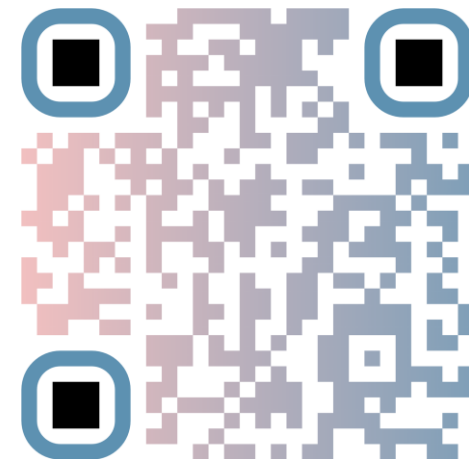


# Cloud for Official Statistics

UNECE HLG-MOS project





# ACKNOWLEDGEMENTS

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# Project Themes

- Service and Deployment Models
- Procurement
- Adoption
- Security and Privacy
- Capacity and Competencies



# Cloud Deployment Models

## Brief description

Models	Description
<b>Public</b> Cloud	Public cloud infrastructure is provided by third-party cloud service providers and is accessible to the general public over the Internet. Organizations <b>share</b> the same pool of <b>resources</b> .
<b>Private</b> Cloud	Private cloud infrastructure is solely <b>dedicated</b> to a <b>single organization</b> . It can be hosted on-premise using your own infrastructure or by a third-party cloud service provider.
<b>Community</b> Cloud	Community cloud infrastructure is a shared computing environment tailored to meet the needs of a specific community or industry.
<b>Multi / Hybrid</b> Cloud	Often organizations use services of <b>multiple</b> service providers and it can be an extension of the idea of <b>hybrid</b> working but with your <b>own existing infrastructure</b> and services hosted in more than one cloud service provider.
<i>On-premise / Legacy data center</i>	<i>Is the traditional compute and storage hardware in your own IT Comms / data center. The dedicated hardware is often given special attention and care.</i>

# Cloud Service Models - pizza analogy

## On-premise / Legacy DC

Made in house

- Cook the Pizza
- Toppings
- Pizza dough
- Oven
- Gas
- Kitchen

You manage

## IaaS

Kitchen as a Service

- Cook the Pizza
- Toppings
- Pizza dough
- Oven
- Gas
- Kitchen

Vendor manages

## PaaS

Walk in and Bake

- Cook the Pizza
- Toppings
- Pizza dough
- Oven
- Gas
- Kitchen

## SaaS

Pizza as a Service

- Cook the Pizza
- Toppings
- Pizza dough
- Oven
- Gas
- Kitchen

## On-premise / Legacy DC

- Application
- Data | Metadata
- Runtime
- Operating System
- Virtualization
- Servers
- Storage
- Network
- DC facilities

## IaaS

- Application
- Data | Metadata
- Runtime
- Operating System
- Virtualization
- Servers
- Storage
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- DC facilities

## PaaS

- Application
- Data | Metadata
- Runtime
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## SaaS

- Application
- Data | Metadata
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- DC facilities



# Recommendations

- Public Cloud Platforms can provide greater agility and scale
- However, national regulation and appetite continues to vary from country to country
- Undertake proof of concepts, leading to increased adoption over time
- SAAS services provide greater flexibility, but watch out for Terms and Conditions

# Theme 2 Cloud Adoption



To explore the specific **barriers and challenges** faced by National Statistics Institutes in adopting cloud technology

To highlight **the experiences and lessons learned** from New Zealand, Canada, Ireland, and the Statistical Office of the Republic of Serbia

To understand **the behaviors** that support national statistical institutions' adoption of cloud technologies

# Barriers and Challenges

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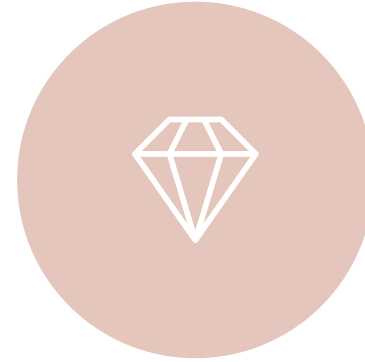
## Legislation and Data Sovereignty

