Government Data System

Future state design – Iteration 1

> **Equity of participation** enabling equity of outcomes to support the ambition of "An inclusive and integrated data system that supports innovation safely"

Contents

Document version control and release audience

Version	Date	Key changes	Audience
0.4	2nd September	Includes all design elements from 0.3 of the slide-based view of the design used to socialise key design thinking and approach and joins it up with the Context Narrative.	Raraunga Māori expert
0.5	12th September	Improving conceptual flow, expanding pillar wording, clean up diagrams, beginning of an evolutionary path and improved narrative wording in the operating model sections. Removed temporary appendix text.	• Data Practitioners Working Group • DGLG (Digital Government Leaders Group) Tier 2 nominated group ('The Group') • GEAG (Government Enterprise Architecture Group)
0.6	16th September	Feedback incorporated from: • the Data Practitioner's group. • Housing and Urban Development case study workshop actions Expanded external referencing added.	• Information Group • International Peer Review (Australian Bureau of Statistics, Statistics Canada, Statistics Ireland) • Forrester Research
0.7	4th October	Feedback incorporated from: • Raraunga Māori expert on V0.4	• Raraunga Māori expert • Te Arawhiti - cross-cutting capability and any additional resources/channels they have. Also cross-checking the glossary to see if there are any terms they use • Crown response to the abuse in care inquiry – Crown Response Unit

0.8	18th November	Feedback incorporated from: - Raraunga Māori expert on V0.7 - International: Ireland, Australia, Canada - Te Arawhiti - Office of the Privacy Commissioner - Information Group - Forrester Research	
0.9	22nd November	Final modifications (format, references, publishing check etc)	
1.0	22nd November	Final version for Information Group meeting 30th November	Published 2nd December 2022

What you should know before reading further

Te Tiriti o Waitangi (Te Tiriti)

Ko Wikitoria te Kuini o Ingarani i tana mahara atawai ki nga Rangatira me nga Hapu o Nu Tirani i tana hiahia hoki **kia tohungia ki a ratou o ratou rangatiratanga me to ratou wenua, a kia mau tonu hoki te Rongo** ki a ratou me te Atanoho hoki kua wakaaro ia he mea tika kia tukua mai tetahi Rangatira – hei kai wakarite ki nga Tangata maori o Nu Tirani – kia wakaaetia e nga Rangatira Maori te Kawanatanga o te Kuini ki nga wahikatoa o te wenua nei me nga motu – na te mea hoki he tokomaha ke nga tangata o tona Iwi Kua noho ki tenei wenua, a e haere mai nei.

Na ko te Kuini e hiahia ana kia wakaritea te Kawanatanga **kia kaua ai nga kino e puta mai ki te tangata Maori ki te Pakeha e noho ture kore ana**.

Na kua pai te Kuini kia tukua a hau a Wiremu Hopihono he Kapitana i te Roiara Nawi hei Kawana mo nga wahi katoa o Nu Tirani e tukua aianei amua atu ki te Kuini, e mea atu ana ia ki nga Rangatira o te wakaminenga o nga hapu o Nu Tirani me era Rangatira atu enei ture ka korerotia nei.

Ko te tuatahi

Ko nga Rangatira o te wakaminenga me nga Rangatira katoa hoki ki hai i uru ki taua wakaminenga ka tuku rawa atu **ki te Kuini o Ingarani ake tonu atu – te Kawanatanga katoa o o ratou wenua.**

Ko te tuarua

Ko te Kuini o Ingarani ka wakarite ka wakaae ki nga Rangatira ki nga hapu – ki **nga tangata katoa o Nu Tirani te tino rangatiratanga o o ratou wenua o ratou kainga me o ratou taonga katoa**. Otiia ko nga Rangatira o te wakaminenga me nga Rangatira katoa atu ka tuku ki te Kuini te hokonga o era wahi wenua e pai ai te tangata nona te Wenua – ki te ritenga o te utu e wakaritea ai e ratou ko te kai hoko e meatia nei e te Kuini hei kai hoko mona.

Ko te tuatoru

Hei wakaritenga mai hoki tenei mo te wakaaetenga ki te Kawanatanga o te Kuini – Ka tiakina e te Kuini o Ingarani **nga tangata maori katoa o Nu Tirani ka tukua ki a ratou nga tikanga katoa rite tahi ki ana mea ki nga tangata o Ingarani.**

W. Hobson Consul & Lieutenant Governor

Na ko matou ko nga Rangatira o te Wakaminenga o nga hapu o Nu Tirani ka huihui nei ki Waitangi ko matou hoki ko nga Rangatira o Nu Tirani ka kite nei i te ritenga o enei kupu, ka tangohia ka wakaaetia katoatia e matou, koia ka tohungia ai o matou ingoa o matou tohu. Ka meatia tenei ki Waitangi i te ono o nga ra o Pepueri i te tau kotahi mano, e waru rau e wa te kau o to tatou Ariki.

The preamble of Te Tiriti speaks to why rangatira from across the land came to sign an agreement with the Crown. It speaks of the desire from the Queen to preserve the rangatiratanga of the rangatira and ensuring that no harm came to either Māori or Europeans. To the authors, the preamble is viewed as setting the scene to establish a relationship. In order for the Crown to preserve rangatiratanga, the Government data system must have a focus on relationships and a particular focus on Māori-Crown relationships.

The first Article of Te Tiriti speaks to the Crown governing Aotearoa New Zealand. For the Crown to be a good steward of a system the Government must acknowledge a wide range of views including Māori views. Statistics New Zealand (Stats NZ) and the Government Chief Data Steward (GCDS) recognise the value and mana that a te ao Māori perspective brings and is exploring how it can weave a te ao Māori approach into the government data system so that they can be a better steward and Te Tiriti partner.

At the same time, Article II speaks of tino rangatiratanga or the ability for Māori to self-determine. The system needs to recognise the place of Māori, as tangata whenua, in New Zealand and acknowledge the significant contributions of Māori to New Zealand [Te Arawhiti (n.d.)]. It is important to ensure that Māori are given the space to design a data system that works for them. Māori contracted to and working in Government cannot speak on behalf of tangata whenua, but they can work with Government to reduce systemic barriers to make it easier for Māori to enact tino rangatiratanga.

Article III speaks of Māori having the rights and benefits of citizenship. There are numerous statistics that show how the system is failing Māori. The authors look at how the rights for Māori can be upheld by creating a more equitable system.

Whilst there are three articles to the signed Te Tiriti document, it is important to think of the spirit of signing, what aspirations rangatira had for future generations, and what was discussed on the day which is equally important as the words on the page. This is captured through the wairuatanga which speaks to both spirituality and wellbeing. Wairuatanga is distinct from, but interlinked with, the concept of mauri[1]. This document focuses on the wairua of Te Tiriti but the data carries the mauri of the people, places, and things it is about so elements of mauri may also appear. Giving effect to Te Tiriti requires consideration of wairuatanga (Came et al., 2020)[2].

> The Government Data Strategy and Roadmap (GDSR) is underpinned by a responsibility to uphold Te Tiriti and a commitment to maintaining and enhancing Public Trust and Confidence[3].

