



Treasury Board of Canada  
Secrétariat

Secrétariat du Conseil du Trésor  
du Canada

Canada

# GC Cloud Financial Model

A Cloud Operating Model Working Group

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**FINAL Report & Recommendation**

February 28<sup>th</sup>, 2021

# Purpose

**1** Define the **problem** with the current financial model for cloud services

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**2** List **principles** for a financial model that addresses the problem statement

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**3** List **options** for resolving deficiencies with the current financial model for cloud services & make recommendations

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**4** Provide the results of a financial study to determine the **magnitude of costs** for application hosting

# Principle – Financial Model

On September 9<sup>th</sup>, 2020 DM CEPP endorsed the following principle for the financial model:

*“Cloud funding will operate under the same model as OnPrem Infrastructure”*

This has been interpreted by Quad members to mean:

- Cloud will have a financial model that will not cause departments additional financial cost for workloads already hosted by Shared Services Canada when shifting hosting models.
- Departments pay the costs and reap the savings of architectural and scaling decisions

# Problem Statement

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As departments migrate applications from one hosting platform to another (on-prem to cloud) the funding does not shift to the new hosting platform.

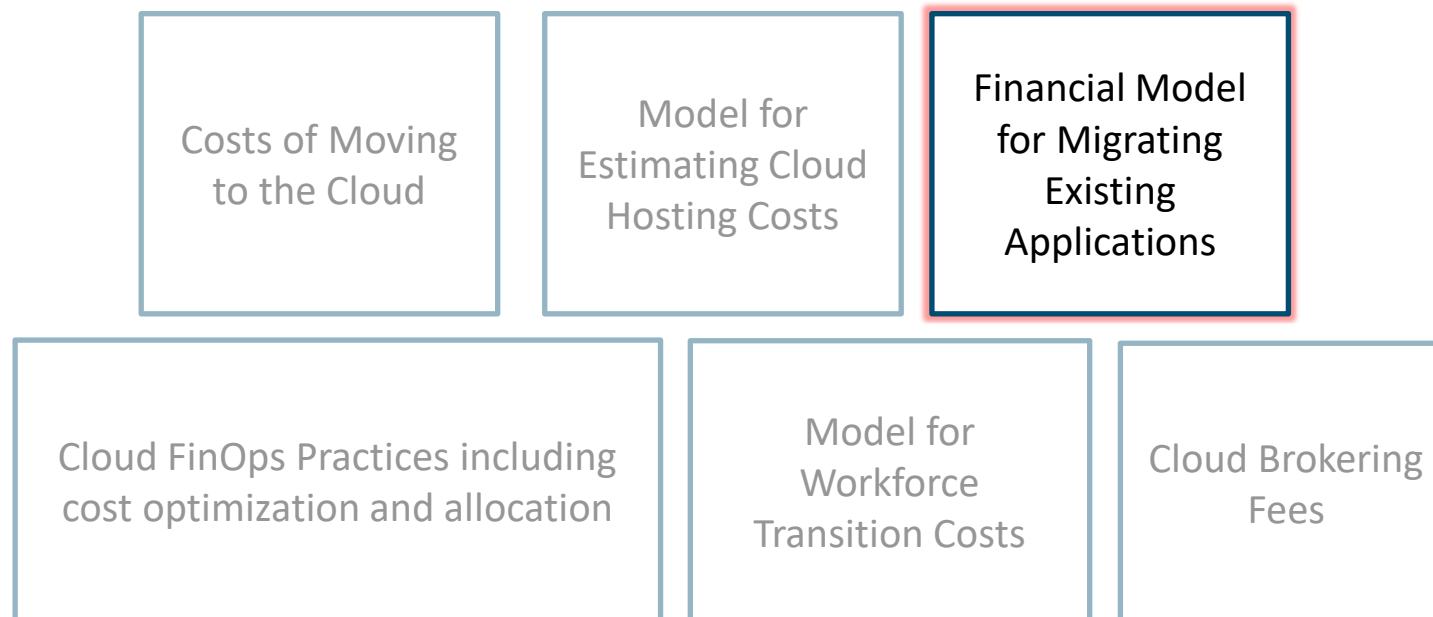
*“Continuing to use government’s own data centres remains the easiest or only choice for many teams due to financial incentives, procurement uncertainty, and other factors. (For example, data centre services are generally provided to departments without additional costs, but cloud services must be paid for from departmental budgets.) A variety of infrastructure and platform offerings from cloud providers are better, less expensive, more secure, and improving at a pace government cannot match. Departments should be allowed and supported to purchase and use them.”*