Legal regulations  
Regulatory constraints  
Rights and interests of indigenous populations  
Jurisdiction of data



## Lack of Social License and Public Perception

Public  
Politicians  
Stakeholders



## Capability and Skills Gap

Upskilling  
Training programs



## Cost Considerations

Consumption cost model  
Integration costs  
Long-term budget planning



# Recommendations



Collaboration with  
stakeholders



Low Risk Approach



Identify Easy Wins  
and Set Timeframes



Agile Capability and  
Flexibility

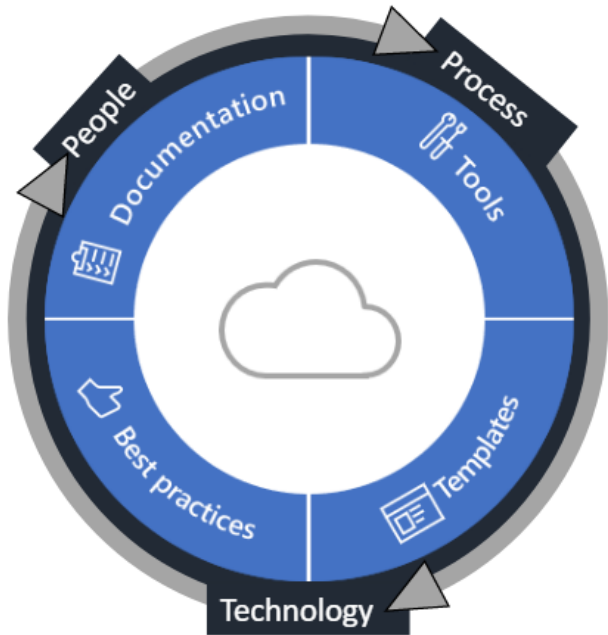


7Rs of cloud  
Migration



Cloud Centre of  
Excellence (CCoE)

# Theme 3 Building Cloud Competencies and Capacity



Paramount to ensuring success is to align **business, people** and **technology** strategies to achieve business goals with actionable, efficient, and comprehensive guidance to deliver fast results with control and stability.

- Change is difficult, it impacts people, culture and feels risky
- It requires different thinking and leaders need to adapt and prioritize growth
- Take calculated risks and to fail fast while supporting a culture shift

## *Key Focus Areas for Success*

- Foster a learning and innovation culture – making **time and space**
- Invest and prioritize training and talent upskilling
- Cloud centers of expertise
- Establish key skill sets and role
- Leverage open-source software and its culture
- Adopt agile and DevOps modern ways of working and thinking
- Manage change is essential
- Collaborate, collaborate, collaborate!

# Establishing Key Roles

Build out skills for cloud in a tiered and intentional approach:

- Tier 1: Cloud Specialists with critical role in cloud operations
- Tier 2: Designed for technical staff who may have some need to deliver solutions using cloud services
- Tier 3: Designed for awareness and foundational skills, which can include members of both the IT and subject matter community

Establish key roles at opportune times along your cloud journey:

- Define formal training curriculums and certifications
- Create a pathway from traditional to new roles
- Continuous hiring mechanism to off-set attrition
- Plan for options to augment capacity

	Planning	Day 0	Day 1	Day 2	Day 2+ / Day N
		Pilots / PoC	Early Migrations	Operations	Cloud Native State
Cloud Architect					
Cloud Engineer					
Platform Engineer					
Cloud Developer					
Cloud Security Engineer					
Cloud Operations Engineer					
Cloud Data Engineer					
Cloud Business Analyst					
FinOps					
<b>Legend</b>					
Defined					
Minimal Viable Product					
Matured					

# Recommendations



- Change management is foundational to your cloud journey.
- Ensure that upskilling is prioritized.
- Be intentional with capacity building and upskilling initiatives.
- Embrace an agile mindset.
- Capacity strategies must be continuous and assume attrition
- Engage and collaborate!