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[1] https://www.taiuru.maori.nz/dna-is-a-taonga-a-customary-maori-perspective (mauri)

[2] Came, H., O'Sullivan, D., & McCreanor, T. (2020). Introducing critical Tiriti policy analysis through a retrospective review of the New Zealand Primary Health Care Strategy. Ethnicities, 20(3), 434–456. https://doi.org/10.1177/1468796819896466

[3] https://www.data.govt.nz/docs/data-strategy-and-roadmap-for-new-zealand-2021/

To ensure that Te Tiriti is given effect in the design of the government data system there are several specific callouts in the sections of the design that refer to the federated data ecosystem (federation) operating model and the associated essential design capabilities. An example callout box is shown below. The purpose of the call outs is to provide some current state context and then place emphasis on how the future data system design aligns with the preamble (interpreted as the Māori-Crown relationship), the articles and the wairuatanga of Te Tiriti. The responses in the callouts to article II focus on how the design helps reduce barriers to enable tino rangatiratanga rather than "full exclusive and undisturbed possession of [Māori data]."

Preamble:

Article 1:

Article 2:

Article 3:

Wairuatanga:

Defining Māori data and Māori data sovereignty

Māori data

The Māori Data Futures 2018 report defines Māori data:

> "Māori Data is that which is collected from us, by us, with us, for us, or from our environment that we have connections to"[4]

In this context 'us' could refer to many kinship connections such as Māori, whānau, marae/rūnanga, hapū, iwi or Māori organisations. To aid the reader, throughout the document the phase *Māori collectives* is used to refer to whānau, hapū, marae, rūnanga, iwi, and other political and social organisations.

Māori data sovereignty

Te Mana Raraunga provide a definition for Māori data sovereignty as the following:

"Māori Data Sovereignty refers to the inherent rights and interests that Māori have in relation to the collection, ownership, and application of Māori data."[5]

This definition is the one that is widely referenced by the Crown. However, the work of Dr Karaitiana Taiuru points out that it does not explicitly mention:

  a) Te Tiriti;

  b) He Whakaputanga[6];

  c) whānau, individuals, marae and other Māori societal groups;

  d) United Nations Declaration on the Rights of Indigenous Peoples[7], which protects Māori society;

  e) the fact that hapū leaders signed Te Tiriti as hapū leaders, not as iwi

  f) many other conflicts to traditional Māori society beliefs and social/political structures.[8]

Taiuru proposed the following definition for Māori data sovereignty in 2020:

> "Māori Data Sovereignty refers to the inherent rights and interests Māori, whānau, hapū, iwi and Māori organisations have in relation to the creation, collection, access, analysis, interpretation,

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[4] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Maori_Data_Futures_Report-2018.pdf page 6

[5] https://static1.squarespace.com/static/58e9b10f9de4bb8d1fb5ebbc/t/5bda208b4ae237cd89ee16e9/1541021836126/TMR+Ma%CC%84ori+Data+Sovereignty+Principles+Oct+2018.pdf

[6] https://nzhistory.govt.nz/media/interactive/the-declaration-of-independence

[7] https://www.un.org/development/desa/indigenouspeoples/declaration-on-the-rights-of-indigenous-peoples.html

[8] https://www.taiuru.maori.nz/wp-content/uploads/Maori-Data-Soverignty-Compilation-KTaiuru.pdf

> management, dissemination, re-use, and control of data relating to Māori, whānau, hapū, iwi and Māori organisations as guaranteed in Article II of Te Tiriti/Treaty of Waitangi."[9]

The definition from Taiuru firstly recognises the Te Tiriti commitment by the Crown to Māori. It also reflects that WAI 262[10], which set the foundation for the need to protect taonga, was lodged by individuals who were experts in tikanga/mātauranga Māori. Finally, it reflects that the WAI 2522 Trans-Pacific Partnership Agreement (TPPA) claim, that addressed Māori data, recognising some Māori data has mātauranga[11].

For the purposes of embedding Te Tiriti into the data system by design, this document will reference the Taiuru definition of Māori data sovereignty. For brevity, when Māori data sovereignty is mentioned, it is referring to the following types of data sovereignty.

> **Whānau | Hapū | Marae/Rūnanga | Rōpū | Iwi Data Sovereignty**
>
> The Taiuru definition is the umbrella definition of Māori data sovereignty and can be adapted to be more specific to who the data is of interest to. These definitions are covered in the following (New language ideas and concepts) section.

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[9] https://www.taiuru.maori.nz/maori-data-sovereignty-and-digital-colonisation/#Maori_Data_Sovereignty_-_a_modified_definition

[10] https://www.wai262.nz/

[11] https://waitangitribunal.govt.nz/news/tribunal-releases-report-on-electronic-commerce-chapter-in-cptpp/

Legislation and government policy

Legislation

The following Acts provide the legislative frame for the Government data system future state design – Iteration 1 (this document).

Treaty of Waitangi Act 1975[12]

Public Service Act 2020[13]

Privacy Act 2020[14]

Data and Statistics Act 2022[15]

Mandate of the Government Chief Data Steward (GCDS)

The Chief Executive of Statistics New Zealand has been designated the System Lead for data as the GCDS[16.] Noting the Chief Executive of Statistics New Zealand is also the Government Statistician.

Detail on GCDS mandate is provided below. Please note the extensions being sought and agreement to previous in principle extensions are not yet agreed by Cabinet and therefore must be considered draft[17].

The GCDS Functional Leadership role was established in 2017, alongside other Functional roles in Government for Digital, Information Security, Property and Procurement. This was to enable a common approach to the collection, management and use of data across government.

In April 2022, Cabinet agreed to strengthen and expand the approach to core functions across departments by designating certain functional leads as System Leaders under the Public Service Act. This builds on the concept of system leadership to unify the public service in areas of commonality to achieve efficiency, alignment and impact across systems.

The current mandate of the GCDS given in 2018 and 2021 is to:

- direct agencies to adopt common data capabilities such as data tools, linking infrastructure, or sharing platforms, subject to an opt-out process;

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[12]

https://www.legislation.govt.nz/act/public/1975/0114/latest/DLM435368.html?search=ts_act%40bill%40regulation%40deemedreg_Treaty+of+waitangi_resel_25_a&p=1

[13]

https://www.legislation.govt.nz/act/public/2020/0040/latest/LMS106159.html?search=ts_act%40bill%40regulation%40deemedreg_public+service+act_resel_25_a&p=1

[14]

https://www.legislation.govt.nz/act/public/2020/0031/latest/LMS23223.html?search=ts_act%40bill%40regulation%40deemedreg_Privacy+Act_resel_25_a&p=1

[15]

https://www.legislation.govt.nz/act/public/2022/0039/latest/LMS418574.html?search=ts_act%40bill%40regulation%40deemedreg_Data+and+statistics+2022_resel_25_a&p=1

[16] https://www.publicservice.govt.nz/system/leaders/public-service-system-leaders/system-leads/

[17] This will be updated post Cabinet decisions.

