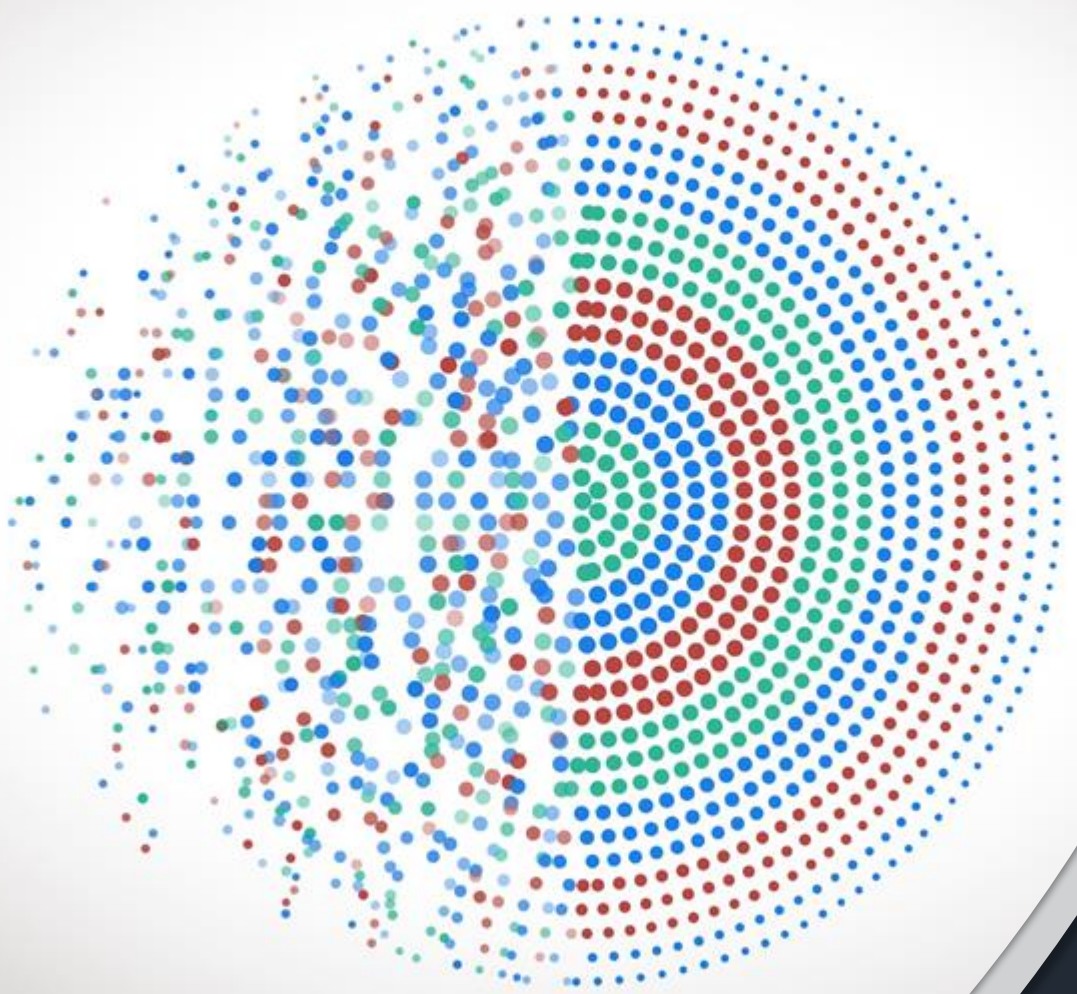




Statistics Canada's Cloud Journey

Government of Canada

Andrew Sinkinson
Senior Director Cloud and Workload Migration
Date: February 27, 2023

About Me: Andrew Sinkinson – Statistics Canada - Government of Canada

UNCLASSIFIED / NON CLASSIFIÉ



Current Role

Senior Director Cloud and Workload Migration

Experience

22 years Government and Private sector

Skill Sets

- Cloud native
- DevOps
- Kubernetes
- Containers
- OpenGov
- Drupal

Delivered Success

- **GC Cloud Pathfinder:** Fully enabled, Migrated and Operating in the Cloud.
- **Enterprise Solutions:** 60+ Solution delivered
- **GC Wide services:** Implemented and provide all Open Government services to the GC
- **Mission Critical Requirements:** Delivered 2016 & 2011 Census Dissemination.
- **Modern approach:** Significant real world Agile and DevOps implementations
- **Talent Development:** Built the StatCan cloud team from the ground up; 95 team members both internally developed and from private sector