# Theme 4: Procurement



Strategy



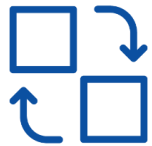
Legal



Cloud adoption  
considerations



Security and  
privacy provisions



Vendor lock-in  
and exit strategy



Budget management  
and cost optimisation



Environmental  
considerations



Cloud models impact

# Legal Considerations

Standard terms and conditions vs contractual terms and conditions

Specific national/regional constraints might exist

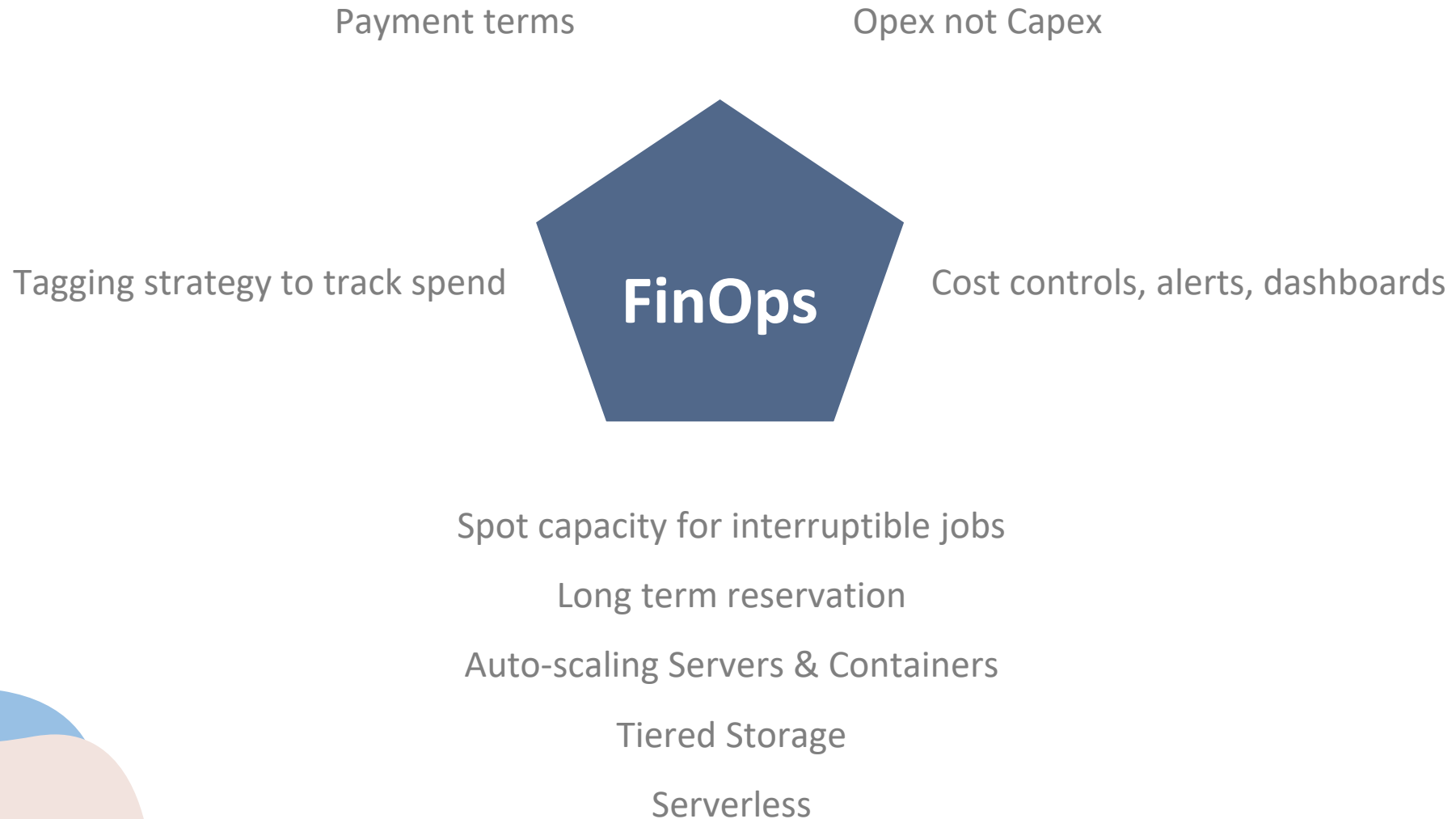


Intellectual property

Data sovereignty

Jurisdiction

# Budget Management and Cost Optimisation



# Recommendations



Legal and data sovereignty issues need to be considered and addressed first. This will create a boundary on what can be implemented in the cloud