- set mandatory standards and guidelines for the collection, management and use of data by government agencies;

- take a directive role in data investment planning including setting annual expectations for which data gaps should be prioritised, and providing advice on proposed new investment;

- report to Cabinet annually on the health of the data system; and

- be consulted and provide feedback on all significant data investment proposals (including budget and Cabinet decisions)

The GCDS is currently seeking agreement to the in-principle enhanced mandate, given in April 2022 to also:

- direct identified lead agencies named in the Data Investment Plan to collect data in line with the data prioritisation and data gaps identified in the Data Investment Plan, with the addition of the following wording: but only after undertaking a Privacy Impact Assessment to ensure compliance with the Privacy Act 2020 (which the lead agency will publish if the collection is lawful) and, if appropriate, being subject to an Approved Information Sharing Agreement under the Privacy Act; and

- set system-wide tools to better foster the trusted and ethical use of data.

The GCDS is currently seeking to extend this mandate to include:

- embedding ethics in the way data is managed, collected, and used across government; and

- supporting the data system to deliver with, and for, Māori and recognise Māori interests in data;

as well as agreeing the GCDS has a role in:

- providing scrutiny over baseline funding as part of implementation of the Data Investment Plan;

- providing assurance of the government data system via the Health of the Data System Report to be issued periodically as appropriate

New language, ideas, and concepts

This is likely to be the first time the government data system has been described in this depth. In order to describe the future state and the shifts towards a federated data ecosystem model, it has been necessary to introduce some new language, ideas, and concepts. These will continue to evolve with feedback on iterations of the design over time.

The following key definitions are included here for accessibility and are also included in the glossary.

federated data ecosystem/federation - A federated data ecosystem (federation) is founded on relationship-based partnerships which allows data stewardship to remain with the original custodian. The partnerships are formed from a network of participants such as government agencies, communities, local government, organisations, businesses, non-government organisations, academia, and Māori collectives. The partners within the federation engage in data and capability sharing to contribute to pursuing common purpose and value. In this context, data and capability represent the federation resources for the success and equity of the federation. Statistics New Zealand

government data system - The government data system is the government-wide system of policies, practices, processes, and people that are involved in the collection, management, and use of government-held data. The breadth of the government data system covers several data domains in which the Government operates either directly or indirectly via non-government organisations and local government at regional levels. Additionally, it includes essential connected data flows between business, communities, Māori collectives, and the government data system. This breadth captures the actual and aspirational partnerships sought by government data system participants to improve outcomes for themselves and for all Aotearoa New Zealand. Statistics New Zealand

Māori collectives – Māori collectives includes "Māori, whānau, marae/rūnanga, hapū, iwi and Māori organisations". Taiuru, K., Māori Data Sovereignty Compilation. (2022)

Māori data - Māori data is that which is collected from us, by us, with us, for us, or from our environment that we have connections to. Science for Technological Innovation NSC, Data Iwi Leaders Group (Data ILG), and Victoria University of Wellington - Māori Data Futures – Hui Report. (2018)

Karaitiana Taiuru definitions relating to Māori data sovereignty[18]

Māori data sovereignty – refers to the inherent rights and interests Māori and Māori collectives have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use, and control of data relating to Māori and Māori collectives as guaranteed in Article II of Te Tiriti/Treaty of Waitangi.

> **"whānau Māori data sovereignty** refers to the inherent rights and interests Whānau Māori, whānau have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to whānau Māori as inherited by whakapapa with mana atua, mana tangata and as guaranteed in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Nations Declaration on the Rights of Indigenous Peoples."

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[18] Taiuru, K., Māori Data Sovereignty Compilation. (2022).

"hapū Māori data sovereignty refers to the inherent rights and interests of hapū (individual or collectively) in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to hapū as inherited by whakapapa with mana atua, mana tangata and or reflected in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples."

"marae/rūnanga data sovereignty refers to the inherent rights and interests of Marae/Rūnanga (individual or collectively) in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to a Marae/Rūnanga as inherited by whakapapa with mana atua, mana tangata and or reflected in He Whakaputanga and or Te Tiriti and provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples."

"rōpū Māori data sovereignty refers to the inherent rights and interests of Māori organisations (commercial, not for profit, collectives, representatives, consortiums, religious, etc) have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to Māori organisations Māori Peoples as inherited by whakapapa with mana atua, mana tangata and or guaranteed to Māori Peoples members in He Whakaputanga, Te Tiriti and the provided recognition of rights with the United Nations Declaration on the Rights of Indigenous Peoples."

"iwi Māori data sovereignty refers to the inherent rights and interests that iwi have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to a specific iwi as guaranteed in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples."

te ao Māori – A Māori world view is holistic and considers the hononga or connection between all things. This interconnectedness means data about the environment and resources are also considered Māori data. For the government data system design this is reflected in the application of Māori values. It is important to note that this is 'a' rather than 'the' Māori world view because Māori are not a single homogenous group. (Taiuru, 2022), *Māori Data Sovereignty Compilation*.

Document purpose

In 2021 the Government Chief Data Steward released an updated Government Data Strategy and Roadmap (GDSR):

"Success is a data system that is both inclusive and integrated. A system where anyone who wants to base their decisions on credible information can do so with ease. A system that generates the deepest insights and the best services, at the least effort to the people and organisations behind the data." - Mark Sowden, Government Data Strategy and Roadmap (2021)

To achieve these goals, the GDSR included the development of a system architecture. In May 2022 the Information Group[19] endorsed the scope for iteration 1 of the government data system design:

- Weaving te ao Māori perspectives into the government data system design practices to enable the Government to give effect to Te Tiriti o Waitangi

- Supporting evolution to an increasingly federated model. This includes common data, data sourcing, access and re-use, and cross-domain/sector interoperability related to operational service delivery and case management

This document presents a conceptual and logical narrative of iteration 1 of the future state design (the design) of the government data system. It includes the key design elements, processes, operational behaviours, and practices. The design outlines the specific concepts that need to be present and how these would deliver on the vision for the future of the government data system as stated in the Government Data Strategy and Roadmap.

Te Tiriti call outs

The government data system design has been developed to give effect to Te Tiriti. References are embedded within each section and through dedicated call outs to emphasise weaving a te ao Māori perspective on data and giving effect to Te Tiriti.

Government data system design pillars

Design pillars are used to guide implementation, including where and how each conceptual and logical design element supports one or more of the design pillars.

Conceptual model for a federated government data system

The conceptual model of the design enables senior stakeholders to view the most significant constructs and patterns of interaction that influence evolution towards a future state data system. Additionally, the conceptual design highlights the breadth of the government data system and how this supports the modern reality of data stewardship and accountability across many federated data ecosystems (federations).

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[19] https://data.govt.nz/leadership/advisory-governance/information-group/

User experience and journeys are outlined for a diverse range of data system participants. Together, these show how the design will support equity of participation to support equity of outcomes for government data system participants.

The federated data ecosystem operational model

The logical, next-level view of the design describes operating model patterns and the key design features and characteristics required to deliver on the conceptual view. The logical view shows how these operational patterns support the desired outcomes.

Essential design capabilities

The design assumes an evolutionary approach to change and building of capabilities to support a federated operating model. The design has been developed to include sufficient detail to support achievable and sustainable change over time. This includes calling out existing capability and guidance that could be leveraged.

