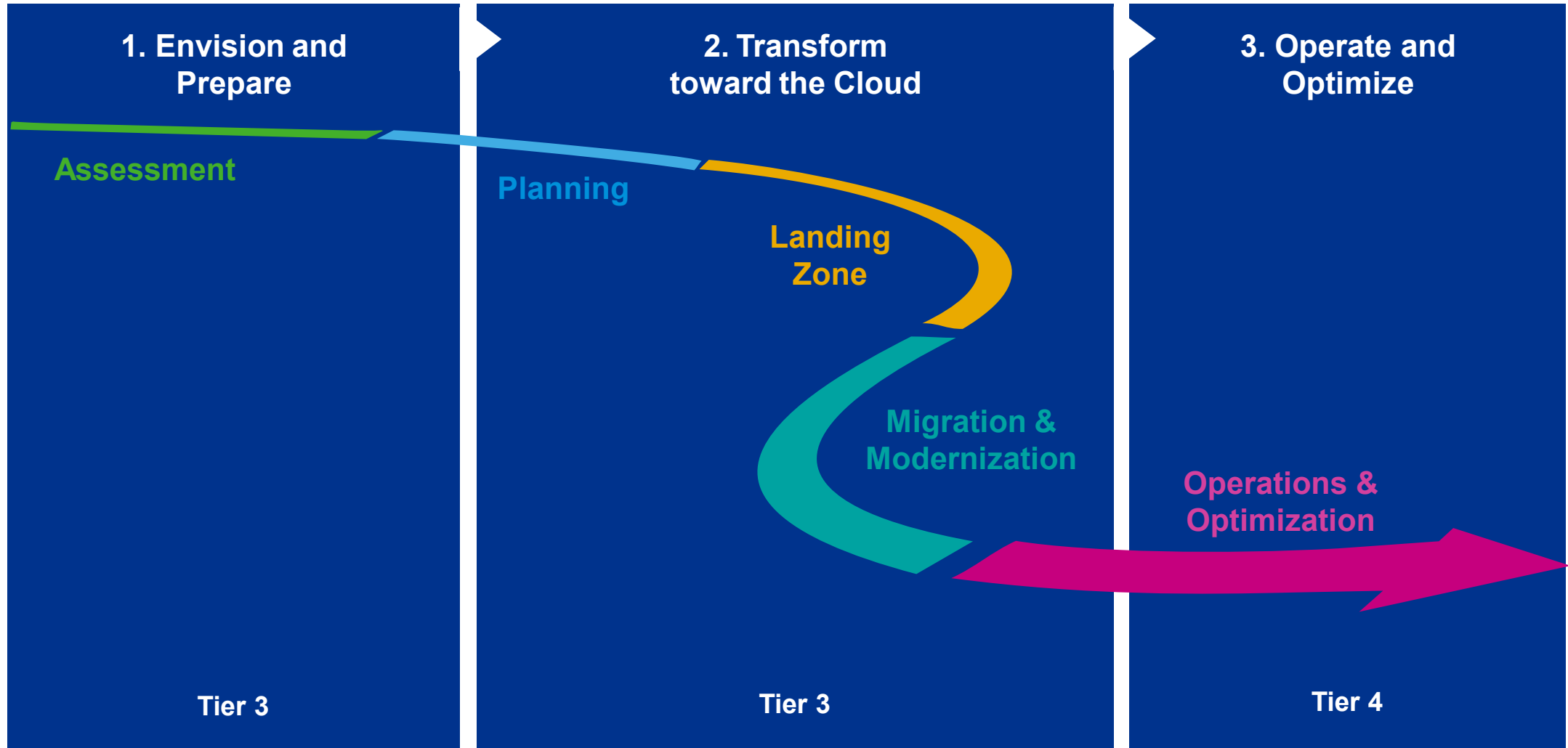
# Nimbus CCoE Cloud Migration Webinar

Nimbus Cloud Center of Excellence  
Government of Israel

February 2022



# Nimbus Cloud Migration Journey



# Before we Start: Why Diligent Assessments are Important



Executing just regular “Lift-and-Shift” of systems **will not bring the desired cost savings** – actual optimization is required, but for which ones?



Regulatory aspects regarding **security, compliance, and data protection** must be considered carefully and answered for each system individually

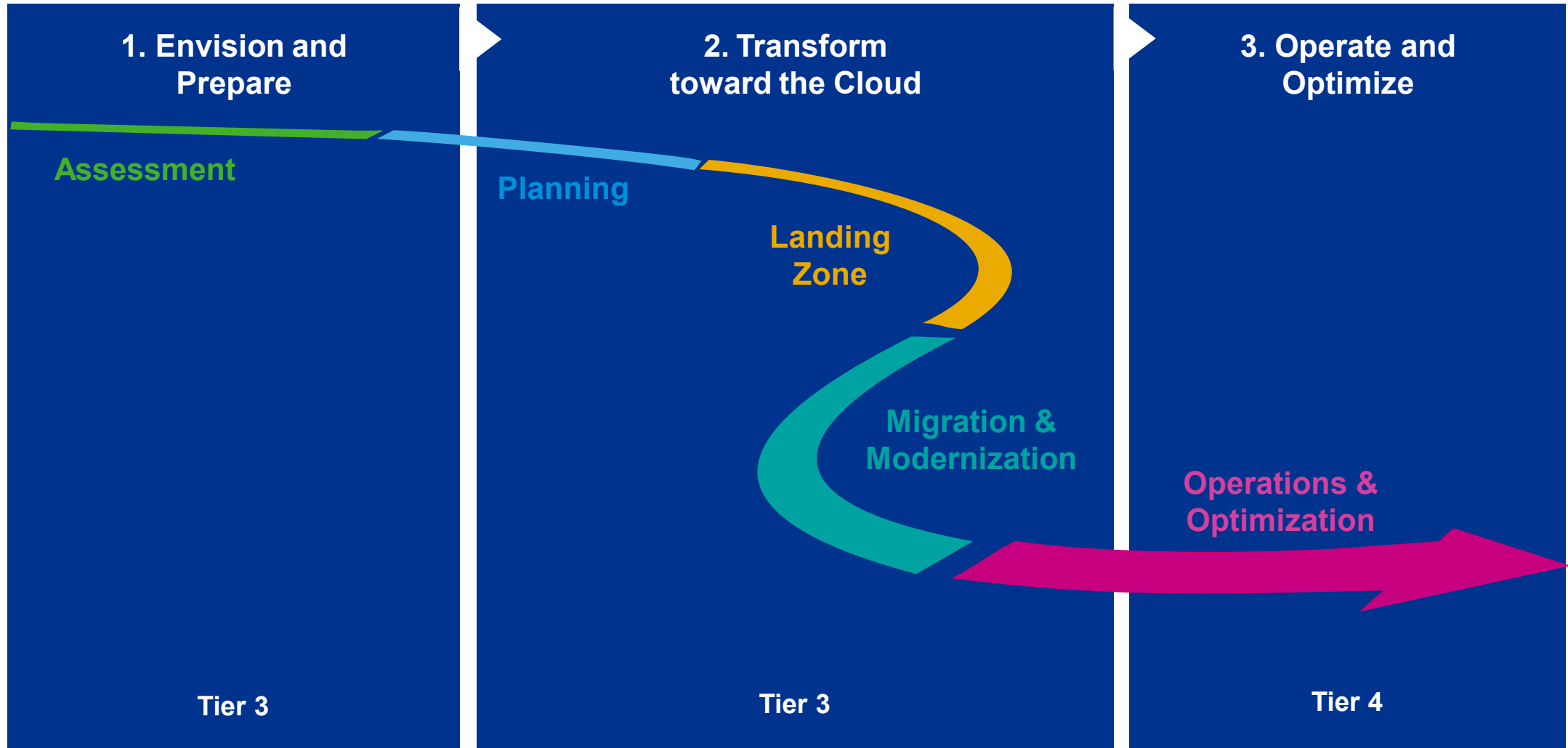


**Technical cloud compatibility is not guaranteed** but must be ensured based on verification of key requirements for operating systems, latency, and other factors

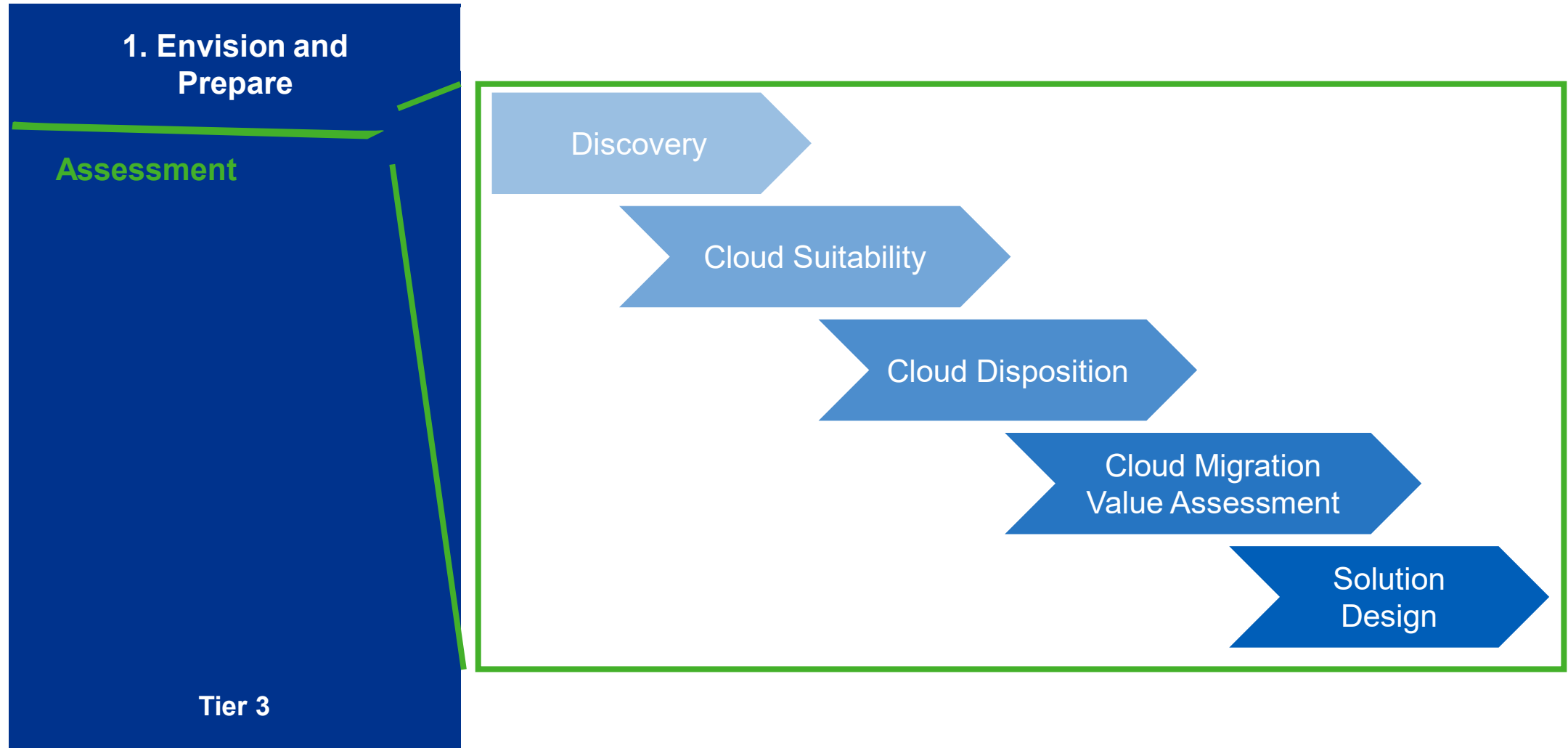


**Value add and modernization opportunities** are not always clear but can be elusive – which disposition makes the most sense? Rehosting, refactoring, replatforming?