Long term strategy to realize identified business benefits and this may result in multiple work streams with differing objectives and timelines

Implement FinOps and consider full lifecycle of the services, including migration to a different provider



# Theme 5: Security and Privacy

## Security



Measures to secure the infrastructure, processes and the data in the cloud

## Privacy



How data are kept in the cloud and to what extent the privacy of individual units are guarded

## Main deliverable



A list of **recommendations for statistical agencies** on what should to be taken into account with regards to **cloud computing** when it comes to **privacy and security**

## Topics Considered



- Data stewardship
- Marketplace
- Shared responsibility model
- Data sovereignty
- Data classification
- Encryption and key
- National cyber security authorities and data protection agencies

# Recommendations

- Before moving to a cloud based environment, address the national legal environment
- Keep in mind data sovereignty and make sure that the geographical location of the data centres of the cloud provider.
- Document the process and all decisions made during it when moving to the cloud.
  - Especially important for all aspects concerning privacy and security.
- Decide and present how staff is supposed to work within the cloud environment.
  - E.g. it must be clear how privacy issues will be tackled and what types of data can be processed in the cloud environment.
- All issues with regards with privacy and security have to be explicitly put forth in the agreement with the cloud provider, and the procurement.
- Key strategy for data encryption is important.
  - Remember that encrypted data without an encryption key is useless.
- Keep an open dialog with your local data privacy authority.

# Conclusion

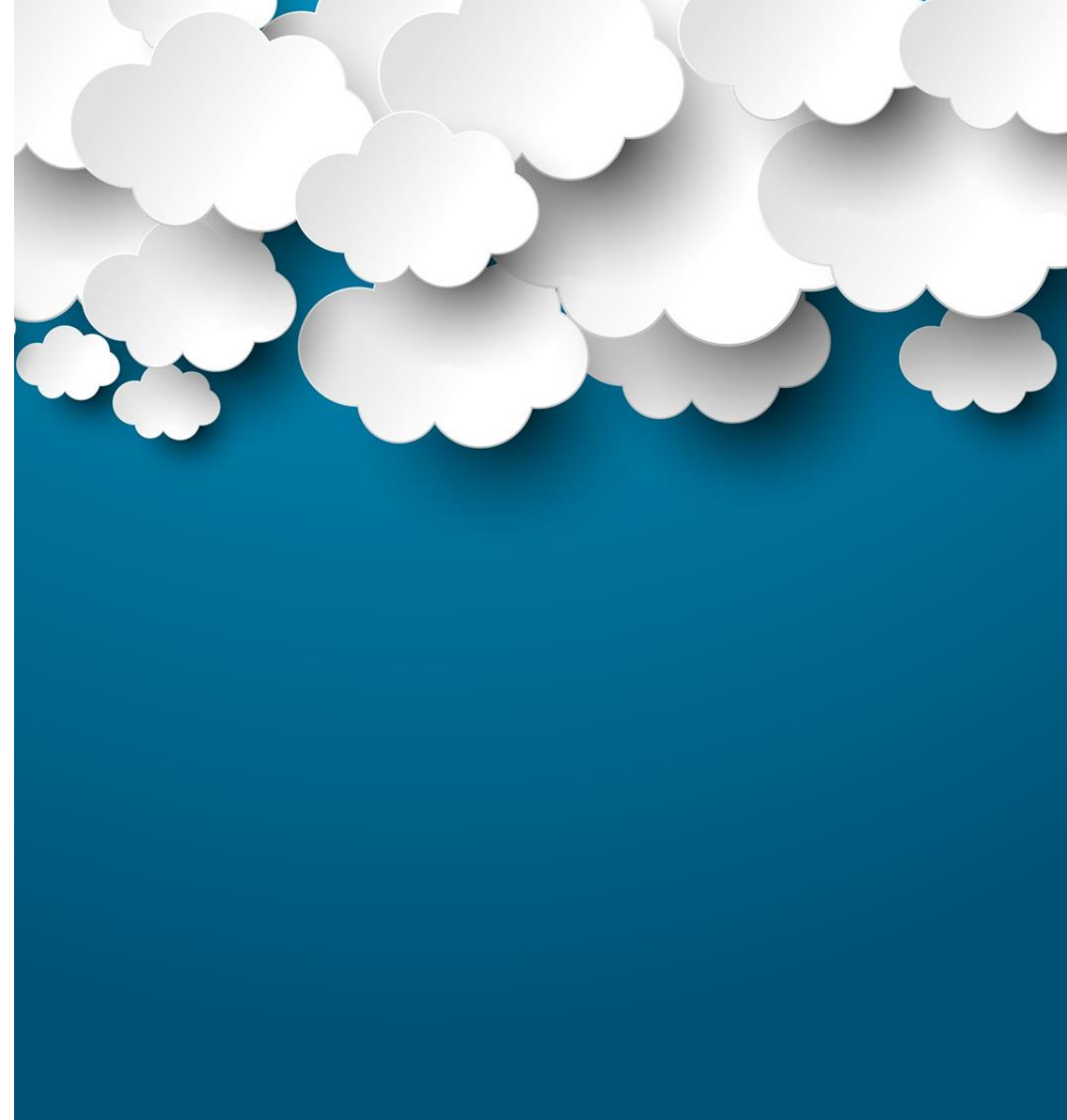
- The Cloud journey has started
- Many considerations for NSI's
- Change is not easy
- Sovereignty key determinant for organisations