The government data system design is purposefully technology agnostic and will show where specific data related standards and best practice should be considered in future state implementation patterns.

Acknowledgements

Data practitioners', design and advice working groups

Representatives from the following organisations have been involved across a variety of workshops and discussions.

Accident Compensation Corporation | Te Kaporeihana Āwhina Hunga Whara	Ministry for Primary Industries | Manatū Ahu Matua
Airways New Zealand	Ministry of Business, Innovation and Employment | Hikina Whakatutuki
Archives New Zealand | Te Rua Mahara o te Kāwanatanga	Te Tāhuhu o te Mātauranga | Ministry of Education
Corrections | Ara Poutama Aotearoa	Ministry of Health | Manatū Hauora
Department of Conservation | Te Papa Atawhai	Te Tāhū o te Ture | Ministry of Justice
Te Tari Taiwhenua | Department of Internal Affairs	Ministry of Social Development | Te Manatū Whakahiato Ora
Fire and Emergency New Zealand	Waka Kotahi | New Zealand Transport Agency
Inland Revenue | Te Tari Taake	Office for Māori Crown Relations | Te Arawhiti
Kāinga Ora–Homes and Communities | Kāinga Ora	Office of the Privacy Commissioner | Te Mana Mātāpono Matatapu
Toitū Te Whenua | Land Information New Zealand	Statistics New Zealand | Tatauranga Aotearoa
Ministry for the Environment | Manatū Mō Te Taiao	Social Wellbeing Agency | Toi hau tāngata

It would not have been possible to put this design together without the significant help and support of a diverse group of data practitioners and subject matter experts. Hearing your challenges and aspirations for the future has helped us to 'keep it real' and practical.

Post settlement Iwi and Māori Rōpū

Statistics New Zealand (Stats NZ) would like to extend their sincere thanks to the post settlement Iwi, Māori Rōpū Māori collectives and for the research insights and whakaaro Māori gained from documents listed below. This information has contributed to the development of iteration 1 of the future state Government data system. This design work has objectives and associated success criteria related to giving effect to the obligations of Te Tiriti o Waitangi and removing systemic barriers.

Iwi and Māori Rōpū and Māori collectives	Contributing documents
Ngāi Tūhoe	https://issuu.com/teurutaumatua/docs/tuhoe_-_smp_publication
Te Hiku o te Ika	https://www.msd.govt.nz/about-msd-and-our-work/work-programmes/community/te-hiku-social-development-and-wellbeing-accord.html https://statsnz.contentdm.oclc.org/digital/api/collection/p20045coll25/id/86/download https://www.treasury.govt.nz/sites/default/files/2015-10/ud-emd-iwisucc-sep15.pdf
Ngāi Te Rangi	https://www.ngaiterangi.com/uploads/8/9/9/4/89942867/2020_agm_pack.pdf
Ngāti Porou	https://ngatiporou.com/sites/default/files/publication/download/TRONP%20Annual%20Report%202020%20WEB.pdf Genomic research https://uploads-ssl.webflow.com/5aefea03f167d6220569b7af/5b3ecd204521fe84b6f238c1_Te%20Mata%20Ira%20Report_%20Informing%20Cultural%20Guidelines%20for%20Bio-banking%20and%20Genomic%20Research.pdf
Ruapehu Whānau Transformation	https://www.ruapehuwhanautransformation.com/_files/ugd/56ed27_9e3bed222a8040eeac57663f156c5524.pdf https://www.ruapehuwhanautransformation.com/_files/ugd/56ed27_7c5105985a4b46bbba6488d17bebb4ff.pdf
Taranaki Whānui	https://www.govt.nz/assets/Documents/OTS/Taranaki-Whanui-ki-Te-Upoko-o-Te-Ika/Taranaki-Whanui-Whole-of-Government-Accord_2011.pdf
Panguru	https://www.linkedin.com/pulse/data-hapu-sovereignty-whina-te-whiu/

International peer review

As part of the finalisation processes for iteration 1 of the government data system design written international peer review was requested.

Written international peer review was undertaken with:

- An Phriomh-Oifig Staidrimh/The Central Statistics Office – Ireland
    - Including detailed comments from the Department of Justice and the Department of Agriculture, Food and the Marine
- The Australian Bureau of Statistics – Australia
    - Including overview comments from the Australian Government Department of Finance
- Statistique Canada/Statistics Canada – Canada

Design testing case studies

Te Tūāpapa Kura Kāinga | Ministry of Housing and Urban Development

Te Rourou – Vodafone Aotearoa Foundation – OHI Data Navigator

Ngā Taonga Sound & Vision – Audiovisual Archive Data System

The key references we have used

We would like to acknowledge all the authors of the following references which were used extensively in the development of the Government data system future state design.

First Nations Information Governance Centre (2020). A First Nations Data Governance Strategy https://fnigc.ca/wp-content/uploads/2020/09/FNIGC_FNDGS_report_EN_FINAL.pdf. Retrieved from https://fnigc.ca/

Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri (2022), Key themes from Māori targeted engagement on a plan to implement the United Nationals Declaration on the Rights of Indigenous Peoples. Retrieved from https://www.tpk.govt.nz/

Office of the Auditor General (2018). Sharing Data. Retrieved from https://oag.parliament.nz

Office of the Auditor General - Haemata Limited (2022). Māori Perspectives on Public Accountability. Retrieved from https://oag.parliament.nz

Productivity Commission (2021). A fair chance for all: Where should we focus? Your feedback. Retrieved from https://www.productivity.govt.nz/

San Diego Community Information Exchange (2021). Leveraging Community Information Exchanges (CIEs) for Equitable and Inclusive Data: A Vision for the Future. Retrieved from https://ciesandiego.org/data-equity/

San Diego Community Information Exchange (2021). Leveraging Community Information Exchanges® for Equitable and Inclusive Data: The CIE® Data Equity Framework. Retrieved from https://ciesandiego.org/data-equity/

Science for Technological Innovation NSC, Data ILG, and Te Hiku Media. (2019). Māori Data Futures – Intellectual Property, Te Aurere, Kaitaia, 20-21 March 2019. Wellington, NZ: Science for Technological Innovation NSC. Retrieved from https://www.sftichallenge.govt.nz/

Science for Technological Innovation NSC, Data ILG, and Victoria University of Wellington. (2018). Māori Data Futures – Hui Report, 9 May 2018. https://www.sftichallenge.govt.nz/

Social Wellbeing Agency (2018). What you told us. Retrieved from swa.govt.nz

Statistics New Zealand (2020). COVID-19 Lessons Learnt: Recommendations for improving the resilience of New Zealand's government data system. Retrieved from https://www.data.govt.nz/

Taiuru, Dr Karaitiana PhD, JP (2022). Compendium of Māori Data Sovereignty (2022). Compendium of Māori Data Sovereignty. Retrieved from https://www.taiuru.maori.nz/

Te Kāhui Raurunga (2020). Iwi Data Needs https://www.kahuiraraunga.io/iwidataneeds. Retrieved from https://www.kahuiraraunga.io/

Te Kotahi Research Institute, The University of Waikato - Kiri West, Daniel Wilson, Ari Thompson, Maui Hudson (2020). Report for the Digital Council. Māori Perspectives on Trust and Automated Decision-Making - Report for the Digital Council. Retrieved from https://digitalcouncil.govt.nz/

Te Mana Raurunga (2018). Principles of Māori Data Sovereignty. Retrieved from https://www.temanararaunga.maori.nz/

Government data system, future state design summary

The government data system is the government-wide system of policies, practices, processes, and people that are involved in the collection, management, and use of government-held data [Statistics New Zealand [Stats NZ] (2018)].