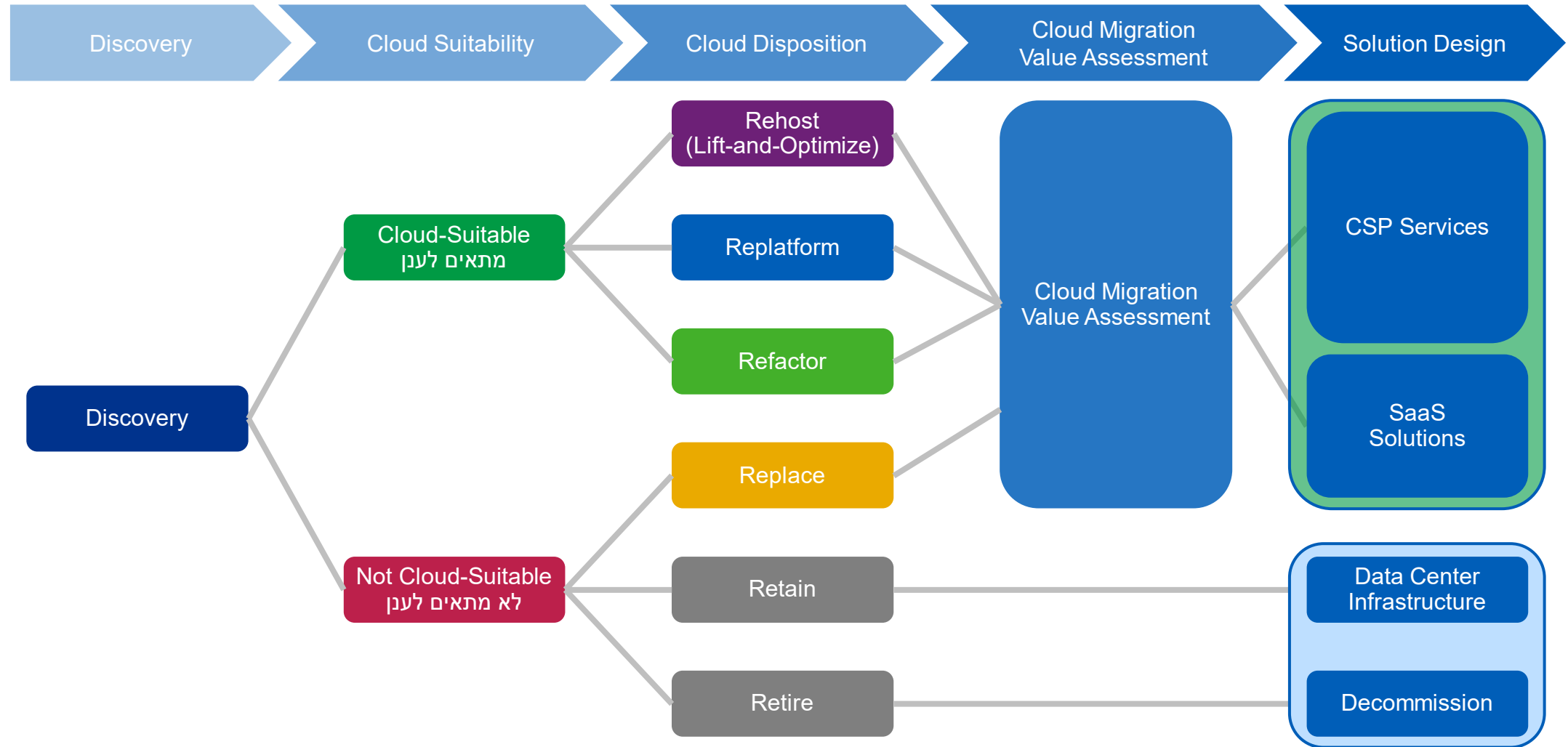
# Nimbus Cloud Migration Journey



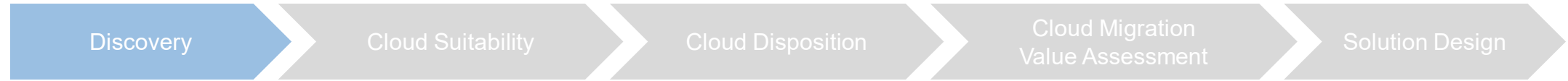
# Nimbus Cloud Migration Assessment



# Nimbus Cloud Migration Assessment Details



# Discovery / Infrastructure and Application Inventory

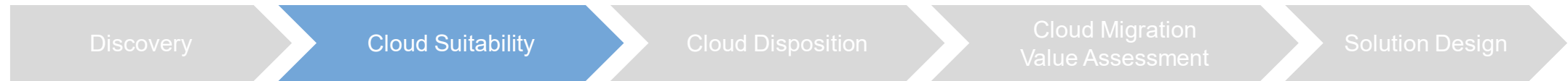


Workload Information			Business Information						Workload Architecture							
ID	Workload name	Workload description (e.g., application or infrastructure type, functionalities, purpose, capabilities)	Business Priority			Involved Stakeholders		Workload Licenses			Workload Architecture					
			User Count	Immediate Impact on Business Revenue (In Case of Downtime)	Business Dependencies	Business Owner	System Owner/ Solution Architect	License Owned By	Total License Costs per Year	Sum of other Costs per Year	Type of Workload Hosting	Name of IaaS Provider	Current Hosting Location	Third Party End User Access Needs	Third Party Access Name	Integration/ Interface Needed
01	Government Travel Expense System owned by the Ministry of Finance	A workload that is used by all Government employees to ensure they reimbursement of travel costs incurred as a result of work-related movements. The Ministry of Finance owns the workload and can approve the requests within the system.	30	Low	High, central and singular travel booking tool for all Government representatives.	John Doe	Thomas Anderson	Israeli Government	\$ 200,000,00	\$ 50,000,00	on-premise	N/A	N/A	No	N/A	Yes
02	Land Registration System within the Ministry of Justice	A workload that can be used by a citizen to register the land they purchased during a legal transaction. Employees of the Settlement of Land Rights Department have access to inserted data and can update it.	50	Medium	Medium, only one department uses workload but all citizens can access front-end to enter data.	James Smith	Sandra James	Israeli Government	\$ 175,000,00	\$ 80,000,00	on-premise	N/A	N/A	No	N/A	Yes
03	Customer Relationship Management System owned by the Government Procurement Administration	A workload that is used to manage interactions between Government representatives and external partners who provide products or services to the Government or its affiliates (incl. citizens). The Government Procurement Administration owns this	4	Medium	High, primary procurement tool for all Government representatives.	Lisa Miller	Laura Murphy	Israeli Government	\$ 600,000,00	\$ 150,000,00	on-premise	N/A	N/A	No	N/A	Yes



- **Workload information:** workload name, workload description
- **Business priority:** user count, immediate impact of downtime on business revenue, business dependencies
- **Involved stakeholders:** business owner, system owner / solution architect
- **Workload licenses:** license owner, total annual license costs, sum of other annual costs
- **Workload architecture:** type of workload hosting, name of IaaS provider, current hosting location, third-party end user access needs, third-party access name, integration/interface needed
- **Migration planning:** current operating system environment, maximum operating system environment
- **Migration execution:** hosting server name, minimum vCPUs, minimum RAM, provisioned app/data storage, provisioned database storage

# Cloud Suitability: List of Criteria



## Managed Service Providers

Managed service providers can specify terms in their contracts with stipulations pertaining to Cloud hosting. If a managed service provider states they will not manage workloads hosted on Cloud, the workload(s) will not be suitable for Cloud.

## Latency

If an workload can not tolerate increased latency, the workload is not immediately suitable for Cloud.

## Licensing

Software agreements may state that workloads may not use their licenses on Cloud instances. If an agreement has this stipulation, the workload is not suitable for Cloud.

## Operating Systems

Cloud service providers support many but not all operating systems, especially earlier versions. If the current OS has a customized kernel, GUI or is not supported by a Cloud Service Provider, then it is not suitable for the Cloud.

## Software

Software providers may stipulate in their agreements that Cloud hosting is not allowed. If the software provider stipulates this, then it is not suitable for Cloud.

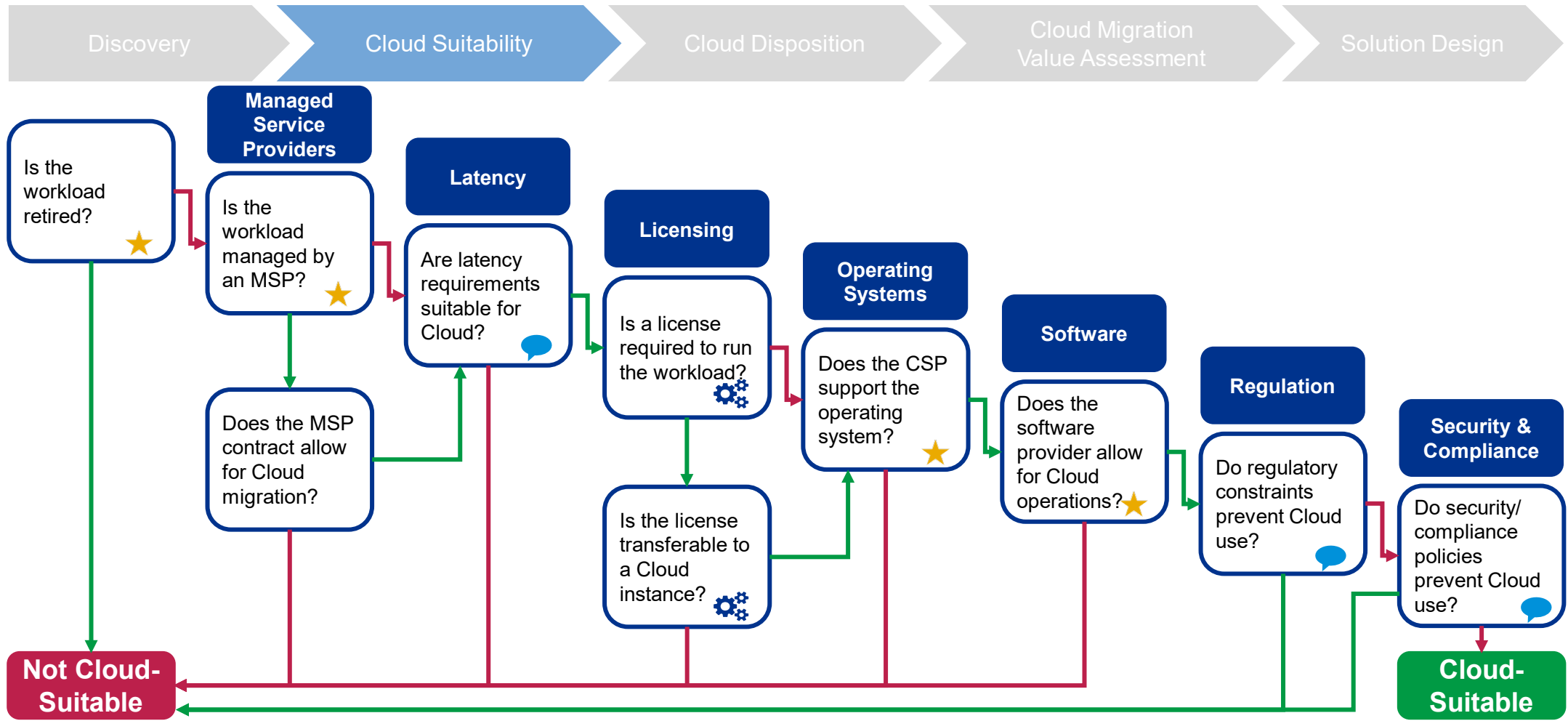
## Regulation

If any regulations stipulate Cloud hosting cannot be used, then the workload is not Cloud suitable.

