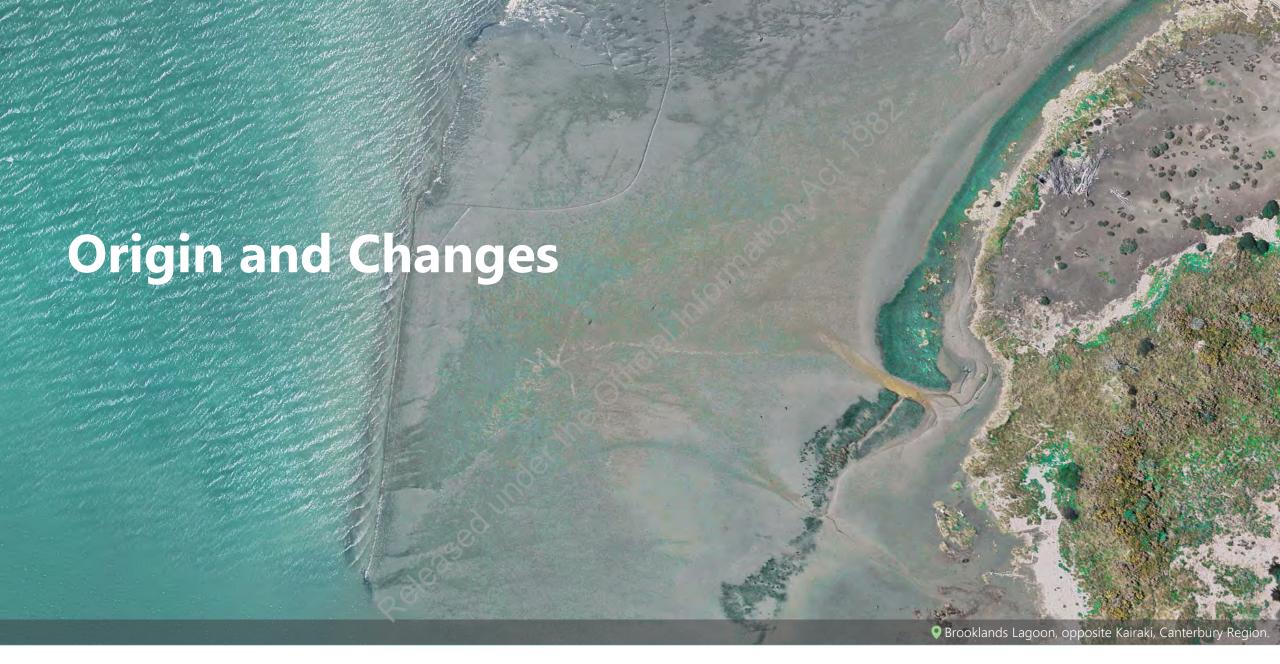# Hosting Model 2023

Incorporating: Government Cloud First Policy

https://toitutewhenua.atlassian.net/wiki/spaces/STEP/pages/308314696/Hosting+Model+2023

DD/Architecture
Edwin Koetsier

17/11/2023

Origin and Changes

Brooklands Lagoon, opposite Kairaki, Canterbury Region.

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Hosting Model

Original Hosting Model as envisioned and agreed in 2018.

- **Hybrid multi-cloud** model, taking advantage of the strengths and overall fit of each offering. Most services will be migrated from the All-of-Government private cloud (DCSG) to the Amazon Web Services (AWS) and Microsoft (Azure) public cloud environments

  - **AWS** for IaaS/PaaS is the preferred environment for bespoke developed applications and associated environments (both production and non-production) due to market leadership in this space.

  - **Azure** for IaaS/PaaS is used for Microsoft-based solutions, particularly at the application layer (such as Office 365, CRM and Sharepoint) or when using platform components such as MS SQL database and Azure Active Directory.