The breadth of the government data system covers several data domains in which the Government operates either directly or indirectly via non-government organisations and local government at regional levels. Additionally, it includes essential connected data flows between business, communities, Māori, and the government data system. This breadth captures the actual and aspirational partnerships sought by government data system participants to improve outcomes for themselves and for all Aotearoa New Zealand.

The need for a re-designed government data system

An inclusive data system is one that enables equitable participation in a manner that builds relationships and enhances trust between government data system participants. Trusted relationships support a transparent and open discussion of aspirations and data needs. Open, trusted discussion supports effective partnerships delivering equitable outcomes and reciprocal benefit for all data system participants.

Increasingly the linking together of data across the boundaries of private industry, Government, communities, and our personal lives offers some of the greatest opportunities but brings with it significant responsibilities and accountabilities related to public trust and confidence. Solving our big societal challenges requires efficient data flows between people, organisations, sectors, and countries. The government data system is struggling to continue to deliver to the strategic needs of Government and the expectations of Aotearoa New Zealand and New Zealanders.

The current government data system has not been designed with Māori and does not give effect to the obligations of Te Tiriti. This history is contributing to narratives where some people and communities are excluded and invisible in data while others are harmed by their inclusion. Data held by Government is sometimes referred to as "deficit data" that reflects the interests of centralised systems, and which is not necessarily useful for Māori to achieve their aspirations [Te Kotahi Research Institute (2020)]. There is little strength-based data, for example measures such as connection to identity, language, and culture, within the government data system to develop more balanced narratives.

We must acknowledge this history and determine pragmatic pathways that are achievable and enable all government data system participants to take an evolutionary journey together. The GDSR has Te Tiriti at the centre, so it is important that the data system is designed in a way that recognises Māori and Māori collectives' rights, interests, and aspirations. There is a need to design for equity of participation in the future government data system so that the ambitions of an inclusive government data system founded on Te Tiriti can be achieved in a genuine way that acknowledges the rights and interests of Māori and Māori collectives.

It is important to remove systemic barriers that hinder people and organisations from participating, adding value, and gaining value and benefit from the government data system. However, supporting the creation of an inclusive and integrated data system that supports innovation safely requires purposeful design especially regarding Aotearoa New Zealand centric ethical and cultural protocols.

Outcomes and critical success criteria

The future state government data system design sets out an intentional direction supporting the infrastructure outcomes outlined in the GDSR to enable effective data management and reuse:

- Data can be integrated across government and with other holders of data

- Data is shared safely with those who need it (and are authorised to use it)

- Data is published and easily accessed where appropriate

- The right metadata (contextual information) exists to manage and use the data effectively

- Infrastructure and support exists for Māori collectives.

The future state government data system design is also founded in the GDSR Te Tiriti focus area, to work together with Māori collectives to fulfil responsibilities of Te Tiriti through support of Māori collectives. Significantly this means enabling the following:

- The government data system gives effect to the expectations of Te Tiriti

- Codesign processes with Māori collectives are in use

- Māori data sovereignty is recognised and understood across the government data system

- Ngā Tikanga Paihere guidelines are implemented across the government data system

- A reciprocal relationship exists between Crown and Māori collectives

What does success for the future state government data system look like?

A successful government data system is one that enables equitable participation for all, enabling all individuals and communities to participate in, add value to, and gain value from, the government data system. Significantly, this requires removing systemic barriers that hinder adding and gaining value.

An inclusive and equitable data system is built on strong relationships and trust. This requires positioning the government data system towards relationship-based data partnerships founded on stewardship rather than ownership.

The following measures and objectives will guide how we further develop, refine, and implement the government data system design:

- A Te Ao Māori perspective is woven into the design and design practices of the Government data system

- Māori collectives are able to express tino rangatiratanga and mana motuhake serving their needs and aspirations

- Participation in end-to-end data design has increased for Māori collectives

- Government held data, collection, storage, sharing and use practices are transparent and increasing in consistency

- Data equity and the understanding of data bias are embedded into data design and design practices

- Small and medium sized government agencies are increasingly supported by the broader Government data system

- The government data system increasingly has the capacity and capability to deliver the data needs required to respond to the wellbeing of our people and environment

- Investment roadmaps supporting equity of participation are in place

The current government data system has many assets that we could leverage as the starting point for its evolution. The pace at which we evolve the data system needs to be efficient, effective, sustainable, and based on solid foundations and ethical and cultural protocols which will underpin successful federation. Evolution needs to be inclusive to ensure the journey of change we need to embark on is achievable and practical.

Federated data ecosystems, towards shared stewardship

Adopting federated data ecosystem operating model signals a shift to relationship-based data partnerships founded on stewardship rather than ownership. Partnerships support equity of participation and enhance value through leveraging the joint capability of partners.

Federated data ecosystems provide scalability, flexibility, and consistency to meet the varying demands placed on the government data system:

- Enabling Māori collectives to participate as a partner in the Government data system.

- Enabling Māori collectives to express their rangatiratanga as mana whenua through equity of participation in data design, collection and dissemination serving their needs and aspirations.

- Assisting small and medium sized agencies to keep pace with the increasing expectations in the collection, management, integration, interoperability, and use of data

- Encouraging consistent privacy, ethics, and security practices

Federated data ecosystem design allows for evolutionary shifts to be undertaken at a pace appropriate for each purpose and can progress separately for domains and participants.

To achieve the shifts required in the government data system and to make a positive impact for Aotearoa New Zealand and New Zealanders we need data ecosystems founded on federation that are fit for purpose and enable participants within the government data system to work together, whether the challenges are around health, homelessness, climate change, or responding to societal and environment concerns.

Significantly, federated data ecosystems provide the opportunity for Māori collectives to participate with equity as a partner in the government data system. This partnership will enable Māori collectives to express their tino rangatiratanga and mana motuhake through equity of participation in data design, collection, storage, and use serving their needs and aspirations.

A purposeful shift in the design of the government data system from the current highly distributed bilateral sharing to federated data ecosystems [20]will enable partnerships founded on stewardship rather than ownership. Partnerships are defined by a common purpose and can better support equity of participation by leveraging the joint capability of partners. They provide a way for agencies to benefit from the capability and capacity of others, which they may lack. Small, and even

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[20] Reference Appendix A for an overview of data sharing patterns

some medium sized, agencies do not have the capability or capacity to meet the increasing expectations in the collection, storage, management, integration, interoperability, and use of data.

Partnerships and shared stewardship and governance will also be important for the successful adoption of data reliant digital approaches such as artificial intelligence/machine learning (AI/ML), which require highly mature data design and data management practices. This is particularly true in the context of the increasingly risky cyber security environment.