**Delivering digital services by 2025**

[Delivering digital services by 2025 – Canadian Digital Service \(canada.ca\)](https://canada.ca/delivering-digital-services-by-2025)

# Scope

While there are many areas of cloud funding that could be explored, the scope is limited to the are aligned to the COM principle.



*A parking lot is at the end of this document for out of scope items*

# Lexicon

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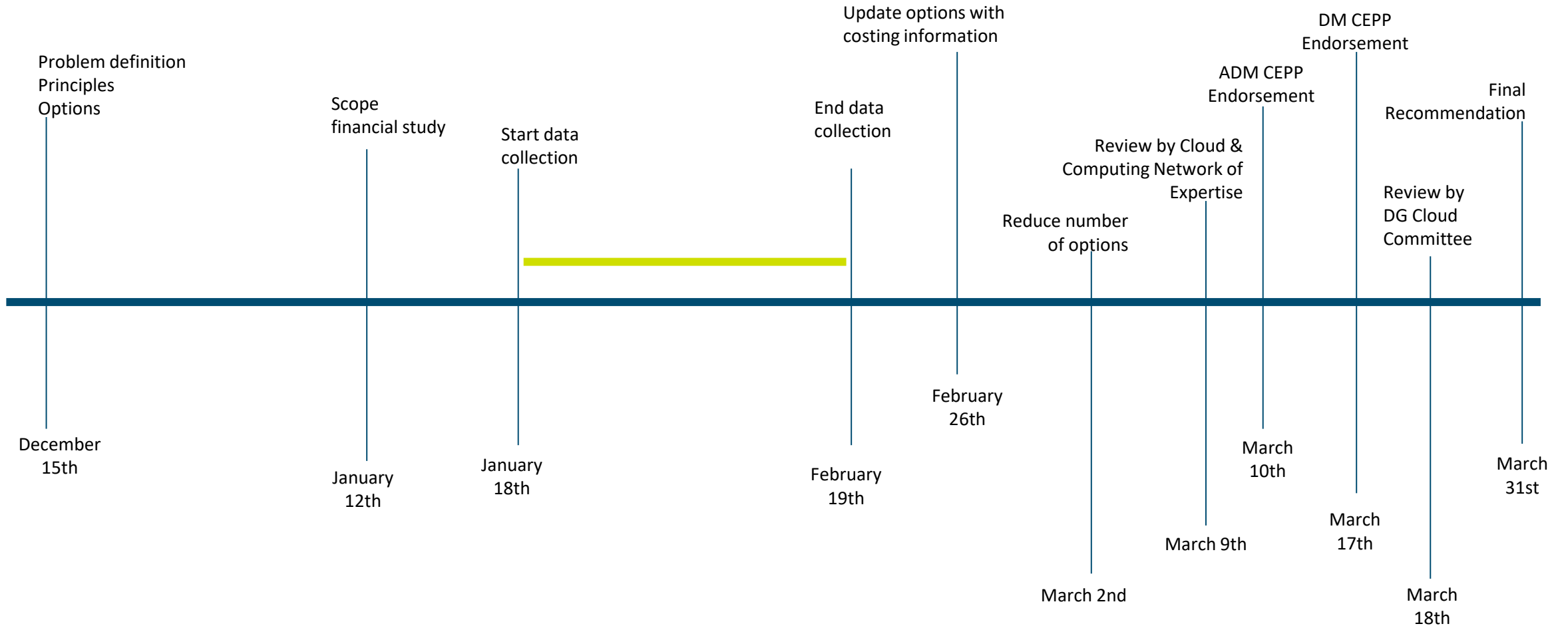
**Application hosting services:** The facilities, compute, storage, network services required to deliver business applications. Also includes the management and compliance of those services.