# Appendix

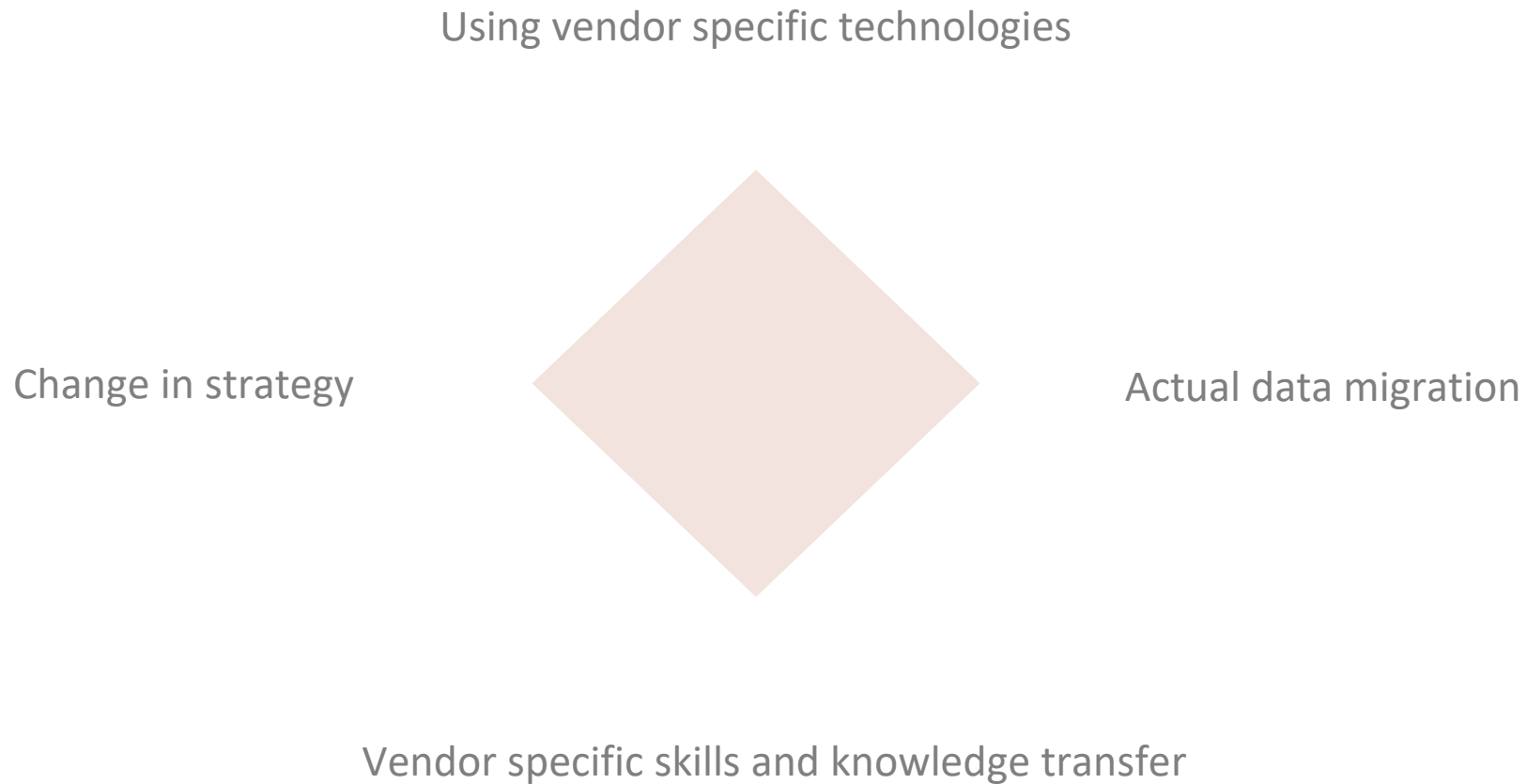
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# Build a Cloud-Friendly Culture