The use of AI/ML can aggravate and introduce more bias if the data used to model and train AI/ML systems is not well understood and cultural and ethical concerns are not considered early in data design processes. Federated data ecosystems enable diversity of participation across ethnicity, societal and cultural perspectives, providing the opportunity to increase data literacy and capability needed to mitigate and manage bias in data.

Federated data ecosystems are increasingly common in Government, with examples being Canada, US (United States), Estonia, and Hungary (Estonia and Hungary have/are moving towards increasingly centralised data systems).

The government data system will comprise many federated data ecosystems, each potentially progressing independently as they focus on specific purposes and outcomes. Some will be complex domain or sector based. Others might be smaller and centred around the needs of a specific community while other will be centred around solving specific local or national challenges.

Whether small or large, federated data ecosystems will increasingly rely on equitable and collaborative relationship-based partnerships where data, data and technology infrastructure, knowledge and capability can be brought together. These partnerships will be central in achieving our collective aspirations.

The design of the future government data system is founded on eight key pillars critical to enabling the shifts required to achieve better outcomes for Aotearoa New Zealand. These pillars are Equity, Trust, Partnership, Reciprocity, Protection, Value, Quality, and Innovation.

These pillars support a more inclusive and integrated data system and describe the collaborative relationship-based behaviours and practices needed to support the participants within the government data system.

The federation operating concepts embody a partnership and codesign based operating model and value chain to support the creation of value beyond what any of the participants could achieve individually. Significantly, this includes:

- Establishing and growing equitable and trusted relationships and partnerships

- Discovery and discussion of data needs and aspirational outcomes through codesign

- Acquisition and authority to use data for an agreed united purpose

- Data usage, publication and the outcomes and value derived are focused on equity

- Operational support processes and infrastructure support the effectiveness and sustainability of the federated data ecosystem
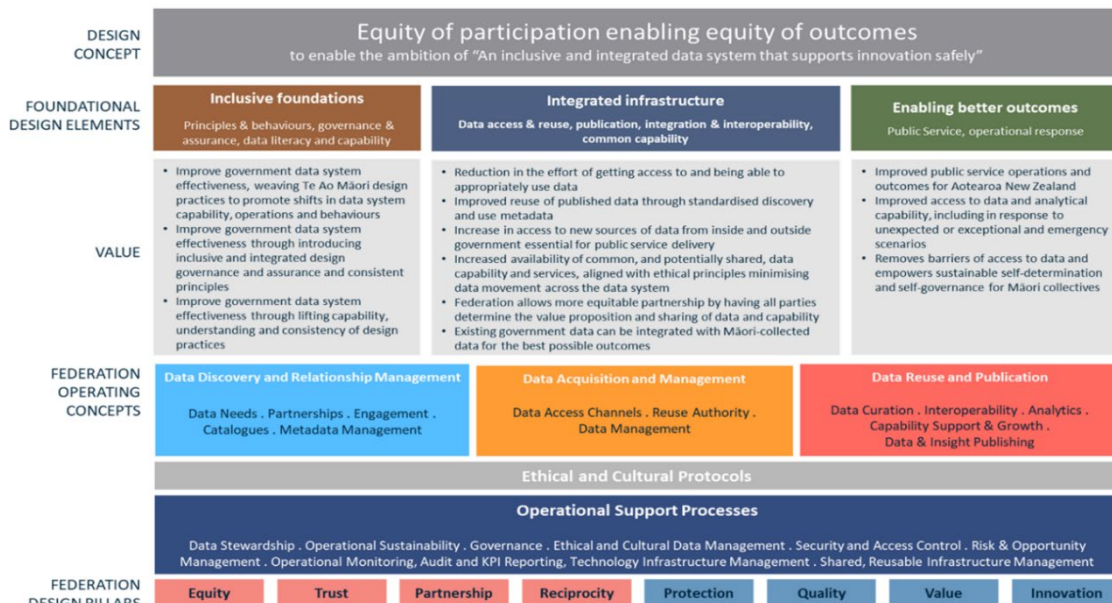
Figure 1 – Government data system – key elements of the design

We will achieve success through evolutionary change

The evolutionary journey of the government data system towards a future as described in this design narrative will take time. The evolution needs to deliver sustainable incremental benefit efficiently and effectively. This must start with practical first steps that leverage existing closely aligned data system assets and capability.

The evolutionary journey should be an agile and inclusive series of steps allowing validation of both design and assets leveraged. Validation enables pivots to take place based on real-world data system participation and use case practical evidence of areas of change required.

Initially, the journey may only be undertaken by a few who can test assumptions and sure up the foundational design elements. Once established, the foundations provide the basis for a new way of working that can be normalised across the data system against a wider set up use cases and outcomes.

As momentum is established and normalised data system participants will be able to identify opportunities to optimise aspects of the data system design to support increased effectiveness and sustainable. Taking an evolutionary approach to data system design implementation supports targeted investment in data system capability allowing incremental benefit.
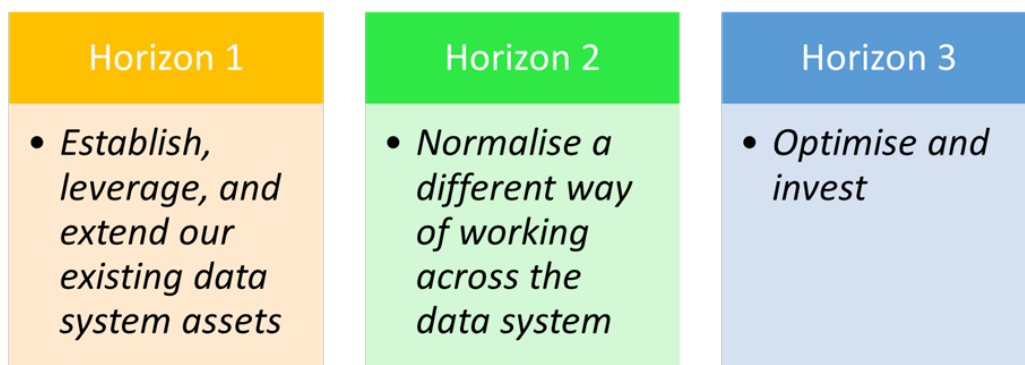
Figure 2 – Investment and implementation roadmap horizons

The following diagram provides a summary view of the Investment and implementation roadmap. It shows the key shifts over the three horizons illustrating the evolution of the government data system over time. The summary outlines the key outcomes, along with the associated key shifts, as a node for each horizon. Detail on the elements enabling the key shifts; essential design capabilities, data infrastructure, data capability and the further iteration of the design, can be found in the Investment and implementation Roadmap 1.0 which accompanies this document.