**On-prem** (on-premises): application hosting service delivered from SSC managed data centres. Operates on a, primarily, capital expense model.

**Cloud** (public cloud): application hosting services (P/IaaS) or software as a service (SaaS) delivered by commercial cloud service providers. Operates on a, primarily, operational expense model.






# Working Group Schedule

Final recommendation to be made by March 31<sup>st</sup>, 2021



# Cloud Costing Requires a Different Approach

Managing costs for cloud requires a different model, often referred to as FinOps.

Traditional IT Models	Cloud Models
 Cost of equipment is paid upfront with well understood monthly costs	Costs are variable. $Costs = rate \times usage$ .
 Costs are managed centrally through acquisition of equipment	Rates are managed centrally. Usage is managed by delivery teams.
 Costs are calculated periodically, annually for example	Costs are calculated continuously. Billing is complex.
 Reducing resource usage has little impact on savings	Feedback loop between usage and costs impacts consumption and architecture choices (the Prius effect)
 Excess capacity required to deal with unexpected growth	No upfront purchase of capacity required. Spare capacity always available.

Source: *Cloud FinOps: Collaborative, Realtime, Cloud Financial Management*



# Principles

Defining a financial model for cloud should....



Attribute costs to the **consumer** and respect the **feedback loop** (i.e the *Prius Effect*)



Recognize transition is **not always like-for-like** technologies as depts 'move up the stack'



Be equitable, but recognize **equitable** may not be a shared view



**Visibility & Transparency** of costs maintained



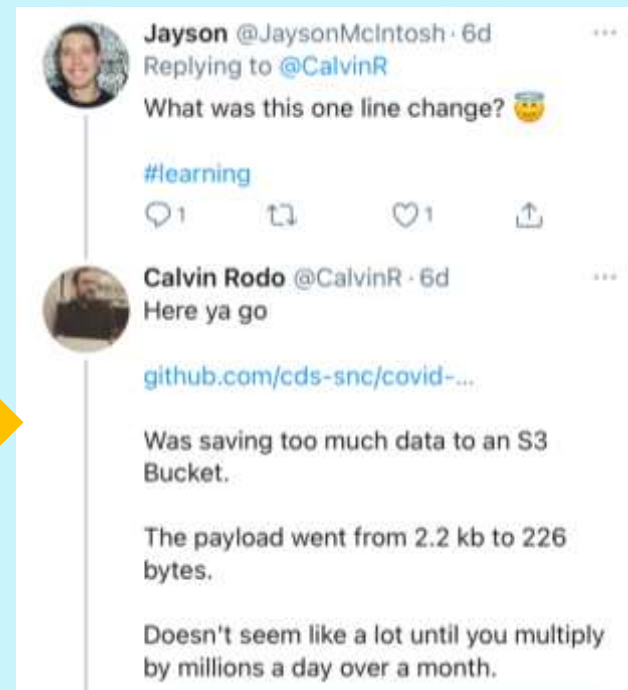
Recognize **roles are not always like-for-like** as resources are software defined

# Principle 1 – Attribution of Costs

Attribute costs to the consumer and respect the feedback loop between consumption/architectural choices and cost implications of those choices (*the Prius effect*)

## Choice impacts cost

- Cloud is consumption-based
- Application architecture choices impact costs
- As cost impact is immediate, it drives optimization decisions and creates a feedback loop
- FinOps becomes a critical part of provisioning and monitoring activities
- Separating cost implications from service consumption will interrupt the cost feedback loop



## Principle 2 – Not always like-for-like

Recognize transition is not always like-for-like technologies as depts 'move up the stack' [example moving from VMs SaaS]



### Shifting service models

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- Cloud first policy requires CIOs to consider SaaS before other service models
- Departments are shifting back office and commoditized capabilities to SaaS: email, collaboration, case management, analytics, etc...
- Departments are shifting IT capabilities to PaaS: monitoring, databases, application logic, etc...

# Principle 3 – Equitable

Be equitable but recognize equitable may not be a shared view.