Experience

- **Cloud Migration:** Successfully Planned, Executed on largest GC Cloud migration.
- **Cloud Operations:** Successfully running Day 2 operations.
- **Collaboration:** Assisting GC Departments on cloud journeys.
- **Governance:** Developed cloud governance structures within a GC context
- **Stakeholder engagement leadership:** Able to help strategically shape the approach to cloud journeys



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Statistics Canada's Cloud Journey - Three Horizons



Overview – StatCan WorkLoad Migration initiative



The Government of Canada (GC) tasked Shared Services Canada (SSC) to modernize the government's digital platform and support the adoption of cloud. As part of this mandate SSC has been tasked with **closing obsolete legacy data centers** as part of these modernization efforts.



The Tunney's Pasture Data Centre (TPDC) – in which the bulk of StatCan business applications and data holdings are housed – is targeted for closure by SSC by **Mid 2023**. The StatCan digital estate within TPDC has been **moved to commercial cloud**.

*Note A small number foundational services moved to an Enterprise Data Centers (EDCs)

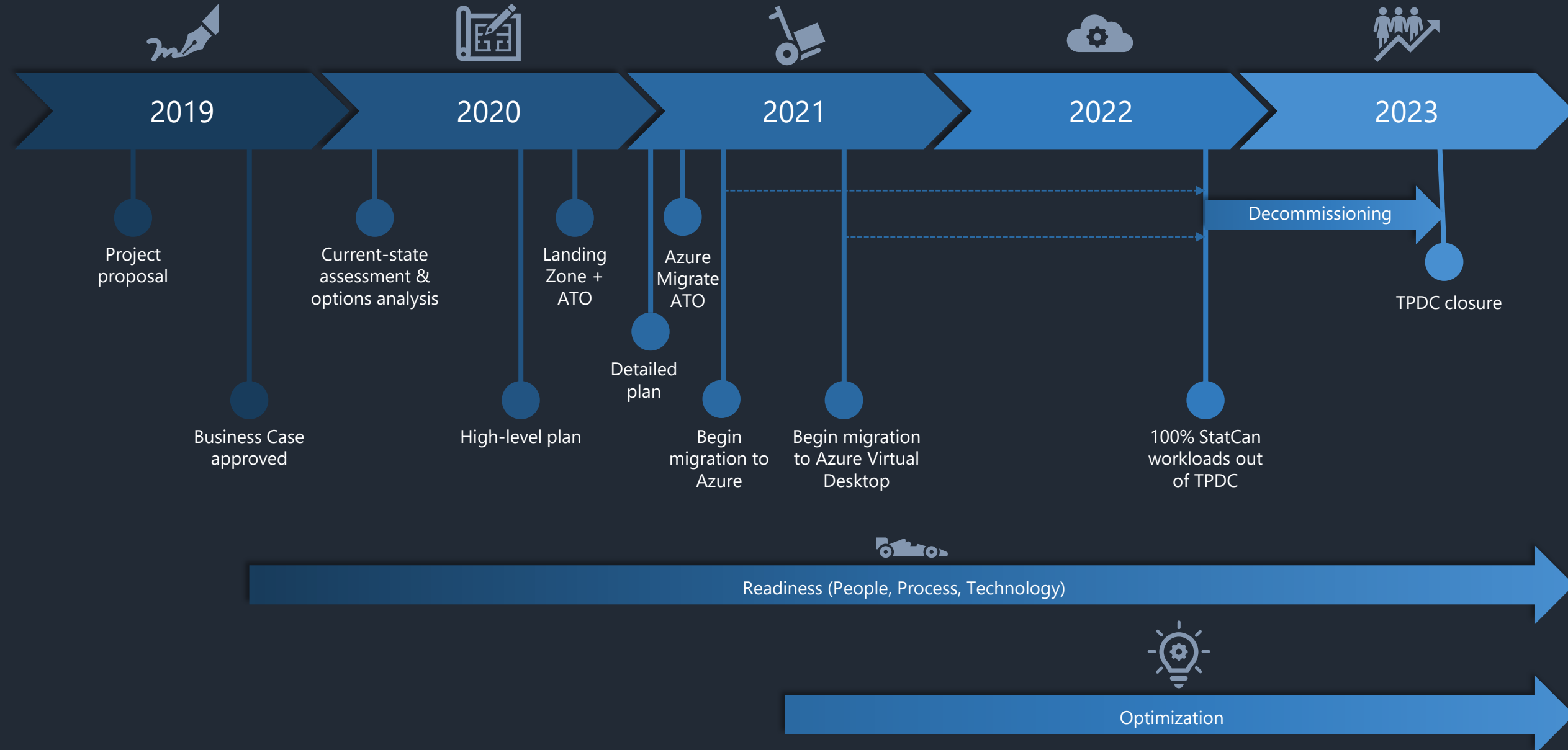


The size and complexity of the StatCan WLM project was a **first of its kind in the GC** and has been deemed a **pathfinder** by Treasury Board Secretariat (TBS), to open the field for other GC organizations to move to the cloud.



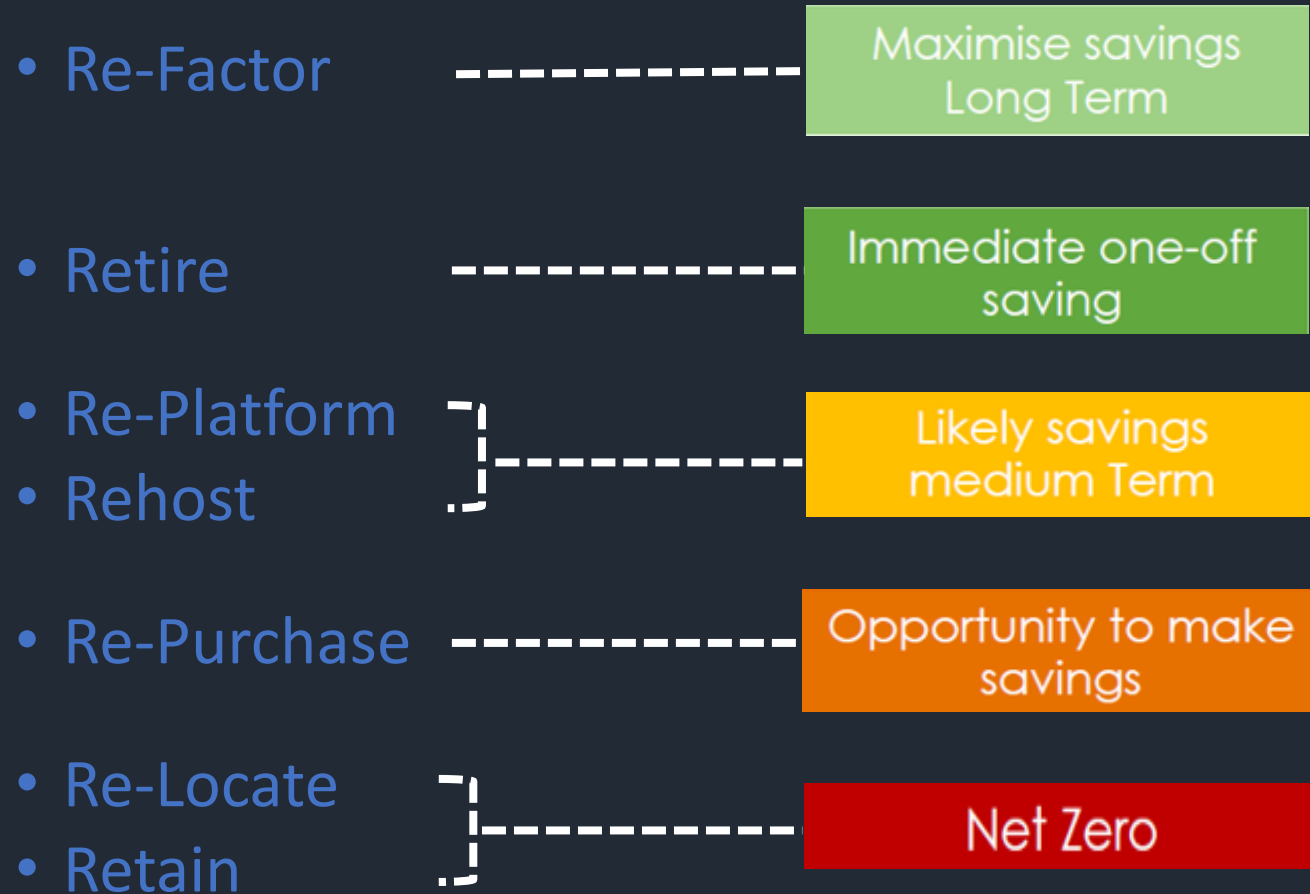
StatCan moved the majority of their TPDC estate to **Microsoft Azure**, and as such partnered with Microsoft as well as other companies and SSC on a **multi-year Workload Migration (WLM) initiative**.