- **Leadership support:** Leaders should champion cloud adoption.
- **Encouraging creativity:** Encouraging proposing new ideas, and experiment with cloud solutions.
- **Embracing failure as a learning opportunity:** Creating an environment where failures are viewed as valuable learning.
- **Empowering employees:** Providing employees with autonomy, decision-making authority, and opportunities to contribute to cloud.
- **Engage and collaborate:** Ensure that both IT and subject matter experts are brought together to explore new ways of thinking, operating and exploring.
- **Iterative approach:** Reinforce the practice of building, refining, and improving solutions continuously.



# Vendor lock-in and Exit strategy



# Project delivery

1. Webinars September and November 16
2. Document
  - Support sound informed decisions on adopting cloud
  - **What** managers need to know and **why** it is important
  - Examples of use of cloud
  - Key concepts and definitions
  - 70 - 80 pages; online in Dec; published in Feb

# Next steps

- Promote the publication
- Determine if organizations wish to continue to share and learn
  - 4-6 meetings per year
  - Focus on **how** organizations are adopting cloud



# Webinar - Your needs, cloud opportunities and challenges

01

Did we address the **needs** of your organisation that motivate the adoption of cloud solutions?

02

Did we address the **opportunities** can cloud solutions bring to your organisation in addressing these needs?

03

Did we address the main **challenges** or risks faced by your organisation in the adoption of cloud solutions?

# Future



- Do NSOs need more to support them along their cloud journey?
- Do you, IT experts, need more?
- Do you need to know more on **how** NSOs are adopting cloud?
- Share and learn on actual practices and new developments
- Share and learn on more technical IT matters
- 50% are interested; the other 50% are maybe interested
- Do you have suggestions on how to continue the sharing and learning among you and your organisations?

# Manage the Change, Accelerate Culture Evolution

Ensure that the cloud culture change is done **WITH** everyone, not **TO** everyone. Ensure proper change management approaches are in place to ensure success:

- Explaining the change
- Planning the change
- Managing the change
- Reinforcing the change
- Sustaining the change

## How do we consider the impact to people?

Storyline (Themes):	The case for Change	Understanding the Changes	Define How We Get There	Future State Benefits Realisation	Sustain-Optimising Value
Purpose:	Explain where we are going and <b>Why</b>	Set expectations for change ( <b>What</b> )	Manage uncertainty during transition	Shift the focus towards the future	Reinforce the new ways of working
Core message:	Explain why the organization needs Cloud, what's in it for me for Consumers, Service Enablement & Delivery Teams ( <b>Who</b> )	Setting the stage for the change and specific changes to Structure Role & Responsibilities (by function and role)	Empathy for employees experiencing the change, detailing new product-centric cloud operating model, solutions and functions	Highlight the benefits and successes that have evolved from the Cloud journey for Consumers, IT & the organization as a whole	Explaining continuous improvement opportunities and dedication to the CCloud Program- Celebrate wins
Emotional Experience for change for employees:	Awareness	Denial & Resistance	Exploration	Motivation	Confidence
Commitment Level	Awareness	Understanding	Acceptance	Commitment	Advocacy

*The Change Curve*  
 ↑ +  
*Emotional Disposition*  
 ↓ -