## Departmental View

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- Resources were transferred to SSC in 2011 to host applications
- When departments migrate apps out of on-prem hosting services to cloud services, the funding does not shift
- Departments are investing twice to having pre-2011 applications hosted

## Shared Services Canada View

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- SSC has a mandate to manage data centres, email, and networks
- SSC is funded to provide those services
- Long-term commitments in contracts and capital cannot be 'quickly' sunsetted



# Principle 4 - Visibility & Transparency

Visibility and transparency over total costs and cost drivers both in the cloud and on-prem

## Cost transparency

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- Understand the total costs both on-prem and in the cloud
- Understand what components are driving overall costs both cloud and on-prem
- Trust is gained through transparency
- The SSC Cloud Broker has centralized visibility into all cloud tenants and their spending breakdowns

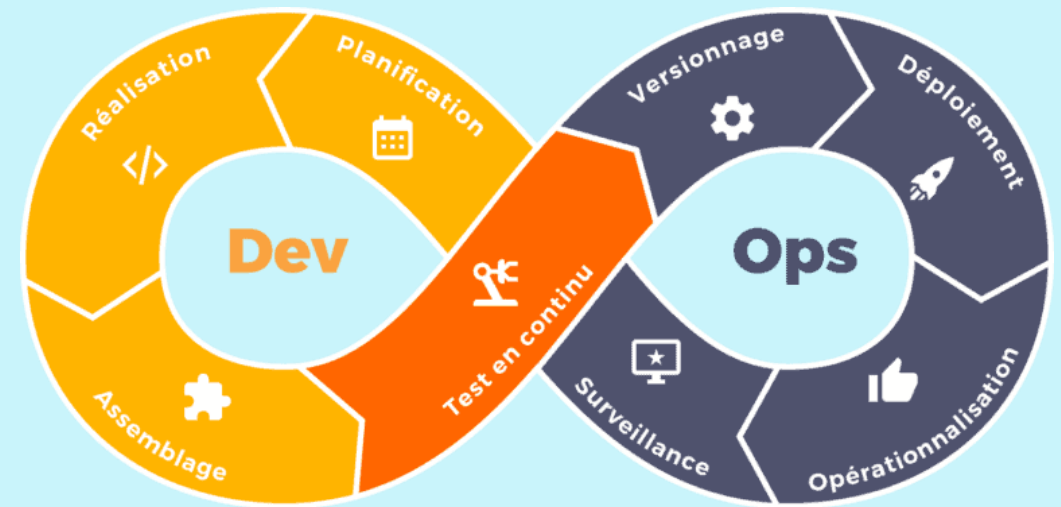


# Principle 5 – Roles are not always like-for-like

Roles and responsibilities change as cloud resources and services are now code.  
[example: app developers becoming full-stack developers]

Roles are **optimized** for delivery, security, & quality

- Cloud roles are optimized for delivery while maintaining security and quality
- All resource configurations (compute, storage, network) are software defined and is managed as code
- Application developers have shifted towards fullstack development. Developers operate what they build
- Quality and security shift left
- Capacity management has shifted toward cloud service providers. Cost management are part of delivery teams' responsibilities



# Suggested Options



**Status quo:** Depts fund all cloud costs when workloads transferred from on-prem to cloud



**Exit value:** The value of hosting applications on-premises is determined when being migrated to the cloud. SSC uses that value to reduce the department's cloud bills. (*note: two sub-options are documented*)



**Parity of choice:** All on-premises application hosting services become cost recovery-based. Departments will be able to evaluate the pricing of both models and factor that into their hosting location choice.




**Central gating:** All application hosting services, whether on-premises or in the cloud are funded by SSC. Departments will be required to coordinate their consumption growth and reductions with SSC.





**New Funding:** When migrations to cloud occur, new funding is sought from the fiscal framework to cover modernization and cloud hosting costs.

# Option 1 - Status Quo

Depts fund all cloud costs when workloads transferred from on-prem to cloud.

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  - Departmental CIO chooses (as per Cloud First policy requirement) to migrate application(s) from on-prem to cloud services.