  - **DCSG** will be retained to house legacy systems that need to be migrated or that need to be housed in NZ for performance, data sovereignty or security reasons

- **Identity services** across the public cloud services will be provided by Microsoft Azure Active Directory services.

- **Interconnect network** will be established where data and transactions flow between all the hosting environments, providing fast and secure network connections.

- **Software as a Service** (SaaS) service hosting is excluded from the hosting options analysis, as hosting decisions for these services are managed by the service vendor.

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Azure Changes

The changing role of Microsoft Azure between 2018 and 2023 included:

- ✓ Many existing applications hosted in DCSG, Azure provided a path to public cloud and onshoring
- ✓ Microsoft and Azure offer range of software applications and services, mostly 'as-a-Service'
- • Scope changed by adding IaaS layer, removing the 'hybrid' moniker from our hosting strategy
- • Workloads were (unsuccessfully) targeted for migration with support from Microsoft/Datacom
- • Azure AD became the IAM provider across all platforms, where B2C for STEP has been delayed
- • Preferred platform for corporate data and (user-) reporting, based on Power BI usage
- • STEP has undertaken an investigation for deploying in Azure, this is no longer an active option
- • Microsoft is leading Generative AI and is providing opportunities to experiment with OpenAI

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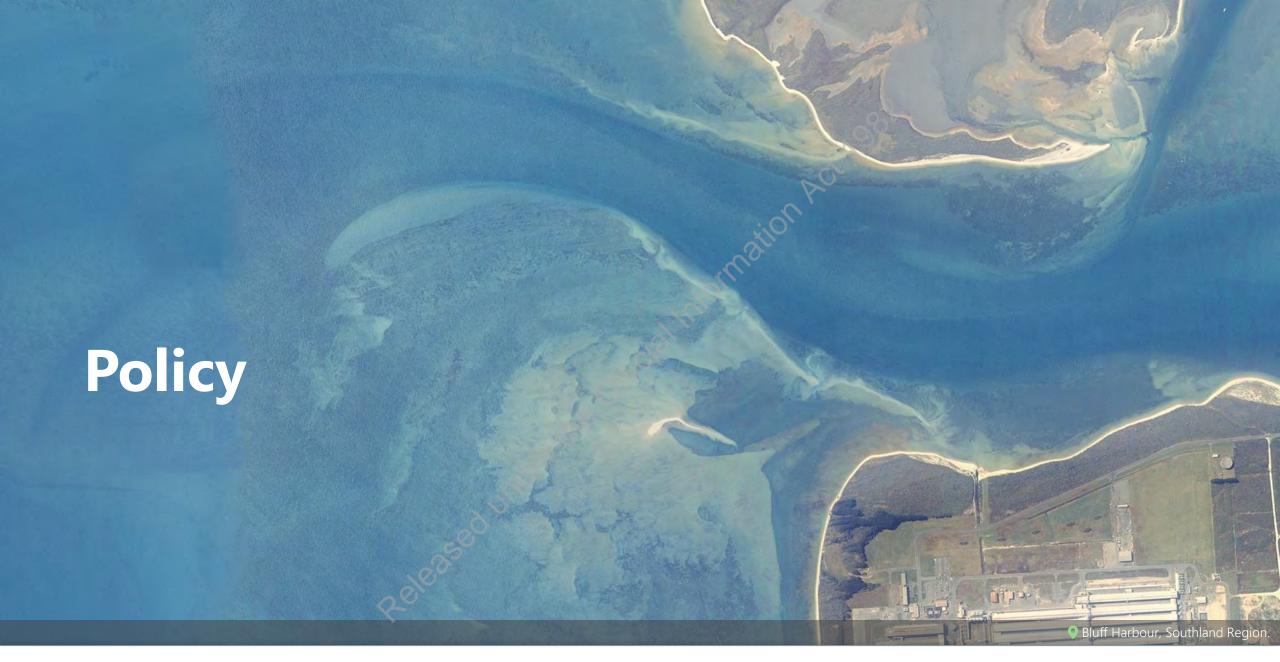**Te Kāwanatanga o Aotearoa**
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AWS Changes

The AWS changes are linked to the <u>STEP hosting roadmap</u> and is AWS focussed.