## Security & Compliance

If any internal security or compliance policies state Cloud hosting cannot be used, then the use case or workload is not Cloud suitable. (e.g. Data Classification does not allow for it)

# Cloud Suitability: Decision Tree

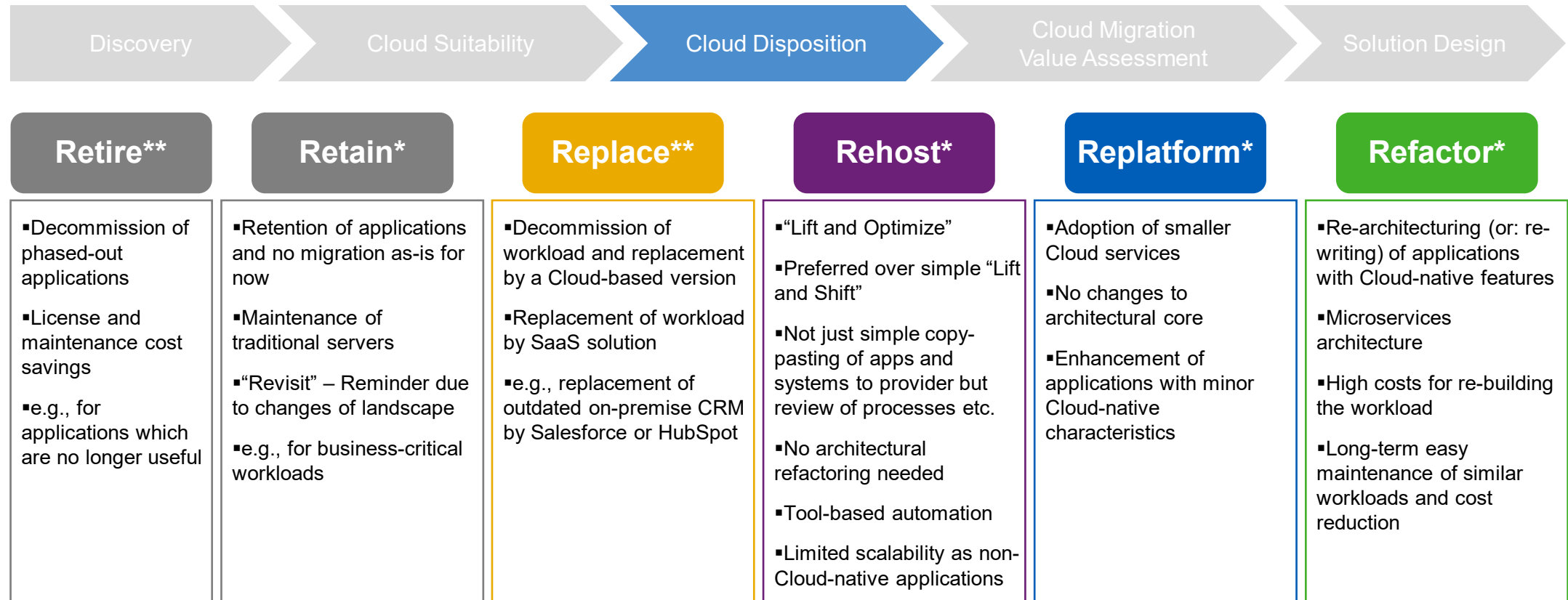


OS = operating system

**Legend:**

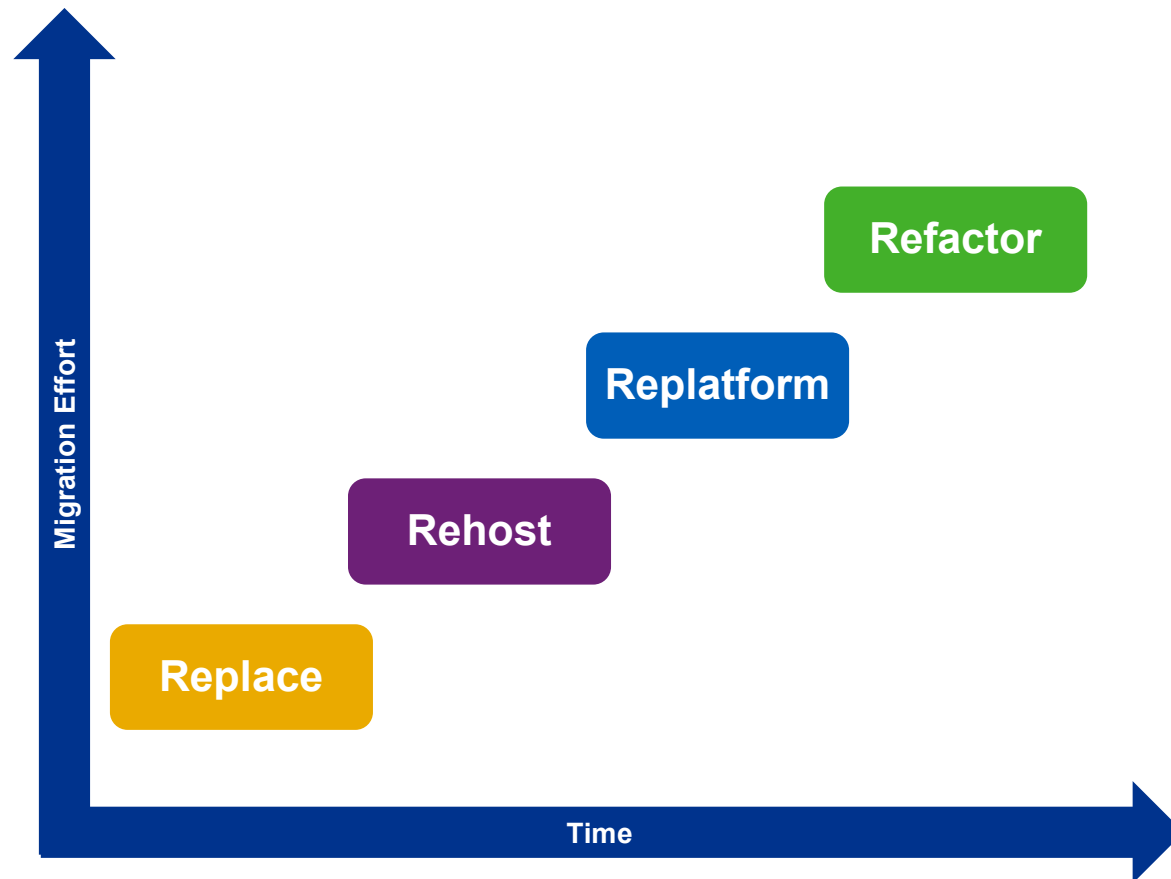
- Yes
- No
- ★ CMDB Data
- ⚙️ Analysis
- 💬 Assumption

# Cloud Disposition: Hosting Choices Overview



**Legend:** \*Technical Decision \*\*Business Decision

# Cloud Disposition: Migration Strategies Illustration



- **Replace** and **Rehost** are the **fastest** migration methods and **simplest** way to migrate to the Cloud.

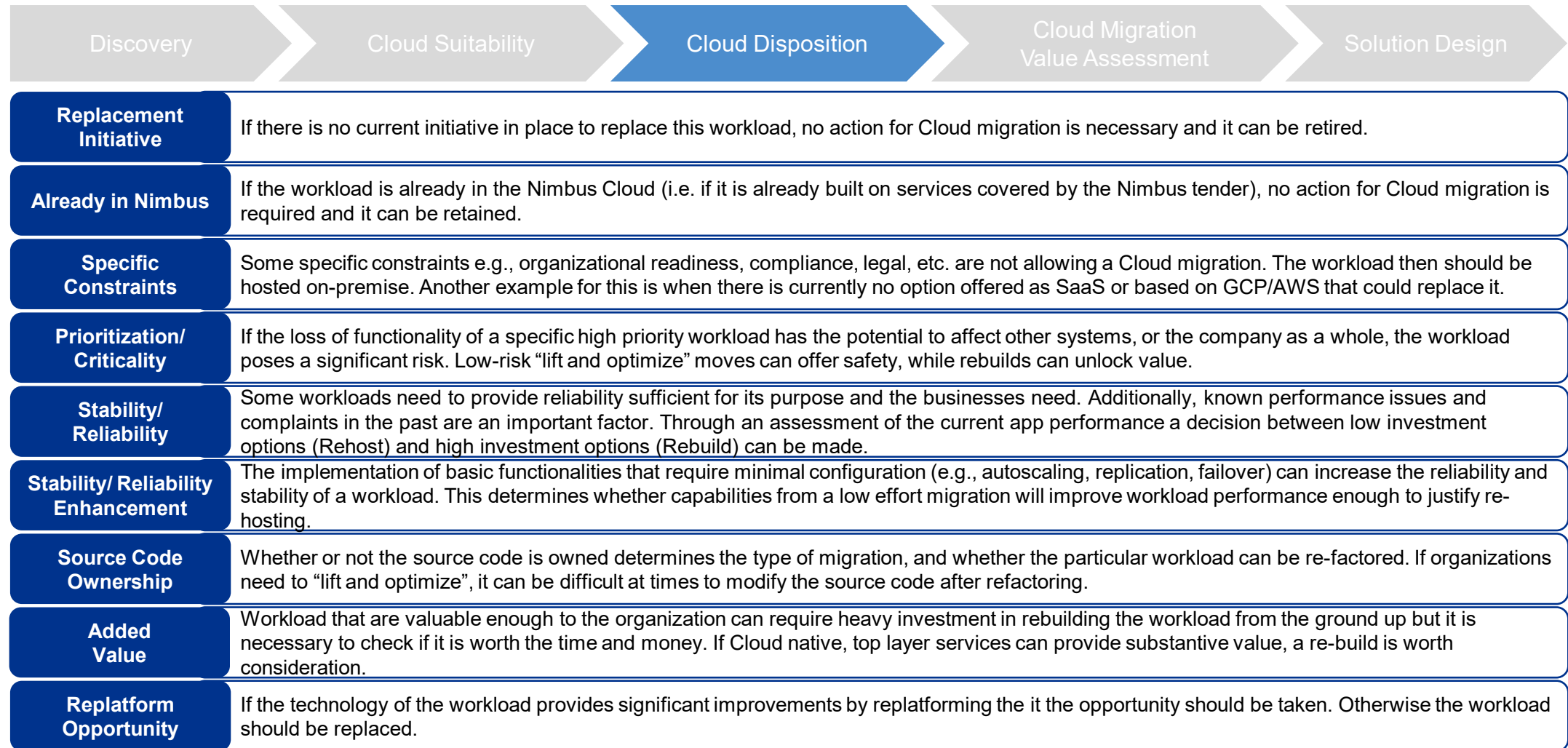
- However during changes you **limit the potential benefits**.