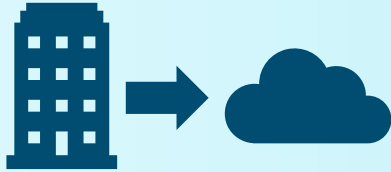


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- 
  - SSC decommissions the on-prem application hosting services needed to host the migrated applications OR repurposes them for other applications

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- 
  - The cloud service provider (CSP) sends the bill for the costing of the migrated applications to the department for payment



# Option 2a - Exit Value – Annual SSC Gift Card

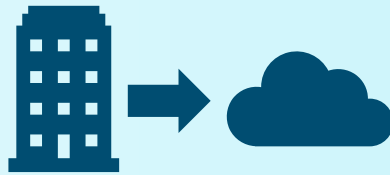
The value of hosting applications on-premises is determined when being migrated to the cloud. SSC uses that value to reduce the department's cloud bills.

- 
  - Departmental CIO chooses (as per Cloud First policy requirement) to migrate application(s) from on-prem to cloud services.
- 
  - SSC decommissions the on-prem application hosting services needed to host the migrated applications OR repurposes them for other applications.
  - The annual value of the unused on-prem application hosting services are determined to be \$X.
- 
  - The cloud service provider (CSP) sends the bill for hosting the applications to Shared Services Canada.
  - SSC applies the \$X value to the hosting costs.
  - SSC cost recovers the remaining hosting amount from the department

# Option 2b - Exit Value – Transfer to Department

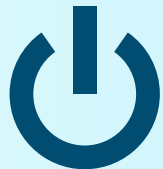
The value of hosting applications on-premises is determined when being migrated to the cloud. SSC transfers that amount to departments.

1



- Departmental CIO chooses (as per Cloud First policy requirement) to migrate application(s) from on-prem to cloud services.

2



- SSC decommissions the on-prem application hosting services needed to host the migrated applications OR repurposes them for other applications.
- The annual value of the unused on-prem application hosting services are determined to be \$X. SSC transfer that amount to the department on an annual basis.

3



- The cloud service provider (CSP) sends the bill for hosting the applications to the department.
- The department pays the CSP using the SSC transferred value plus any additional costs over the transferred amount.

# Option 3 – Parity of Choice

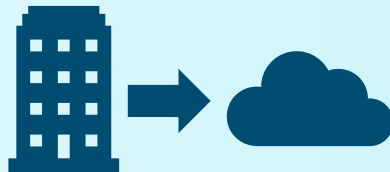
The value of hosting applications on-premises is determined when being migrated to the cloud. SSC uses that value to reduce the department's cloud bills.

1



- Shared Services Canada implements a cost recover model for on-prem application hosting services. The full cost of hosting applications is collected from departments.

2



- Departmental CIOs can factor the cost of hosting applications on-prem vs the cloud when making migration decisions.
- Departmental CIO chooses (as per Cloud First policy requirement) to migrate application(s) from on-prem to cloud services.

3



- The department ceases to pay for the on-prem application hosting services.
- The cloud service provider (CSP) sends the bill for hosting to the department. The department can apply the funding not applied to on-prem services to cloud services.

# Option 4 – Central Spend Gating

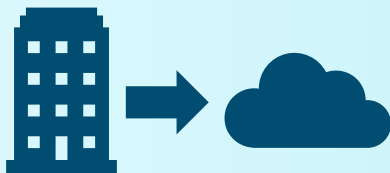
All application hosting services, whether on-premises or in the cloud are funded by SSC. Departments will be required to coordinate their consumption growth and reductions with SSC.

1



- Departmental CIO makes a request to SSC to migrate an application from on-prem to cloud
- SSC decides if the application should be migrated to cloud and the funding allocated to that application. SSC pays all cloud costs. Those costs are cost recovered or appropriated from department

2



- SSC decommissions the on-prem application hosting services needed to host the migrated applications OR repurposes them for other applications.

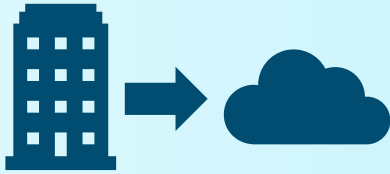
3





- When a department wishes to grow consumption or change architecture, they present the cost implications to SSC
- SSC approves or denies the request and funding allocated to host the application is adjusted accordingly
- If the funding required changes, SSC increases the appropriation or cost recovery from the department







# Option 5 – Net-new Funding







When migrations to cloud occur, new funding is sought from the fiscal framework to cover modernization and cloud hosting costs.