✓ Hosting Landonline data in NZ, where the debate on the "social and cultural licence" to move systems and data offshore resulted in keeping the core land registries in the master production database onshore.

- The historical decision to continue hosting the Landonline master production database in New Zealand reflects our ongoing commitments and associated Māori expectations and interests related to Te Tiriti-based principles

- The original drivers for off-shoring of data was adoption of public cloud. However, as major cloud vendors Microsoft and AWS now have plans for datacentre deployment into NZ, the drivers for off-shoring have significantly diminished

- To mitigate a performance risks with survey functionality, with logic in Australia and database in New Zealand, we implemented a single AWS Outpost in the Datacom Orbit datacentre. Outpost allows native AWS services to run locally near the Landonline (Informix) database, it's an interim solution.

- STEP is currently leveraging AWS services to its advantage, where most services will have an Azure or other equivalent. This approach is within project's scope but may hinder cross-platform services or services of other AWS accounts

- Onshoring of AWS (and Azure) in 2024 may change some of the future hosting options and preferences, including performance costs and risks; other cloud providers (such as Google) are not being considered at this stage

- The success of the public cloud environments is closely aligned to their non-functional qualities, which are mentioned with the target hosting model

Policy

Bluff Harbour, Southland Region.

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Cloud First Policy – Refreshing Policy

DIA is reconfirming the existing Cloud First Policy, that included:

✓ Adopt public cloud services in preference to traditional ICT systems

✓ Plan for how agencies intend to use public cloud services

✓ Make adoption decisions on a case-by-case basis following a risk assessment

✓ Only store data classified as RESTRICTED or below in a public cloud service

The refreshed Cloud First Policy includes:

✓ Be aware that the 2012 Infrastructure-as-a-Service directive is now <u>revoked</u>

✓ Do not invest in on-premise ICT infrastructure unless criteria are met, or investment is approved by GCDO

• Consider accountability, ethics, transparency, and collaboration in relation to <u>Māori data</u>

• Consider high-level <u>sustainability</u> principles in the use of cloud services

• <u>Over time</u>, RESTRICTED information should be hosted in a New Zealand based data centre

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Cloud First Policy – Adoption

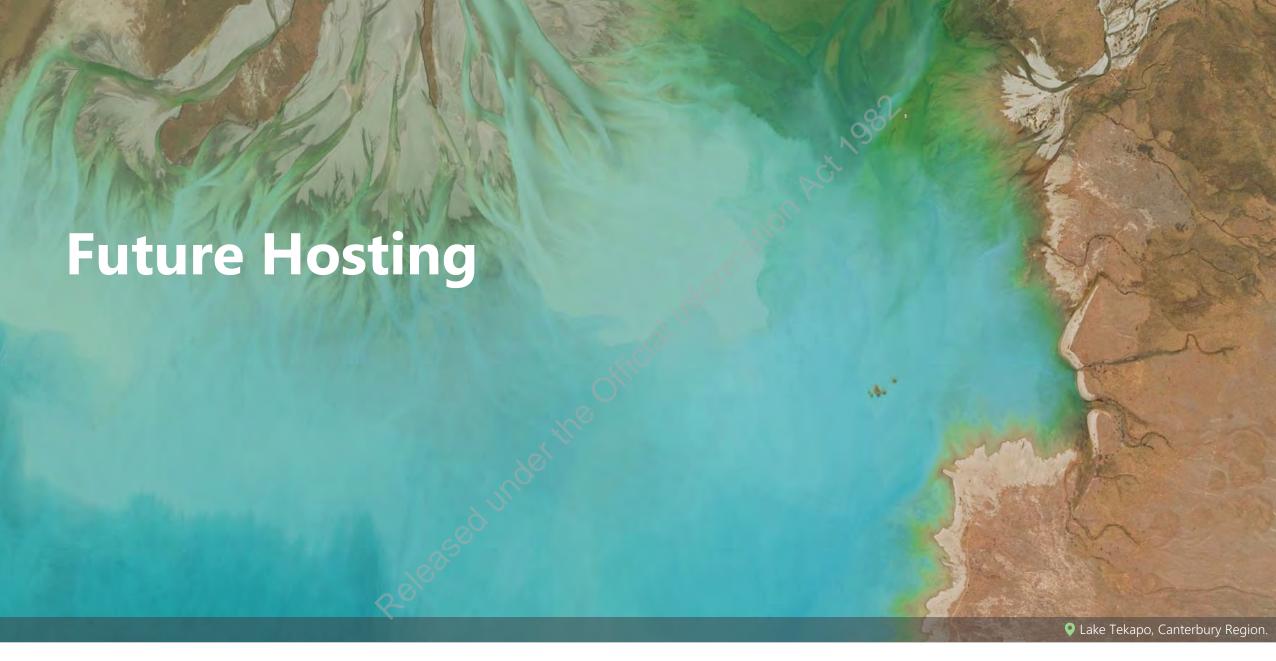DIA is managing the adoption of cloud computing, by:

- ✓ Developing risk and assurance frameworks and guidance
- ✓ Identifying and revising audit and data classifications
- ✓ Providing cloud-specific procurement guidelines

The all-of-government 'cloud first' approach for adoption cloud computing includes

- ✓ Common foundational capability, appropriate policy frameworks and standards, and service deployment strategy
- ✓ Consider guidance before making decisions to adopt cloud-based services
- • Guidance on security and risk of cloud computing apply retrospectively to all cloud services currently in use

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Future Hosting

Lake Tekapo, Canterbury Region.

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Target Hosting Model

Target hosting model is best described as:

- **Public cloud**, with AWS and Azure already selected

- **Multi-cloud**, with rules for utilising public cloud providers

- **In-country**, expecting AWS and Azure to open datacentres in NZ

- **Secure**, where DIA assesses the onshore NZ datacentres and infrastructure

- **Value-based**, similar deployment structures to support cost comparisons

Reasons for sticking with our choices include:

speed to market, high agility, consistent performance, robust, reliable, on-demand self-service, rapid elasticity, simplicity, value for money, minimal up-front costs, portability of workloads, no social licence constraints, measured and metered service

Application Assigning

Simple criteria for assigning applications:

- **Software-as-a-Service** (SaaS) applications; almost any cloud provider is acceptable for hosting by the SaaS vendor. A SaaS service is consumption-based, accredited for security and well-managed; non-public cloud may be avoided.

- **Third Party developed** applications, avoid dependencies on external practices and data centres by using code packages that are exchanged, assessed and deployed with our internal CI/CD processes and tools.

- **In-House developed** applications, with mandated tools across all development environments for internal code repository and internal CI/CD processes and tools (both GitHub). In the future, more tools may become mandatory (e.g., Codicy and Snyk). There are currently three different Infrastructure as Code tools (Cloud Development Kit - CDK, CloudFormation and Terraform).

  - **Survey and Title Enhancement Project** (STEP) - The preferred choice for Landonline replacement with React, Kotlin and PostgresSQL with as ultimate target deployment in AWS.

  - **Location Information** (LI) - The preferred choice for spatial applications is an environment with Python and PostgresSQL deployed in AWS, using Cloudfront, Lambda and S3 buckets where possible.

  - **Application Services** (IS&D/AS) - The preferred choice for non-spatial, custom applications (ex-Datacom) is in Azure, with low code - no code options for developers (Pega/Appian) and end-users (Power Platform). Preferred development languages are being standardised on C# .NET Core and Javascript.

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Thank you!

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