High-Level Timeline

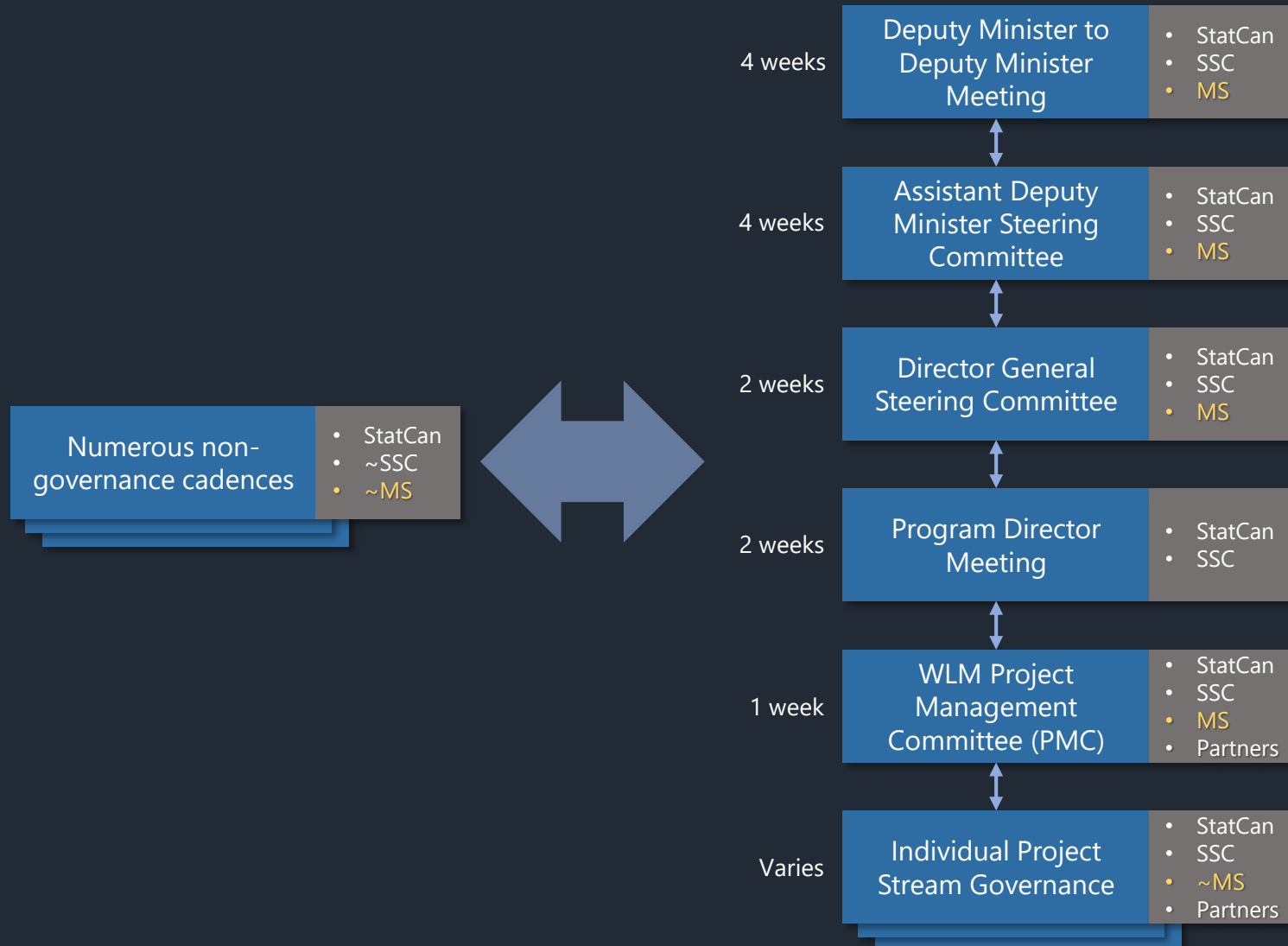


ROI and the 7 R's Assessment Path

The largest ROI and OPEX savings are achieved through **Re-Factor**. Based on the migration path selected here are the potential savings.