- **Refactor** is the **most costly, complex and time consuming** migration method, but the **most advantageous** in terms of **Cloud capabilities and benefits**.

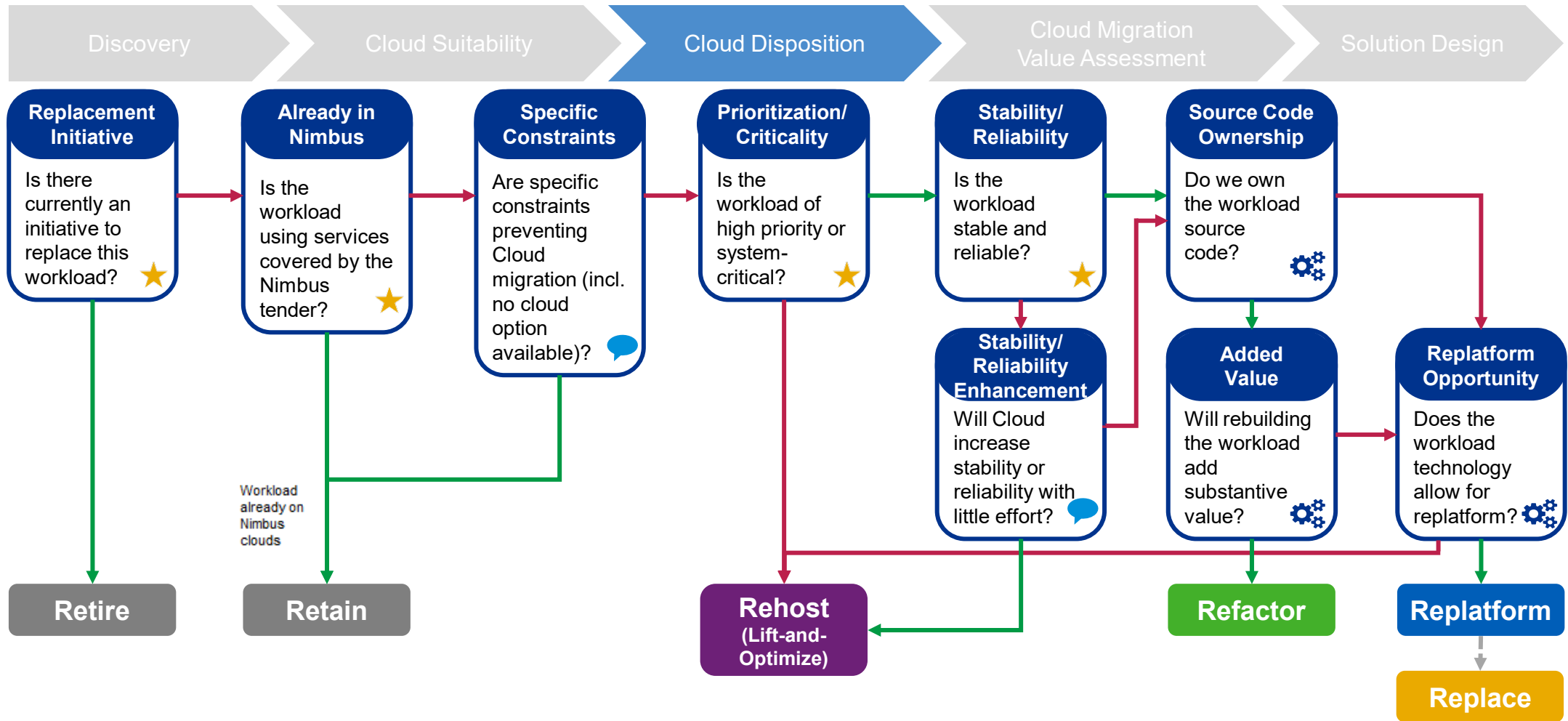
- **Rehost** is the **most common starting point** in a migration project, but not as a “complete strategy”.

- Once the applications are already in the Cloud, it is **easier to use the re-factor method**.

# Cloud Disposition: List of Criteria

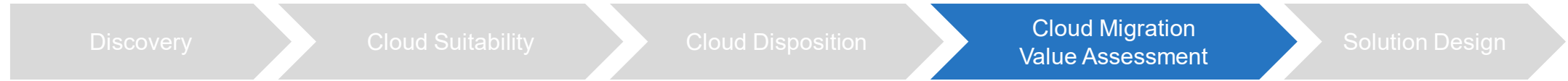


# Cloud Disposition: Decision Tree



**Legend:** — Yes — No ★ CMDB Data ⚙️ Analysis 💬 Assumption

# Cloud Migration Value Assessment: Business Case



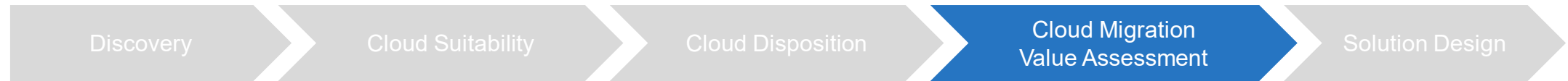
### Migration Business Case Inputs

<b>Cloud Disposition Type</b> suggested based on previous suitability and disposition assessments (Rehost/ Replatform/ Refactor/ Replace)	
 Associated Migration Value	<b>Business Value</b> (incl. criticality, user count, transaction count)
	<b>Technological Value</b> (incl. lifecycle optimization, low-tech decommission)
	<b>Operational Value</b> (incl. process improvements, simplification, efficiency)
	<b>Financial Value</b> (incl. current vs. projected workload costs, revenue opportunities)
 Associated Migration Cost	<b>Human Resource Costs</b> (incl. personnel, experts, upskilling, training)
	<b>Cloud Architecture Costs</b> (incl. hardware, software, changes, support)
	<b>Cloud Provider Costs</b> (incl. licenses, storage, support, run time costs)
	<b>Post-Migration Costs</b> (incl. maintenance, further improvement)

### Migration Business Case Outputs

 Resulting Financial Benefits	<b>Net Present Value (NPV)</b> of suggested Cloud migration disposition type
	<b>Payback Period (PBP)</b> of suggested Cloud migration disposition type
	<b>Other Financial Indicators</b>
 Resulting Non-Financial Benefits of suggested Cloud disposition type	

# Cloud Migration Value Assessment: Cost Deep Dive



## Human Resource Costs

- **Personnel** (incl. external experts)
- **Upskilling, training, launch support, and end user support** (incl. help desk, item resolution)
- **Project management and business analysis** (incl. initial assessment, agile initiatives, quality control)
- **Impact of Landing Zone decision** (incl. savings when relying mostly on central eGov cloud team)

## Cloud Provider Costs

- **Licensing** fees (off-the-shelf)
- **Customization** ad-on charges
- **Storage** charges
- **Support** services (incl. setup)
- **Run time** cost (incl. instances, traffic, memory, storage, support)

## Cloud Architecture Costs

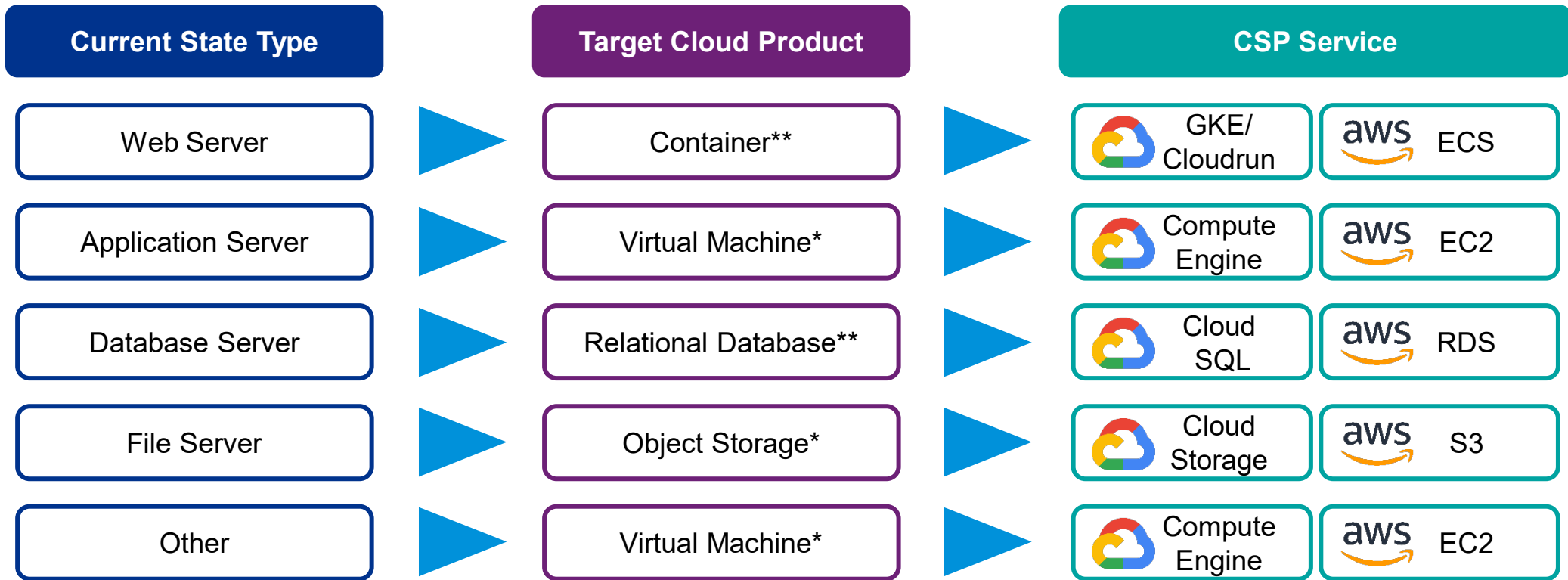
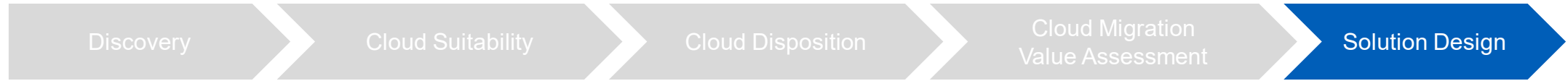
- **Hardware** purchase or lease
- **Software** development or purchase (incl. analysis, design, coding, testing, release)
- **Interfaces or data handling** (incl. consolidation, remediation, integration)
- **Retirement**
- **Impact of Landing Zone decision** (incl. connectivity)

## Post-Migration Costs

- **Maintenance** (incl. performance adjustments)
- Cost associated to **further improvement** of Cloud environment (incl. upgrades, joint ongoing development)

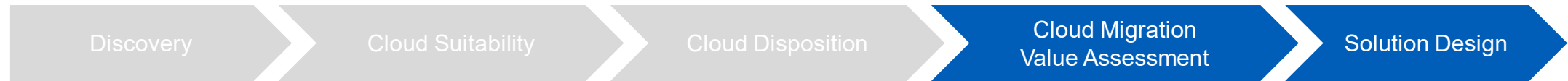
Cost impact of Landing Zone Approach to be considered!