Roadmap summary
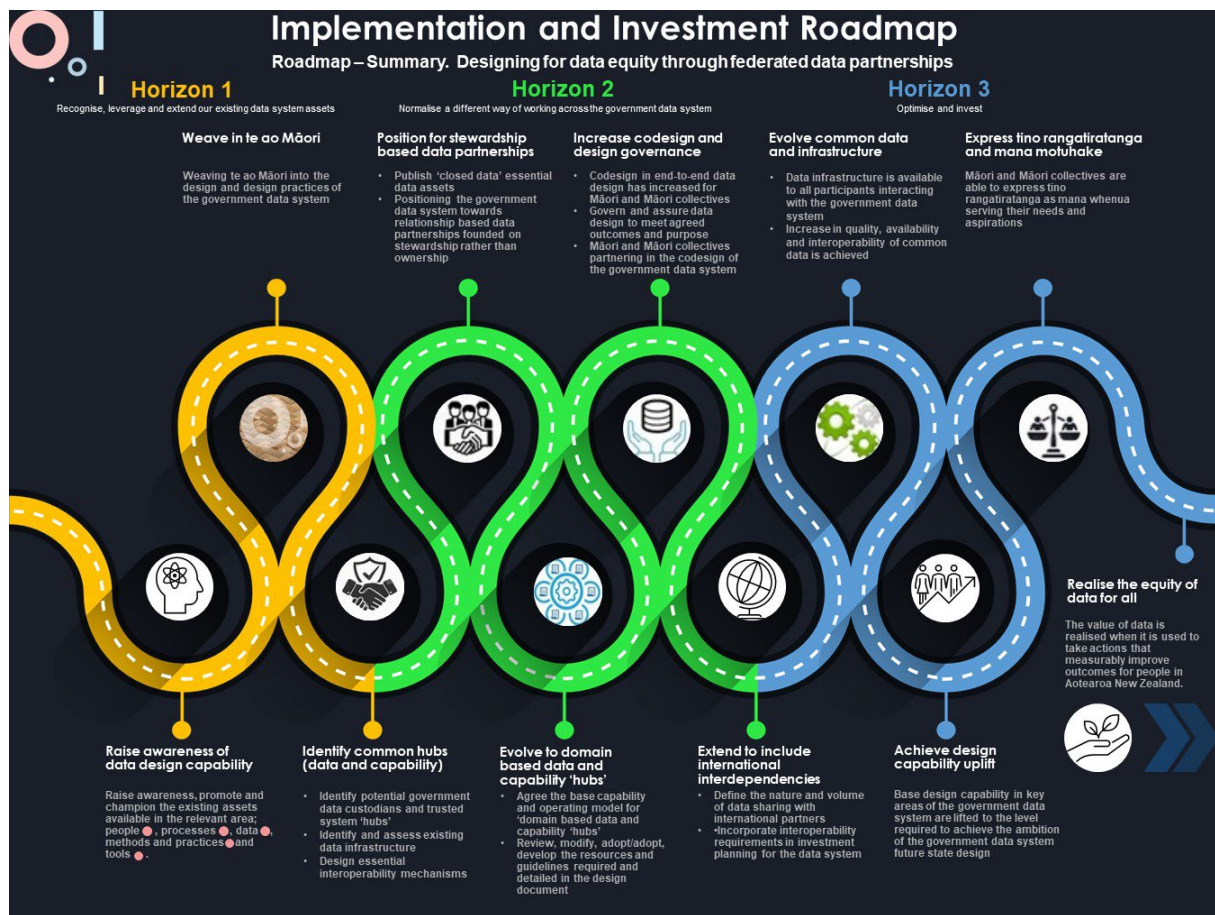
Government data system design pillars

The government data system will comprise many federated data ecosystems. Each brings together organisations who have data or need data for mutually agreed common purpose(s). To be effective each will rest on the same foundations.

Federated data ecosystems will be founded on eight key pillars critical to enabling the shifts required to achieve better outcomes for Aotearoa New Zealand. The eight key design pillars provide the framework against which to validate design decisions.

Equity: Removing the systemic barriers that hinder people and organisations from participating, adding value, and getting value and benefit from the government data system.

Trust: A safe, inclusive, and efficient government data system contributes to better outcomes in Aotearoa New Zealand.

Partnership: Collaborative, relationship-based data partnerships will enable discovery, sharing and integration of common data and capability across federated data ecosystems

Reciprocity: Mutual benefit and exchange of value where all partners act reasonably with honour and in good faith

Protection: Within each federated data ecosystem, data will be appropriately protected but will also enable data to be used to protect and improve the health and wellbeing of people

Quality: Evidence led decisions leading to good outcomes requires sufficient fit-for-purpose quality data. Partners will determine if data is fit for purpose to support their aspirations.

Value: The value of data is realised when it is used to take actions that measurably improve outcomes for people in Aotearoa New Zealand.

Innovation: Innovative practices will redefine how we work together creating a collaborative, innovative and sustainable approach to improving equity in the creation and use of data across the government data system.
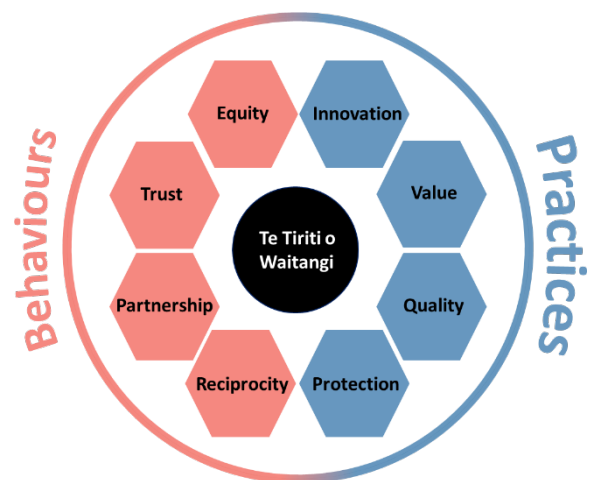
Further detail describing the pillars is outlined below providing additional information on how the design will enable the government data system to achieve to the aspirations of the pillar and how the design will enable this.

Information to support these pillars has been gathered from various documents. To preserve the kōrero, words such as 'Treaty' and 'Māori' have been kept but from the government data system design perspective, these should refer to Te Tiriti and all Māori collectives rather than just Māori as a single collective.

Equity

The government data system needs to enable equity of participation.

Why is this important	How do elements of the design enable this?
It is important to remove systemic barriers that hinder people and organisations from participating, adding value, and getting value from the government data system. Giving effect to Te Tiriti means that additional focus is needed to ensure data systems that do not work well for Māori are transformed [Te Arawhiti (n.d.)][21] to address structural discrimination across the system [Te Arawhiti (n.d.)] and support improved outcomes for Māori, particularly people and whānau with low levels of wellbeing [Te Arawhiti (n.d.)]. The government data system requires a different set of behaviours which involve working together progressively, creating a collaborative, innovative and sustainable approach [Ministry of Business Innovation & Employment [MBIE] (2021)] codesigning to achieve equitable outcomes for all government data system participants and beneficiaries. Engagement on the United National Declaration on the Rights of Indigenous Peoples (UNDRIP) declaration plan notes that Māori participants felt the need to "monitor collective, intergenerational, whānau and environmental well-being. The health and status of whenua, awa, tamariki, rangatahi, wāhine and tāngata whaikaha Māori were important to participants." [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Paragraph 142 (2022) Paragraph 142].	The government data system will provide equitable and effective mechanisms for people and organisations to access data and information that considers their requirements, including literacy, accessibility, mode of delivery and cultural and social differences [Ministry of Health (2021)]. These mechanisms will include the ability to codesign and share capability and decision-making more equitably. The design ensures equity of participation. Specifically, each federation's standard operating model considers what that means from each organisation's perspective. This includes establishing inclusive relationship management processes, and governance and proactively monitoring against participant expectations. Additionally, government data system will support the use of data to monitor the equity [Ministry of Education [MOE] (2021)] of federated data ecosystems as determined by participants. It was noted in the engagement for implementing the UNDRIP declaration plan that Government holds data to measure inequity. "Participants wanted hapū and iwi to have a role in monitoring to be responsive to local needs and aspirations and opportunities to incorporate positive data for Māori." [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Paragraph 142 (2022) Paragraph 141].