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  - Departmental CIO chooses (as per Cloud First policy requirement) to migrate application(s) from on-prem to cloud services.
  - A TB Sub is prepared requesting new funding to support the hosting of applications being migrated to cloud. Approval is sought from the Board before proceeding with a migration.

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- 
  - SSC decommissions the on-prem application hosting services needed to host the migrated applications OR repurposes them for other applications.

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- 
  - The cloud service provider (CSP) sends the bill for hosting the department
  - Department uses the newly aquired funding from the fiscal framework to cloud hosting costs.

	New Funding		Existing Funding			
	 Status Quo	 Fiscal Request	 Exit value 'gift card'	 Exit value 'funds returned'	 Parity of Choice	 Central Gating
<b>Nimbleness &amp; self-service</b> <ul style="list-style-type: none"> <li>Maintains the nimble, self-service nature of cloud</li> <li>No gates applied to provisioning</li> <li>Allows delivery teams to pivot quickly</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Depts coordinate FinOps activities</li> <li>✓ Depts can reallocate funding to priorities quickly</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Depts coordinate FinOps activities</li> <li>✓ Depts can reallocate funding to priorities quickly</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Depts coordinate FinOps activities</li> <li>✓ Depts can reallocate funding to priorities quickly</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Depts coordinate FinOps activities</li> <li>✓ Depts can reallocate funding to priorities quickly</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Depts coordinate FinOps activities</li> <li>✓ Depts can reallocate funding to priorities quickly</li> </ul>	<b>Very Low</b> <ul style="list-style-type: none"> <li>✗ Coordinating consumption with SSC will add gates to provisioning</li> <li>✗ Elastic consumption would be interrupted</li> </ul>
<b>Cost accountability</b> <ul style="list-style-type: none"> <li>Costs are attributed back to the programs they enable</li> <li>'Prius effect' is maintained</li> </ul>	<b>Very High</b> <ul style="list-style-type: none"> <li>✓ New funding would be sought from programs to cover additional costs</li> </ul>	<b>Very High</b> <ul style="list-style-type: none"> <li>✓ Fiscal request would need to tie directly back to programs</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Cost recovery could be billed back directly to programs. Exit value would need to allocated to all programs.</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ Cost recovery could be billed back directly to programs. Exit value would need to allocated to all programs.</li> </ul>	<b>Very High</b> <ul style="list-style-type: none"> <li>✓ cost recovery could be billed back directly to programs.</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>✗ Costs would be attributed back to fiscal framework, not programs</li> </ul>
<b>Ease of implementation &amp; sustainable administration</b> <ul style="list-style-type: none"> <li>Can be implemented in less than 12 months</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>✗ Departments must allocate costs back to programs and harvest additional funds.</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>✗ departments must start fiscal framework request far in advance of migration</li> </ul>	<b>Medium</b> <ul style="list-style-type: none"> <li>✓ No change to fiscal framework, however funds would need to be transferred to cloud bill payer</li> <li>✗ Formula for exit value does not exist</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>✗ Adjustment of fiscal framework would be required</li> <li>✗ Formula for exit value does not exist</li> </ul>	<b>Low</b> <ul style="list-style-type: none"> <li>✗ would require pricing model for on-prem services</li> <li>✗ Adjustment to fiscal framework</li> </ul>	<b>Medium</b> <ul style="list-style-type: none"> <li>✗ Requires the establishment of consumption limits</li> <li>✗ Requires governance of consumption and budgeting</li> </ul>
<b>Incentive to optimize and retire legacy</b> <ul style="list-style-type: none"> <li>Financially incentivized to retiring legacy</li> </ul>	<b>Very Low</b> <ul style="list-style-type: none"> <li>✗ Retiring legacy increases departmental costs</li> </ul>	<b>Very Low</b> <ul style="list-style-type: none"> <li>✗ departments must seek new funds when retiring legacy</li> </ul>	<b>High</b> <ul style="list-style-type: none"> <li>✓ provides an incentive to retire legacy hosting environment and apply exit value to cloud bill.</li> </ul>	<b>Very High</b> <ul style="list-style-type: none"> <li>✓ provides an incentive to retire legacy hosting environment and apply exit value to multiple modernization efforts</li> </ul>	<b>Medium</b> <ul style="list-style-type: none"> <li>✓ Depending on the pricing model, legacy could have at-risk surcharges</li> <li>✓ Depts are incentivized to optimize consumption to reduce costs</li> </ul>	<b>Very Low</b> <ul style="list-style-type: none"> <li>✗ Departments do not experience incentive to optimize their consumption of cloud</li> </ul>