# Solution Design: Traditional IT Infrastructure in the Cloud



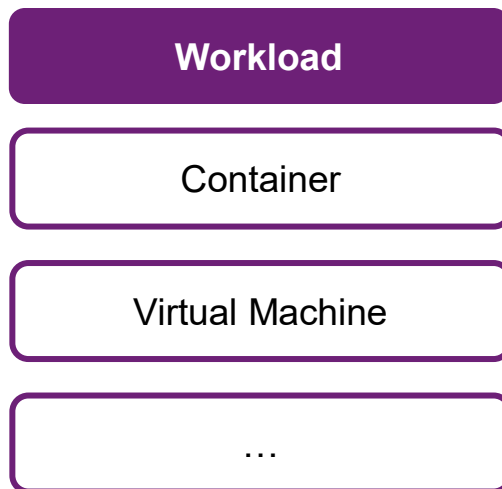
**Legend:** \*Rehost to IaaS \*\*Replatform to PaaS

# Solution Design: Service-Based GCP vs. AWS Hosting Decision



## Decision should be:

- On a workload-by-workload basis
- Based on a high-level solution design to compare vendors
- Influenced not only by costs but also other aspects
- Supported by AWS- and GCP-certified experts



## CSP Services



GKE/  
Cloudrun

Compute  
Engine



aws ECS

aws EC2

# Nimbus Cloud Migration Assessment

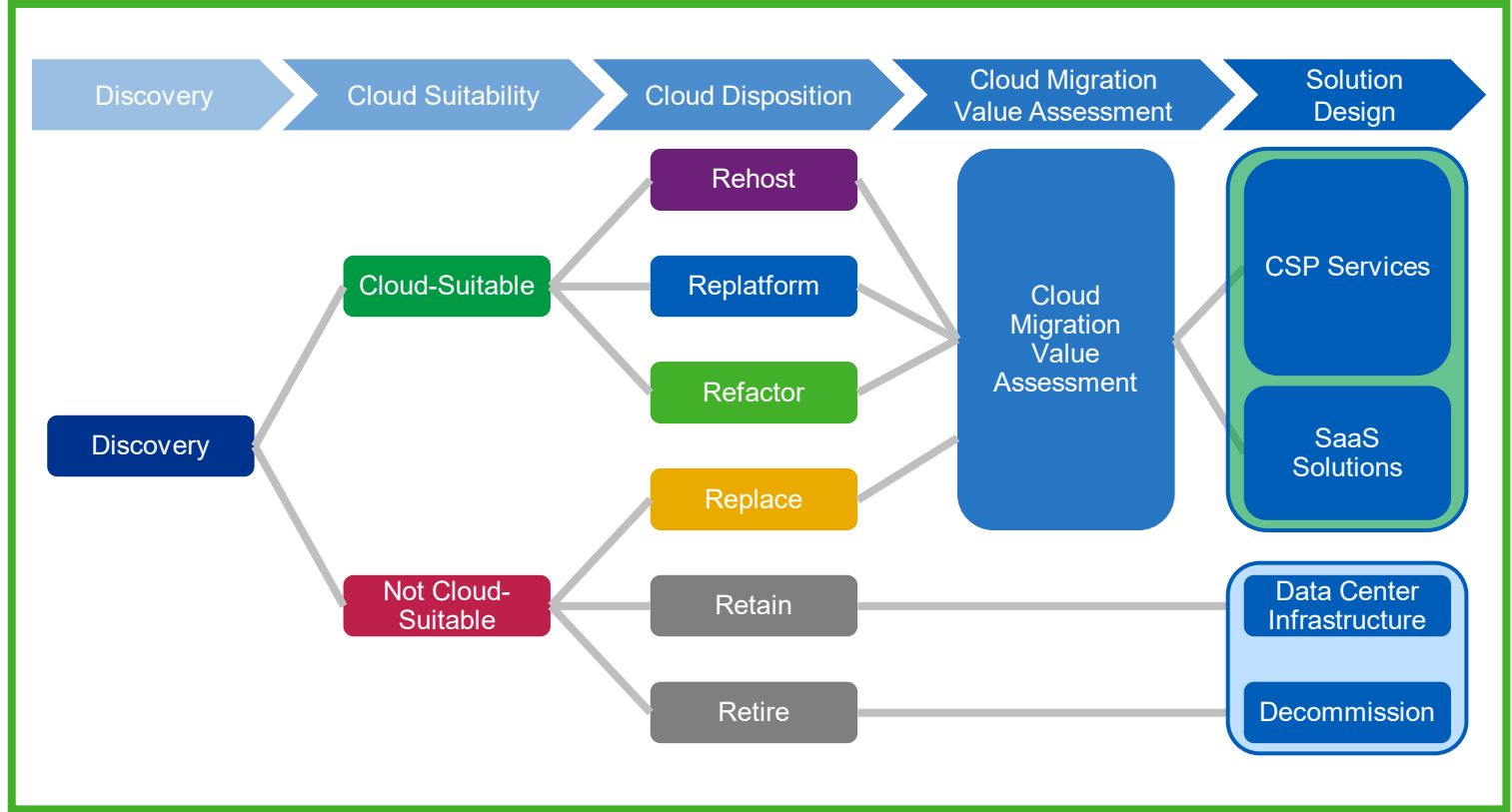


 Responsible contact person per Ministry

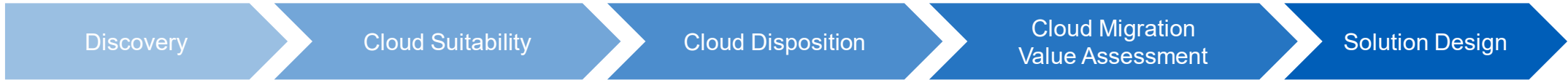
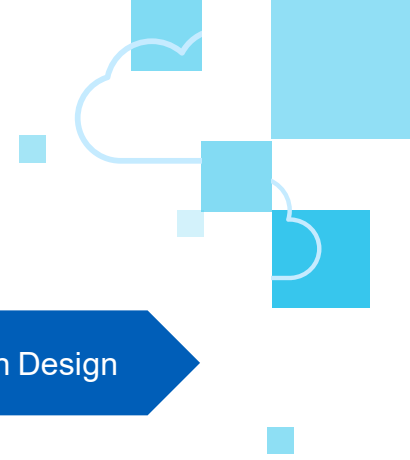
**1. Envision and Prepare**








**Assessment**

**Tier 3**



# How to? Use of Tools



<p><b>CSP-native migration capabilities</b></p>	 <b>StratoZone</b>	 <b>Migration Evaluator</b>
<p><b>Third-party migration and assessment tools</b></p>	 <b>Quest</b>	 <b>CARBONITE</b>
<p><b>IT service management tools / CMDBs</b></p>	 <b>servicenow</b>	 <b>CLASSIAN</b>
<p><b>Manual assessment approaches</b></p>		
<p><b>Consulting support with technical cloud architecture and migration services</b></p>		<p><b>Tender 3 – Digital Tech</b></p>

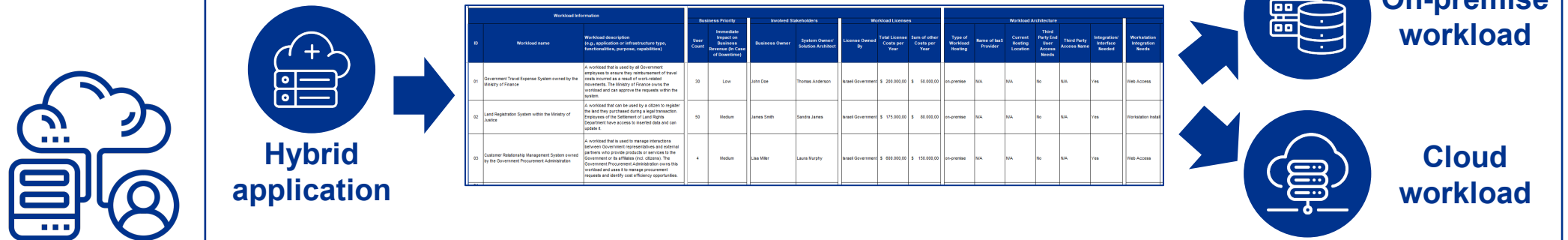
*Illustrative examples only*

**Additional considerations to keep in mind**

# What about Hybrid Environments?

How are hybrid deployments considered in the migration process? How do they receive a review across the suitability and disposition assessment frameworks?

Hybrid systems should be conceptually separated into pure on-premise or Cloud workloads before Cloud suitability and disposition assessments. This should be done as **part of Discovery**.



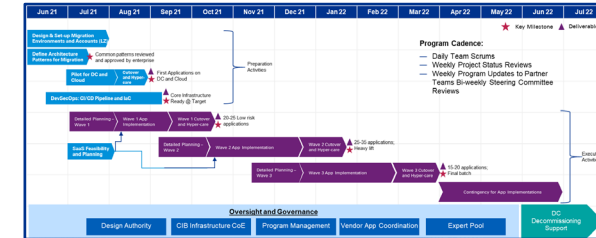
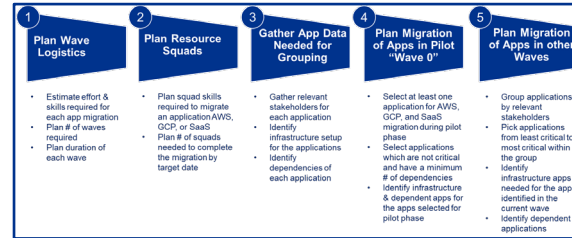
Hybrid applications etc. have a mixed/combined setup of on-premise and Cloud hosting due to **specific requirements for certain workloads** (e.g., latency requirements only allow for on-premise hosting).

In this way, the outcome of the migration assessment for an application overall can be **mixed** with a **Retain recommendation for some workloads** and a **Replace/Rehost/Replatform recommendation for others**.