Governance



- Deputy Minister level doesn't follow strict governance however does include robust prep & follow-up
- ADM/DG/Director/PMC levels for the most part follow standard practices including Terms of Reference (ToR), agendas, quorum/voting processes, operating procedures, Record of Decisions (RoD), etc.
- Individual projects follow a mixed bag of practices (opportunity for governance improvement), though they all report back up to PMC
- Microsoft is not a voting member in any of the governance levels

Securing the Cloud



- Guardrails.
- Host based sensors installed.
- Security Assessment and Authorization for all foundational Services & apps .
- Ongoing Penetration Testing.
- Independent 3rd party evaluations.
- Privacy Impact Assessment .
- Automated app vulnerability Scans
- Sentinel and Security Center

- ☐ Authority to Operate Foundational Services
- ☐ Implemented over 2200+ security controls.
- ☐ Cloud offers Rich set of security capabilities , more visibility then ever before.

Delivery: StatCan Cloud Journey

Challenge

Enable and migrate to Cloud as part of the foundation of modernization at Statistics Canada enabling the Agency to be more agile in its success of collecting, disseminating and releasing data.

Approach:

- Modernize all Mission Critical applications, SAS Grid, Virtual Desktops and build a cloud native platform to support all new investments.
- Lift and shift non mission critical applications to meet aggressive timelines
- Transition to DevOps, Infrastructure as Code (IaC) and built CI/CD pipelines.
- Fully support Day 2 Operations while improving overall Security Posture

Critical Success Factors – Key StatCan Decisions

	DECISION	IMPACT
	Enlist industry assistance	Significantly de-risks entire initiative by leveraging existing cloud migration expertise & experience, considering the technology (Azure) is new to StatCan and the initiative (complex cloud migration) is new to the GC
	Relocate/Rehost as primary migration strategy	Enables achievement of December 2022 deadline for Data Center exit, as this timeline would not be possible with primarily modernization-centric avenues (e.g. Replatform & Refactor)
	StatCan/SSC WLM accelerated change management process	Facilitates required monthly migration wave count, by enacting proactive change reviews, daily change meetings, and immediate post-approval changes
	"Catch-Some" process for firewall flows	Facilitates required migration velocity of 100-120 servers per month, and increases efficiency by parallelizing post-migration testing with firewall operational activities
	Order migration from lower (Dev/Test) to higher (QA/Prod) environments	Reduces business risk by learning from earlier migration waves and applying mitigations/improvements/efficiencies before migrating higher-impact environments

Challenges Along the Way



Critical Success Factors – Key Lessons Learned

ORCHESTRATION	Formal & dedicated Program Management over entire migration initiative	Formal & dedicated Project Management for each project stream	Formal RACI for architecture (Enterprise Architect + Program-level Architect + per-project-stream Architect)	Formal governance through each level (Project & Architecture → Program → Director → DG → ADM → DM)
PROCESSES	Consistent practices, metrics, scoring, tracking, reporting across project streams	Continuous refinement of practices including governance & reporting	Rigorous use of tactical processes e.g. ticket/request management	Clarity on elements that are important but out of defined project scope
INFORMATION MGMT.	Centralized /roll-up tracking & reporting, ideally integrated (StatCan + SSC + MS)	Proactive engagement with Business stakeholders , leveraging Adoption & Change Management methodologies	Clear, succinct, visual, tailored, regular communications	
RISK MITIGATION	Agility in adding staffing/capacity , both for migration and for operations	Minimize duration of hybrid connectivity for workloads migrated over multiple waves	Clarity on critical paths as well as dependencies between project streams	Pragmatic & modern approach to efficiency gains (e.g. firewalls, app testing, etc)

Strategic approach for Digitization

The way forward involves absorbing an iterative process that supports our clients business evolution

Iterative Approach

- **Define a strategy:** outlining the business justification and expected outcomes. Engage Stakeholders and communicate vision.
- **Plan:** align key tasks to business outcomes and evaluate the skills readiness
- **Getting Ready:** Prepare our people, process and environment for changes required
- **Adopt:** Migrate and innovate by implementing changes and new business processes, best practice validation, continuous improvements