	New Funding		Existing Funding			
	 Status Quo	 Fiscal Request	 Exit value 'gift card'	 Exit value 'funds returned'	 Parity of Choice	 Central Gating
Nimbleness & self-service	High	High	High	High	High	Very Low
Cost accountability	Very High	Very High	High	High	Very High	Low
Ease of implementation & sustainable administration	Low	Low	Medium	Low	Low	Medium
Incentive to optimize and retire legacy	Very Low	Very Low	High	Very High	Medium	Very Low
Recommendation	Eliminate	Eliminate	Retain	Retain	Retain	Eliminate
Rationale	<ul style="list-style-type: none"> <li>✗ Incentive to retire legacy and optimize is very low</li> <li>✗ Departments must return new app hosting costs to programs</li> </ul>	<ul style="list-style-type: none"> <li>✗ Incentive to retire legacy and optimize is very low</li> <li>✗ Challenging to implement due to long fiscal framework request cycles</li> </ul>	<ul style="list-style-type: none"> <li>✓ High incentive to retire legacy</li> <li>✓ High incentive to optimize cloud costs</li> <li>✗ Funding change can only be made when migrating out of legacy</li> </ul>	<ul style="list-style-type: none"> <li>✓ High incentive to retire legacy</li> <li>✓ High incentive to optimize cloud costs</li> <li>✗ Challenging to change fiscal framework</li> <li>✗ Funding change can only be made when migrating out of legacy</li> </ul>	<ul style="list-style-type: none"> <li>✗ Pricing model and full cost recovery of on-prem challenging to implement</li> <li>✓ Funding change can be made at any point (ease of moving between models)</li> </ul>	<ul style="list-style-type: none"> <li>✗ Negative impact to self-service and nimbleness</li> <li>✗ Does not allocate costs back to programs</li> <li>✗ Low incentive to optimize cloud spend</li> </ul>

# Financial Study

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- A financial study was launched to provide the magnitude of costs involved and better illustrate the options analysis
- Statistics Canada (STC), Treasury Board of Canada Secretariat (TBS), and Shared Services Canada (SSC) were the subjects of the study
- The purpose of the study was to determine the magnitude of costs of each:
  - Cost of hosting application in the cloud (STC, TBS)
  - Cost of hosting applications in the legacy environment (SSC)
  - Costs avoided by not migrating to a new data center (SSC)
- The purpose is not to achieve exact costing, but a magnitude of cost for illustration purposes



# Final Recommendations

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- The GC must decide if it is willing to divert funds from on-prem application hosting toward cloud-based application hosting
  - All recommended options involve redirecting existing funds
- If funds are to be diverted from on-prem services, then:
  - The GC forecast cloud consumption over the next ten years. Sunk costs in on-prem services should be aligned to forecasts
  - The implementation model is to be decided:
    - Exit value (value derived for retiring legacy app hosting services) is the least difficult to implement in the short-term, but provides less flexibility over the long-term
    - Parity of choice (pricing model for on-prem app hosting services) provides the most flexibility to move funding between models over the long-term, but is likely more challenging to implement

# Working Group Participants

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Eric Briere, Statistics Canada

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Kosta Vandoros, Transport Canada

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Sevac Eskibashian, Treasury Board of Canada Secretariat

Patricia Laurin, Treasury Board of Canada Secretariat

# Parking Lot

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Members has expressed a desire to continue the working group to complete the following items:

- Costing guidance/methodology for departments moving to cloud
- Comparing costs between service models (IaaS, PaaS, SaaS)
- Brokering Fee allocation model and rates
- Cloud FinOps practices
  - Visibility
  - Cost optimization
  - Cost allocation