# What about App Dependencies?

How are application dependencies considered in the migration process?

Considering **application and workload dependencies** is an important step of migration planning. Here, dependencies between to be migrated workloads should be assessed and grouped into **waves/tranches**.



As part of **migration planning**, **connected workloads should be grouped into wave and tranches** to reconcile **dependencies, functionality, and criticality levels**. The outcome of this process will be a migration plan with separate detailly planned migration tranches.

**Microservice architecture** can break down application functions into smaller independent sections of code, which are able to run independently, and hence reduce complexity and dependencies.

# What about Risk Assessments?

## How are risk assessments considered in the migration process?

As a whole, the **entire process of Cloud migration assessment can also be understood as a risk assessment**. The **criteria for Cloud suitability and disposition function as checks across categories**:

- **Technological risks:** Are specific constraints preventing Cloud migration? Are the latency requirements suitable for Cloud? Is the operating system supported by the CSP?
- **Business risks:** Is the workload of high priority or system-critical?
- **Strategic risks:** Do we own the workload source code? Will rebuilding the workload add substantive value?
- **Regulatory risks:** Are there regulatory constraints that prevent Cloud use?
- **Security and compliance risks:** Are there security/ compliance policies preventing Cloud use?



Managed Service Providers	Managed service providers can specify terms in their contracts with stipulations pertaining to Cloud hosting. If a managed service provider states they will not manage workloads hosted on Cloud, the workload(s) will not be suitable for Cloud.
Latency	If an workload can not tolerate increased latency, the workload is not immediately suitable for Cloud.
Licensing	Software agreements may state that workloads may not use their licenses on Cloud instances. If an agreement has this stipulation, the workload is not suitable for Cloud.
Operating Systems	Cloud service providers support many but not all operating systems, especially earlier versions. If the current OS has a customized kernel, GUI or is not supported by a Cloud Service Provider, then it is not suitable for the Cloud.
Software	Software providers may stipulate in their agreements that Cloud hosting is not allowed. If the software provider stipulates this, then it is not suitable for Cloud.
Regulation	If any regulations stipulate Cloud hosting cannot be used, then the workload is not Cloud suitable.
Security & Compliance	If any internal security or compliance policies state Cloud hosting cannot be used, then the use case or workload is not Cloud suitable.

Replacement Initiative	If there is no current initiative in place to replace this workload, no action for Cloud migration is necessary and it can be retired.
Existing Cloud Environment	If the workload is already in the Cloud, no action for Cloud migration is required and it can be retained.
Specific Constraints	Some specific constraints e.g., organizational readiness, compliance, legal, etc. are not allowing a cloud migration. The workload then should be hosted on-premise.
Prioritization/ Criticality	If the loss of functionality of a specific high priority workload has the potential to affect other systems, or the company as a whole, the workload poses a significant risk. Low risk lift and shifts can offer safety, while rebuilds can unlock value.
Stability/ Reliability	Some workloads need to provide reliability sufficient for its purpose and the business need. Additionally, known performance issues and complaints in the past are an important factor. Through an assessment of the current app performance a decision between low investment options (Re-host) and high investment options (Re-build) can be made.
Stability/ Reliability Enhancement	The implementation of basic functionalities that require minimal configuration (e.g., autoscaling, replication, failover) can increase the reliability of an workload. This determines whether capabilities from a low effort migration will improve workload performance enough to justify re-hosting.
Source Code Ownership	Whether or not the source code is owned determines the type of migration, and whether the particular workload can be re-factored. If organizations need to lift and shift, it can be difficult at times to modify the source code after refactoring.
Added Value	Workload that are valuable enough to the organization can require heavy investment in rebuilding the workload from the ground up but it is necessary to check if it is worth the time and money. If Cloud native, top layer services can provide substantive value, a re-build is worth consideration.
Replatform Opportunity	If the technology of the workload provides significant improvements by replatforming the it the opportunity should be taken. Otherwise the workload should be replaced.

# What about Stability and Reliability?

How are the aspects of stability and reliability considered in the migration process?



**Stability/Reliability Enhancement** The implementation of basic functionalities that require minimal configuration (e.g., autoscaling, replication, failover) can increase the **reliability and stability of a workload**. This determines whether capabilities from a low effort migration will improve workload performance enough to justify re-hosting.

## Stability

= being able to return to an initial or previous operating state after a change or disturbance.

**Reliability**  
= being able to deliver a consistently performing and available process in the face of potential failure.

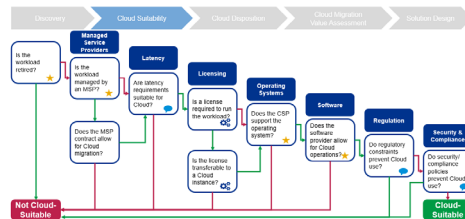
	Low stability	High stability
Low reliability	<p><b>Backend ERP system used by newly released government news citizen app.</b> Subject to <b>frequent failures and outages</b> as well as <b>generally volatile performance</b>. In case of outage, on top <b>limited recovery of performance elements</b> to a previous state.</p> <p>→ <b>Rehosting on Cloud</b> could improve both <b>stability and reliability</b>.</p>	<p><b>Procurement CRM system</b> which, while impacted by <b>frequent failures and outages</b> due to high and heterogeneous volume, is able to <b>produce full, quick, and automated restoration of data, systems, and intermediate products</b> to a previous state.</p> <p>→ <b>Rehosting on Cloud</b> could improve <b>lacking reliability</b>.</p>
High reliability	<p>Low-tech <b>land registration system</b> with <b>rare outages</b> and <b>usually consistent performance</b>. However, in case of actual outage, <b>complex and effortful restoration</b> with <b>limited ability to recover lost data</b> due to reliance on scanned paperwork.</p> <p>→ <b>Refactoring, Replatform, or Replacing</b> to be assessed.</p>	<p>Web-based <b>government travel expense system</b> which has <b>rare outages</b> and delivers generally <b>consistent performance</b>. In rare case if needed, <b>full and automated restoration of data and bookings</b> to a previous state.</p> <p>→ <b>Refactoring, Replatform, or Replacing</b> to be assessed.</p>

# What about Data Classification?

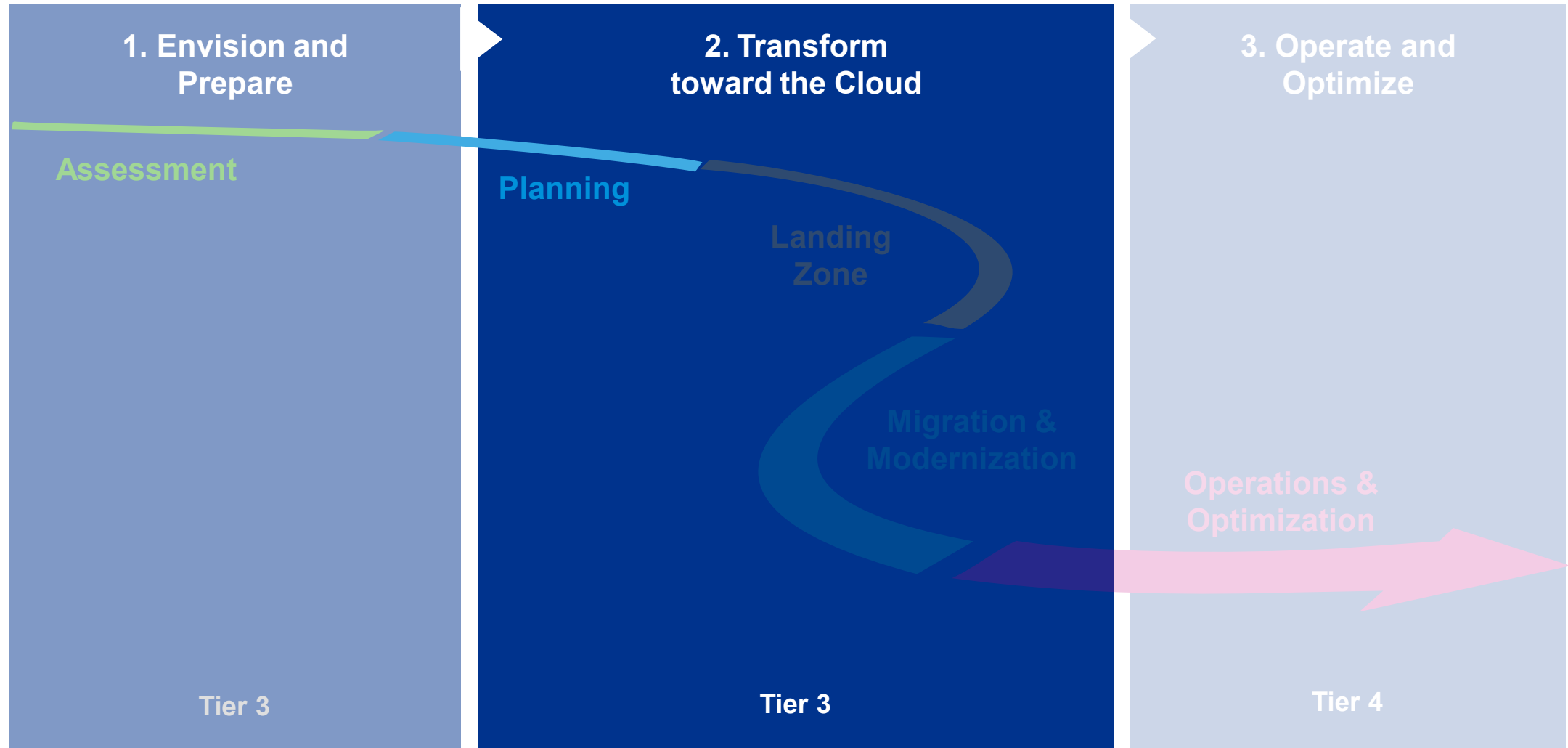
How is data sensitivity considered in the migration process? How is ensured that all necessary data safeguards are applied before, during, and after migrations?

## Considerations for Examining Information Classification during the Security & Compliance Check in the Cloud Suitability Assessment:

- **Information Publicity:** Does the workload contain information with a higher classification level than “unclassified”?
- **Privacy Protection:** Does the workload contain information of sensitive, risky, or medical nature or direct or indirect identifiers?
- **Nature of Data Use in the Cloud:** Will the data be used in a development or testing environment only?
- **Damage Potential:** What kind of damage will occur if the information is lost or leaked?