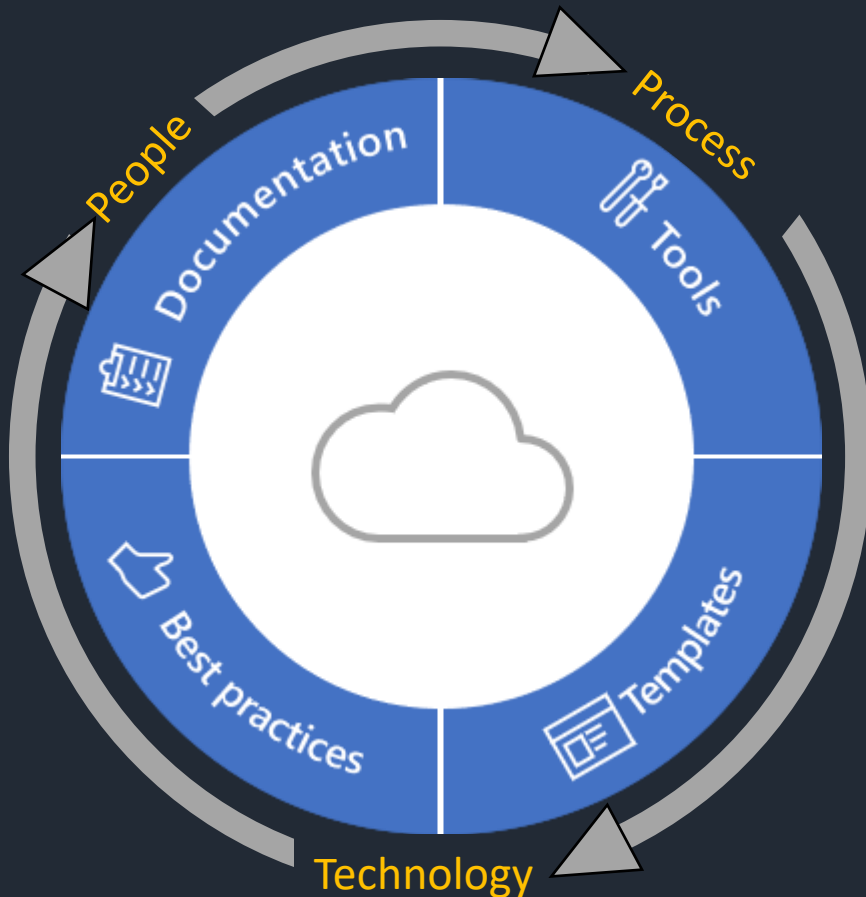
As Operations and services shift

- **Ensure Governance:** Establish & comply, control, benchmarking and securing environment while communicating effectively to clients
- **Manage:** Ensure effective operations and optimize



Key to Success

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.
- Take calculated risks and to fail fast while supporting a culture shift.

Key Focus Areas for Success

- Establish cloud centers of expertise and a service framework for cloud
- Foster collaborative relationships within the Government, public and private sector
- Invest in training and talent upskilling
- Ensure cloud modernization is prioritized to avoid capacity-related delays and set challenging goals
- Use cloud as an opportunity to adopt agile and DevOps modern ways of working
- Develop key capability and tool sets:
 - Infrastructure as Code
 - Continuous Delivery
 - Release Management
 - Configuration Management
 - Automated Recovery



Engaging the Business

Trust

- Trust is key.
- Appoint trusted liaisons between IT and business.

Communication

- Avoid technical jargon.
- Create a one stop shop for all information.
- Dashboards with migration dates and status.
- Hold small Q&A sessions.

Engagement

- Early engagement with concrete plans.
- Consider production schedules.
- Senior leadership buy-in is a must.

Benefits

- Emphasis benefits and long- term gains
- Cloud migration is being done for them not to them.

Achieved Results {project level}

- ✓ 31 migration waves planned and executed
- ✓ 500+ products Migrated, 19 Filers(600 TB), 700+ Citizen-developed apps, 6000+ Virtual Desktops
- ✓ 1308 Servers decommissioned.
- ✓ Secure, repeatable pipelines. Code Repos and Unlocked collaboration and knowledge sharing.
- ✓ Apps made more secure by applying cloud-based practices.
- ✓ Customer experience performance improvement up to 100%.
- ✓ No impact on any Mission Critical products & services.
- ✓ Automated monitoring, backups and patching
- ✓ Facilitated future innovation by building cloud knowledge and removing tech dept.
- ✓ Accelerated quality and delivery through agile / DevOps delivery.
- ✓ Built and Operate a complete cloud native (K8S) platform including open sourcing many components.
- ✓ Fully support Day 2 Operations
- ✓ Significant Collaboration and Sharing that has accelerated GC cloud adoption