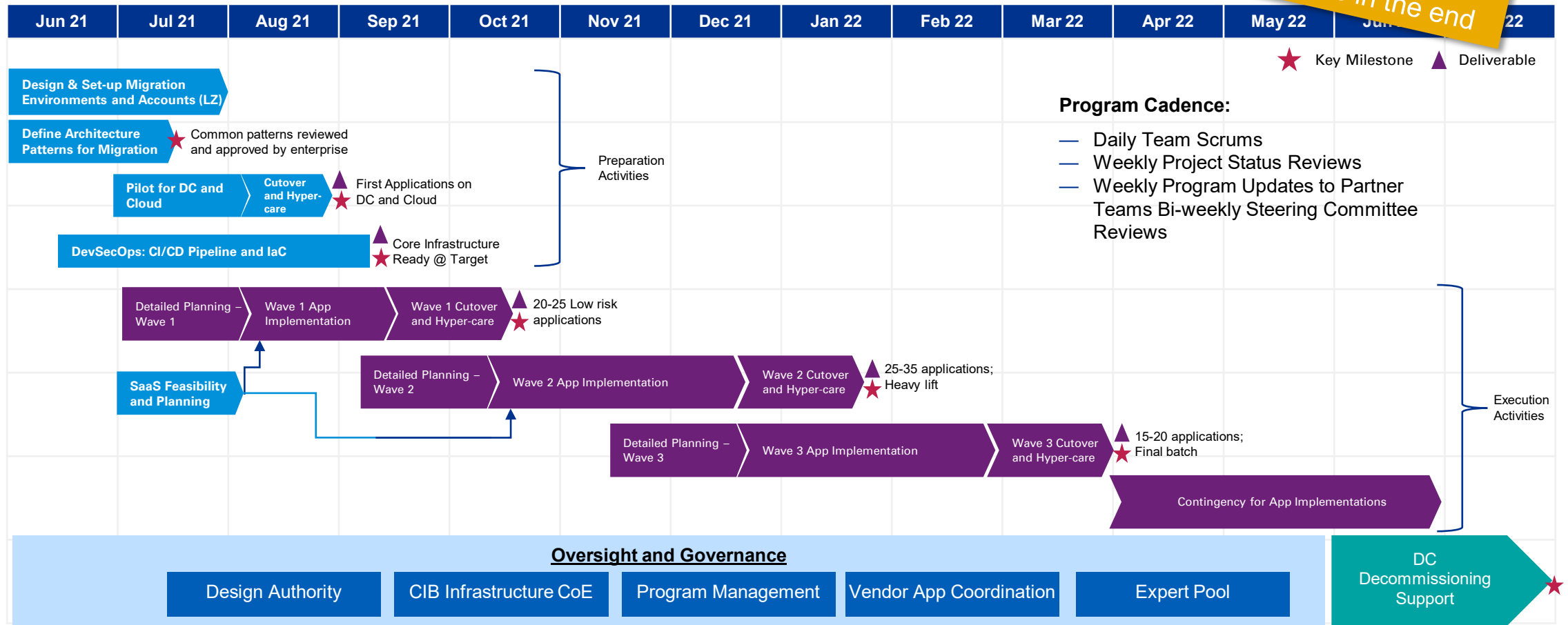


# Outlook into what is upcoming



# Sample Detailed Migration Roadmap

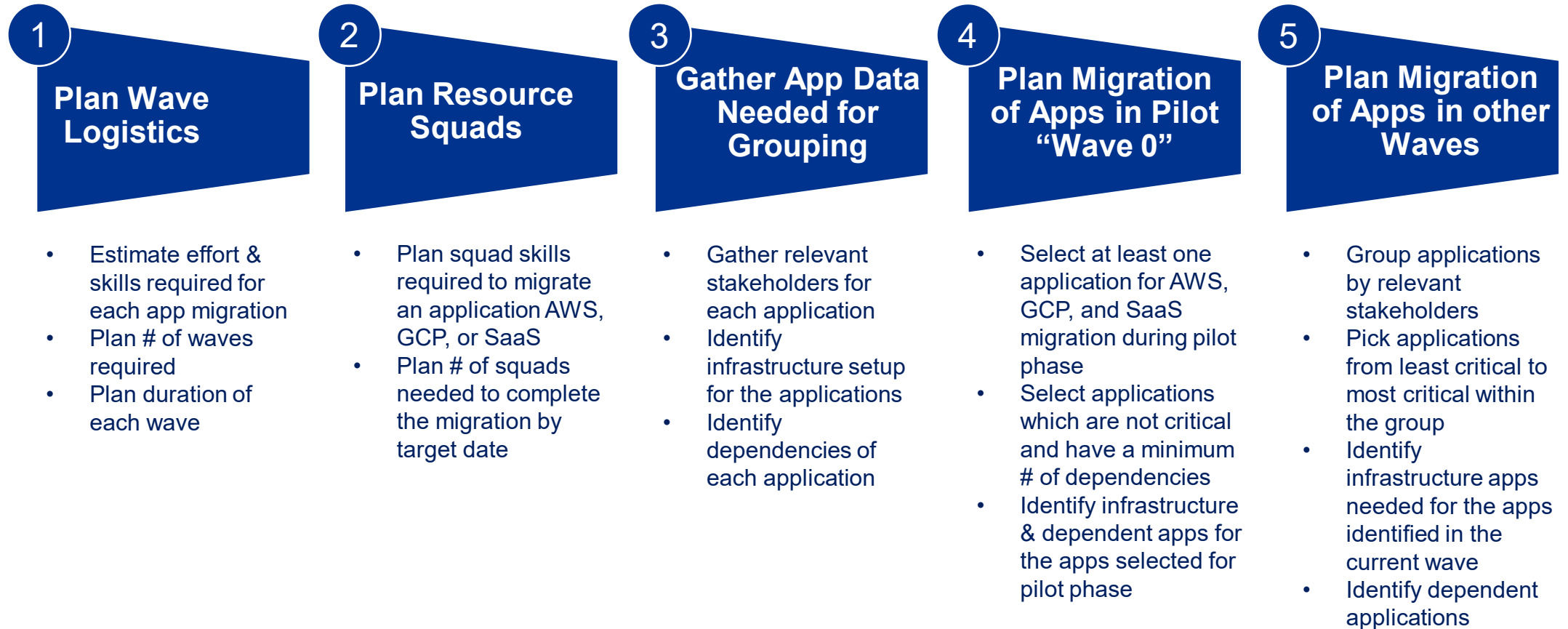
Illustrative Migration Roadmap  
This is what it usually looks like in the end



- Program Cadence:**
- Daily Team Scrums
  - Weekly Project Status Reviews
  - Weekly Program Updates to Partner Teams Bi-weekly Steering Committee Reviews

# Success Factor #1: Migration Wave/Tranche Grouping Criteria

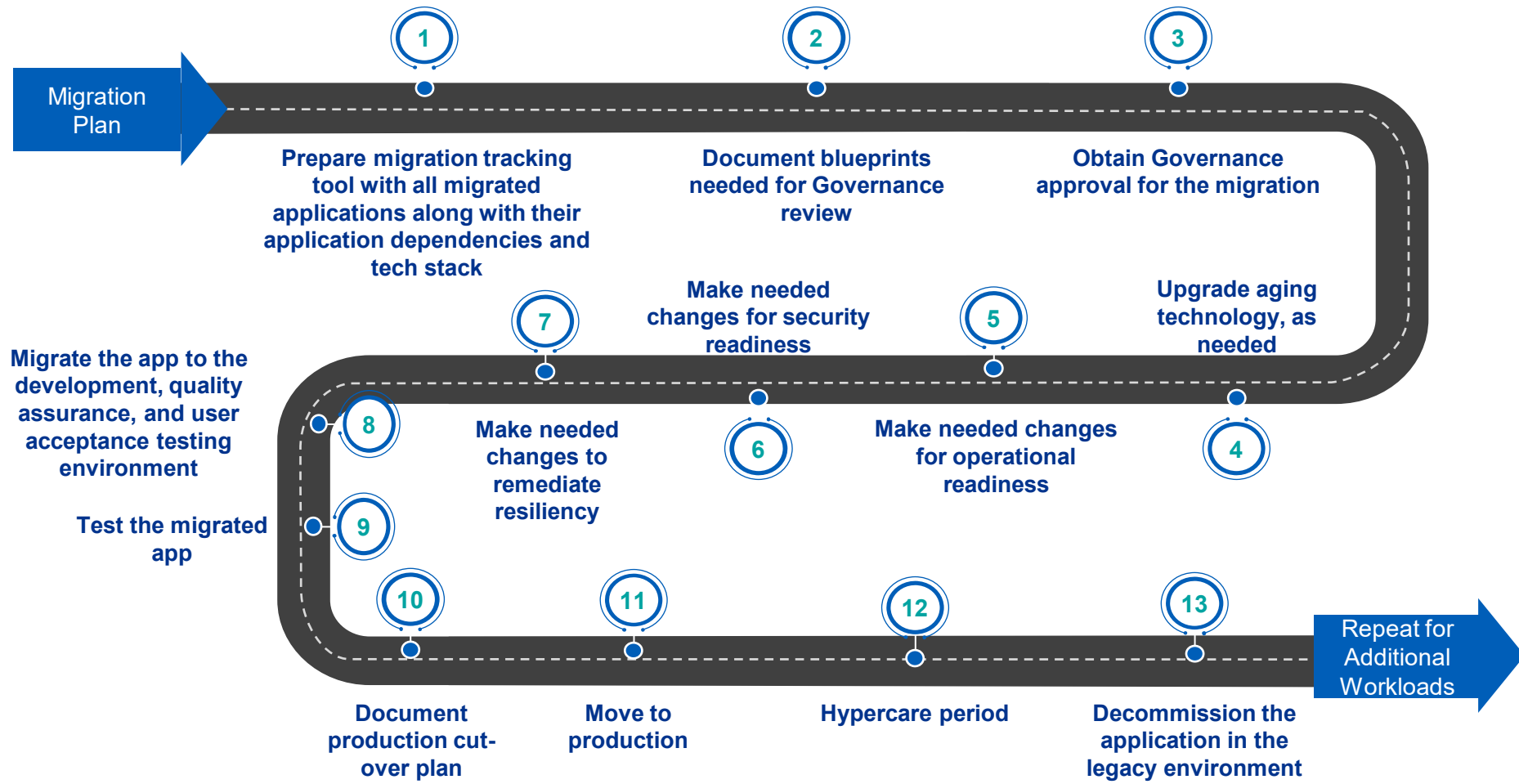
Outlook only!



# Success Factor #2: Cloud Migration Factory Process Flow

Factory = Team & Tools working like a production line on migrations along a process like this:

Outlook only!



# Success Factor #3: Leveraging of Modernization Opportunities

Also for Lift & Optimize Scenarios



**Cloud**

- Provides scalable application architecture
- Reliable and streamlined releases of code
- Optimize automation capabilities throughout the CI/CD pipeline
- Low-barrier access to emerging technologies and XaaS



**Infrastructure as Code**

- Single source of infrastructure descriptions driven by files in code-repo
- Repeatable deployment allows for testing and resetting quickly
- Configuration changes checked in like code allows traceability on changes to infrastructure



**Containers**

- Greatly reduce resources needed to stand-up environments
- Define identical environments for development, testing, and deployment
- Allows for scale by design

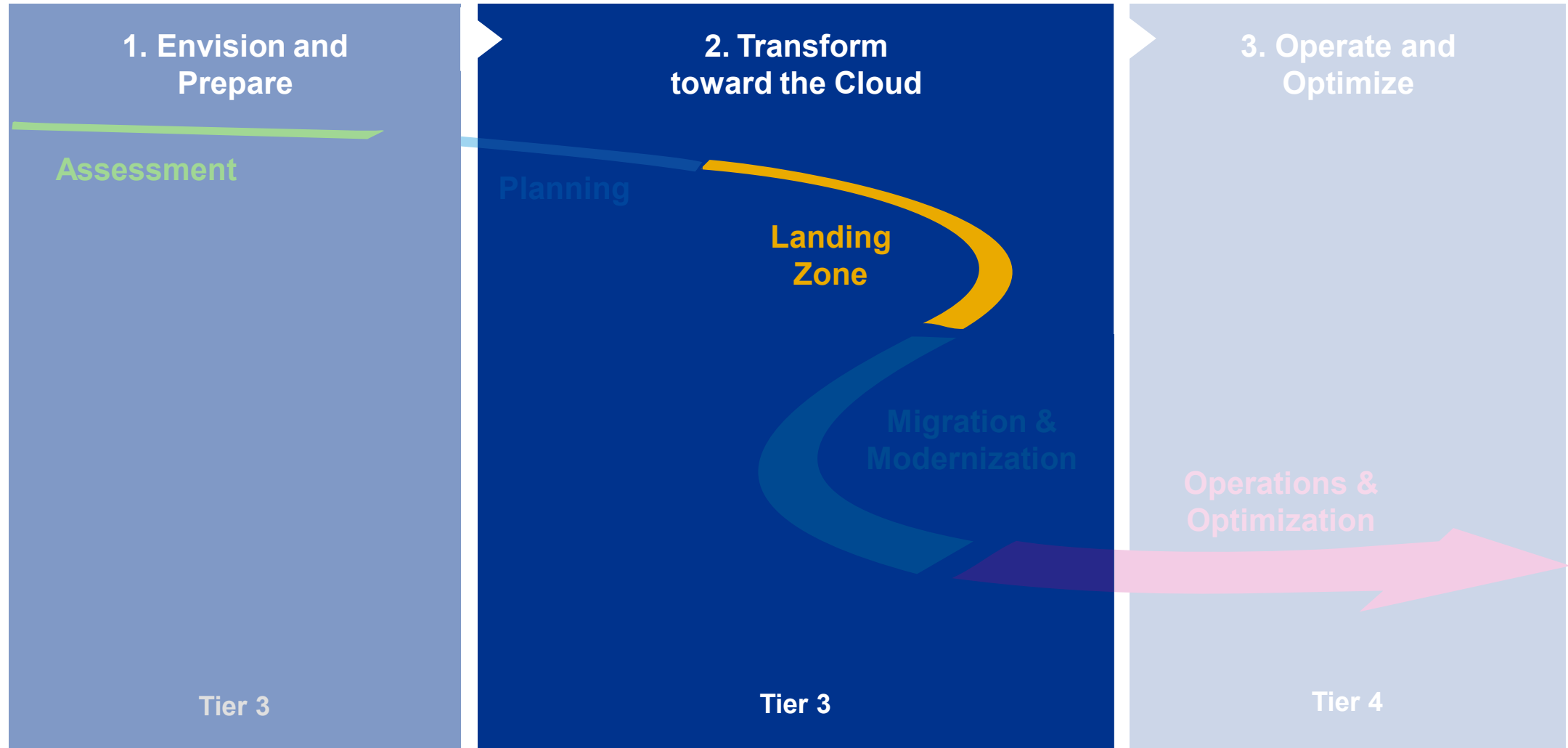


**Microservices**

- Breaks down functions of an application into small independent sections of code
- Reduce individual complexity and dependencies
- Share functionality across development teams

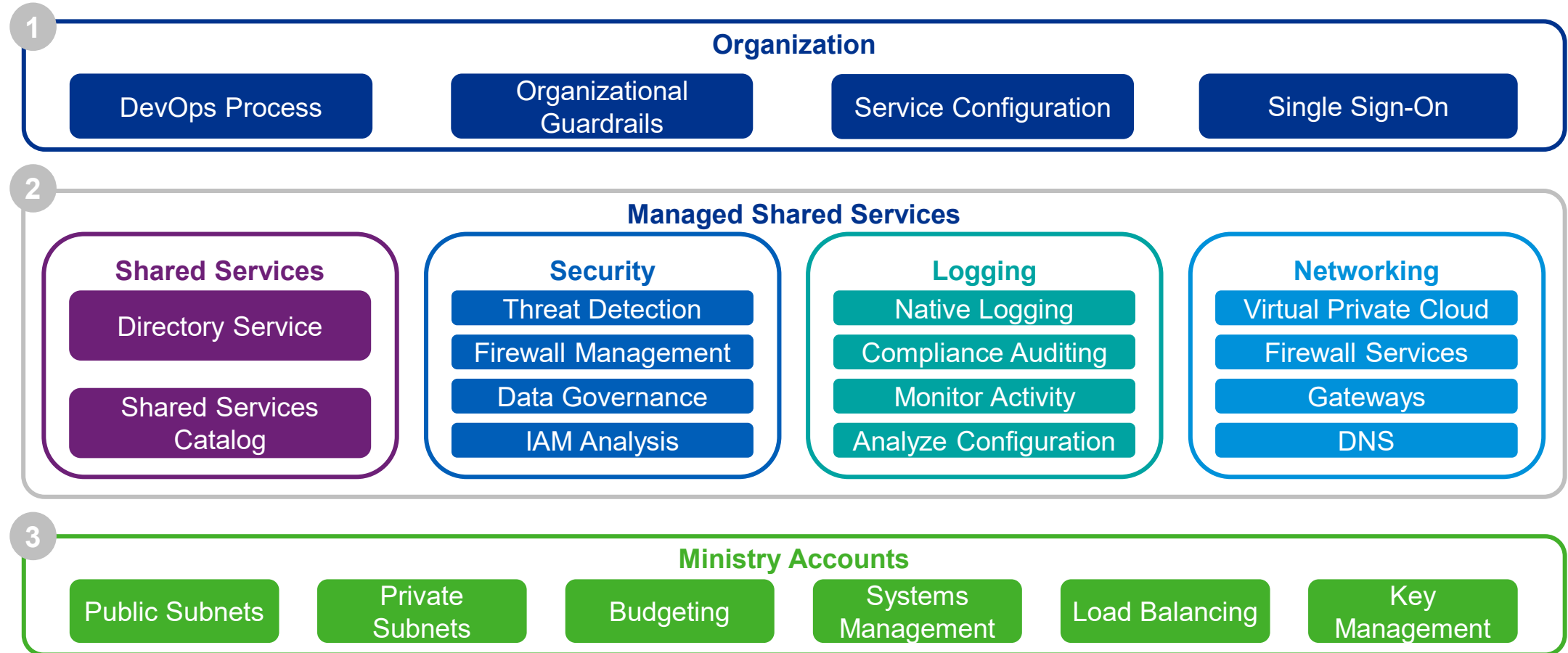
Outlook only!

# Outlook into what is upcoming

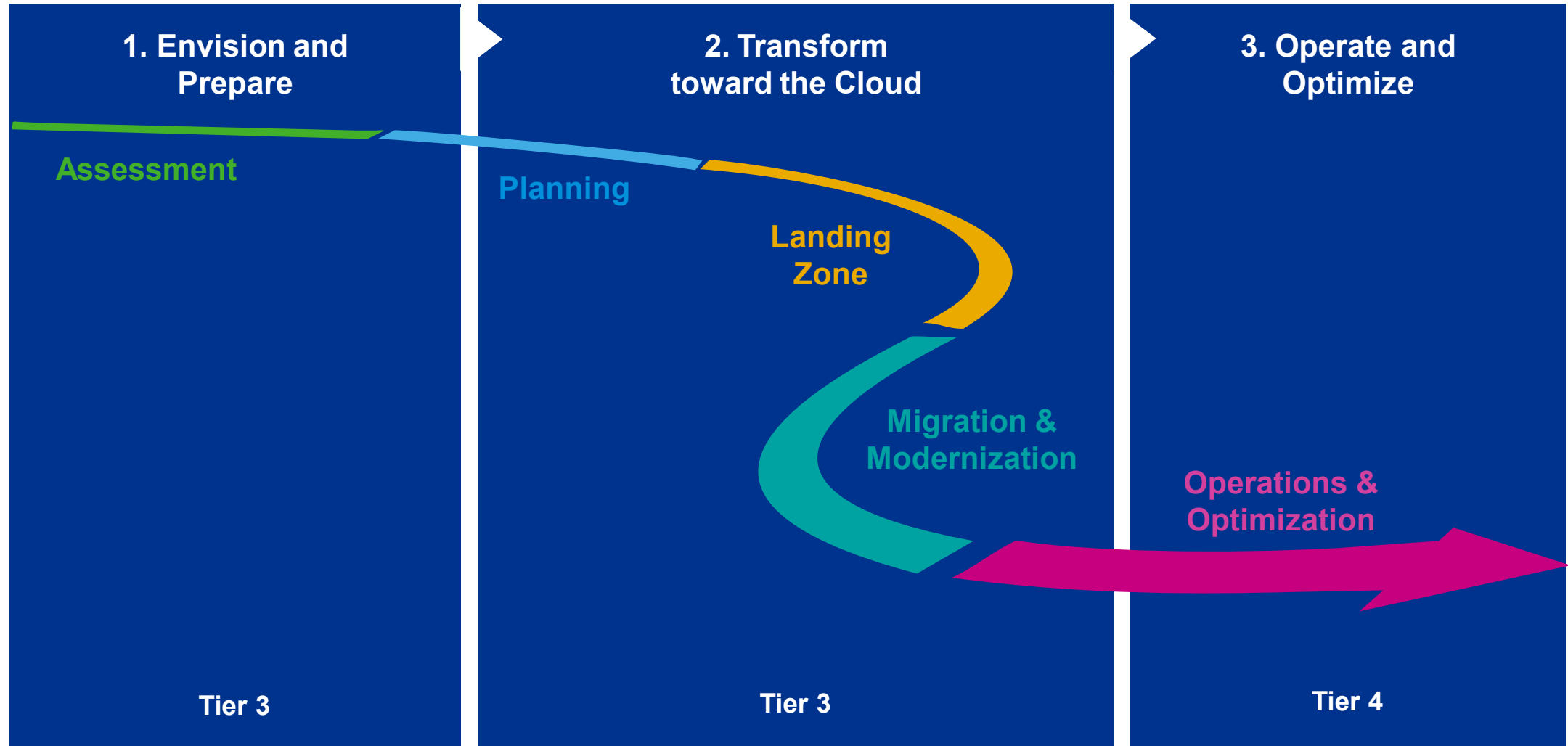


# Landing Zone

A Landing Zone is a CSP-agnostic construct made up of Organizations, Managed Shared Services, and Ministry Accounts, which allow for the implementation of organizational guardrails and the provisioning of shared services without restricting ministries' ability to develop solutions and innovate in the Cloud.



# Questions?





# Thank you for your attention!

**Nimbus CCoE  
Cloud Migration Webinar**

February 2022