Departmental Benefits

- Risk Posture
- Improved Relevance
- Organizational Agility
- Operational Efficiency for Employees
- Data Access, collaboration and sharing
- Keeping Pace with Change & Innovation

- Security for Protecting Statistically Sensitive Information
- Reducing the Risk of Aging IT
- Employee Recruitment and Retention (Culture):
- Governance and Compliance
- Sustainability



StatCan Achievements are Generating Business Value Across the GC

Playbooks on topics such as Workload migration, modern application development, virtual desktops developed and shared broadly by their embarking on their cloud journeys

Lessons learned and **best practices**:

- Connectivity and Network flows
- Foundational Services
- Security
- Training and upskilling
- Automated discovery of assets & migrations



Collaboration and giving back

Significantly contributed reusable Open Source code to help others adopt cloud



<https://github.com/StatCan>

Through **collaboration** and **partnership** with SSC landed and operationalized key foundational services for GC cloud enablement



Post Migration Priorities



WLM RUN-STATE

Day2 operations & servicing of all WLM-migrated estate, including continuous optimization of the Azure Well-Architected Framework pillars.
(Reliability, Security, Cost Optimization, Operations and Performance)



APP RATIONALIZATION & MODERNIZATION

Modernize portfolio of WLM-migrated estate and supporting new investments.



DATA ESTATE MODERNIZATION

Leverage cloud app & infrastructure presence as a catalyst for active & planned Data, AI & Other initiatives.

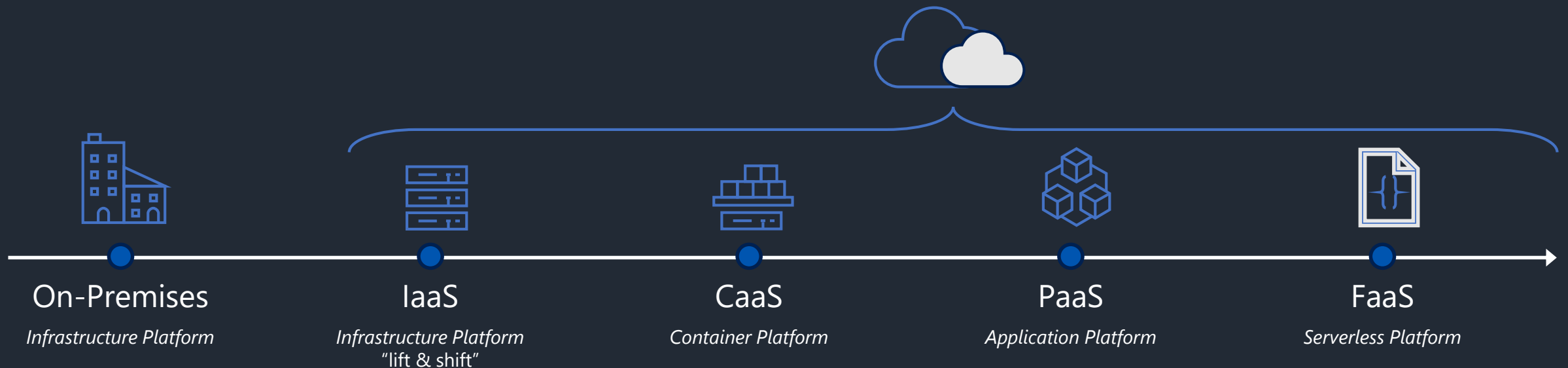
The way we build and deploy services has changed

Past

Long application cycles
Monolithic apps
Servers and VMs
Less data
Desktop
Distinct infrastructure and operations teams

Today

Rapid innovation
Loosely-coupled apps, microservices, and containers
Serverless
Big Data
Mobile
Service-focused DevOps teams



DevOps is the union of *People*, *Process* and *Products* to enable continuous delivery of value to end users.

People

by far the most important

Process

supports culture

Products

supports process and practice



Business Benefits

- Meet new demands and business opportunities at speed
- Platform for operational improvement and continuous innovation
- Replace elements in the value creation chain with new technology



Technology Benefits

- More frequent and more stable releases.
- Lower change failure rates and in the case of a failure, faster mean time to recovery.
- Faster, more collaborative, and more empowered teams that are able to innovate with ease.

Questions