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[21] https://www.tearawhiti.govt.nz/assets/Tools-and-Resources/Maori-Crown-Relations-Capability-Framework-Guide-Bibliography.pdf

Trust

People in the system need to trust each other.

Why is this important	How do elements of the design enable this?
A safe, inclusive, and efficient data ecosystem contributes to better outcomes in Aotearoa [Stats NZ (2021)]. An effective and enduring government data system is built upon ethical and cultural protocols that engender trust as determined by the participants [MBIE, 2021].	The design of the government data system builds trust through the establishment of positive relationships between those that have and need data.
Some who participated in the engagement for the UNDRIP declaration plan wanted to "understand the international frameworks and monitoring of Indigenous rights" [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Paragraph 140 (2022)] which could help improve levels of trust.	The design ensures ethical and cultural protocols are collectively decided during relationship building. These include sharing of aspiration, data needs and the capability to access and use data for a specific purpose. These support a greater degree of openness and transparency increasing trust and confidence between data system participants.
	The federated operating model design enables open and transparent discussion and agreement on common data needs within and across federated ecosystem e.g., property and location data. The design also emphasises the importance of openness around data discovery and agreement on fit-for-purpose data quality including mechanisms data linkage and disaggregation.
	The move towards a more federated data system design establishes an environment where data system participants feel safe to represent their specific world view. This supports a more inclusive and collaborative approach to data discovery, access, and usage.
	Significantly, this enables diverse communities to become more visible and included in the data used for service delivery, operations, and analytics. [Ministry of Health (2021)] For example, existing government data can be integrated with Māori-collected data and presented at a more granular level for the best possible community outcomes for Māori and Māori collectives.

Partnership

Working together to achieve more.

Why is this important	How do elements of the design enable this?
The government data system should enable genuine collaborative, diverse, relationship-based data partnerships to be formed whilst preserving participating organisation independence and autonomy. This will enable discovery, sharing and integration of common data, infrastructure, and capability across the government data system. Each participant brings something to the collaboration including data, capability, understanding of ethical and cultural protocols, and together they weave together different perspectives and views about data [LINZ, 2019]. The government data system will comprise many federated data ecosystems across a diverse set of domains. The government data system must take practical actions to give effect to Te Tiriti giving priority to tribal (iwi) and sub-tribal (hapū) voices [MOE, 2021]. However, forging partnerships and finding new ways of working [Stats NZ (2021)] is not something that can be mandated across the government data system and, therefore, needs to develop organically aligned to clear and valuable outcomes for participants. The government data system must support equitable partnerships with Māori to define and collect the right data for Māori, and then ensure that collected data is available for iwi and Māori [Ministry of Health (2021)] to support informed decisions for intergenerational benefit. Sustainable and equitable communication and collaboration mechanisms will support the health and wellbeing of the government data system and its participants [Ministry of Health (2021)].	The design moves the government data system towards more of a multi-lateral collaborative partnership model. Significantly, the design leverages the combined capability of federation participants to achieve outcomes not feasible by any participant alone. The design also recognises that participants also have independent accountability (e.g., OPC, Māori collectives and Stats NZ) and autonomy to be acknowledged and respected and is foundational to building trust and resilience. This supports conversations and engagement regards the value of data to support better outcomes without compromising organisation operational autonomy and independence. Additionally, the design ensures privacy, ethical, and cultural protocols and best practice are embedded into the relationships that recognise the importance of Te Titiri [MOE, 2021]. This supports the ability for the Crown to uphold its commitments and obligations under the Treaty of Waitangi [Te Arawhiti (n.d.)]. The design also ensures that partnerships clearly understand their purpose for collection and use of data. This enables appropriate decisions regards collection and retention of data avoid over collecting of data and increased security risk. Partnerships also support building capability and enduring relationships to implement appropriate privacy controls covering the full lifecycle of data collection, access, usage, and disposal. The design of the government data system will support the creation and development of effective and enduring relationships between Māori collectives and the Crown. This enables the co-creation of a picture of Māori data needs that include a te ao Māori world view

The engagement for the UNDRIP declaration plan spoke of "rebalancing of the partnership, in terms of equitable resourcing, power sharing, and giving equal recognition and status to Māori knowledge systems, tikanga, values and frameworks." [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Paragraph 142 (2022) Paragraph 94].

and respects Māori data sovereignty [MBIE, 2021].

Reciprocity

Ensuring mutual benefit.

Why is this important	How do elements of the design enable this?
The Waitangi Tribunal's understanding of the principle of reciprocity is derived from Articles I and II of the Treaty and captures the "essential bargain" or "solemn exchange" agreed to in the Treaty by Māori and the Crown: the exchange of sovereignty for the guarantee of tino rangatiratanga [Waitangi Tribunal (n.d.)]. The Waitangi Tribunal considers the following concepts integral to the principle of reciprocity: the equal status of the Treaty partners, and the Crown's obligation to actively protect Māori Treaty rights [Waitangi Tribunal (n.d.)]. Reciprocity enables the Public Service to recognise the skills and knowledge Māori public servants bring, and the importance of better supporting Māori public servants [Te Arawhiti (n.d.)]. Reciprocity within the government data system is achieved through all partners acting reasonably, with honour and good faith to ensure that all participants are receiving value in a manner that is mutually beneficial. What each participant can contribute will vary from time, money, technical expertise, lived experiences, connections, and other items of value.	The design includes several key operating model processes that ensure the value of participation flows both from and to each participant organisation. Value will come in many forms including access to and use of data, access to capability of other participating organisations, or the real-world outcomes for people enabled through facilitating access to data and capability. Operational support processes streamline the value exchange processes and mechanisms between federated data ecosystem participants in an effective, efficient and sustainable manner. Additionally, the design encourages the use of consistent, common infrastructure and data capability between federated ecosystems to minimise barriers to participation and to reduce duplication of effort for minimal value. The design also emphasises the critical role of appropriate protocols (ethical and cultural)[22] required to ensure the value exchange is carried out appropriately for all participant world views. For example, protocols are applied to determine how data is collected, catalogued, accessed, used, and published for the purpose and objectives of federation and its participants.

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[22] See Ethical and cultural protocols section

Protection

Within each federated data ecosystem, data will be appropriately protected but will also enable data to be used to protect and improve the health [Office of the Privacy Commissioner (2020)] and wellbeing of people [Courts of New Zealand (2021)].

Why is this important	How do elements of the design enable this?
Data needs to be appropriately protected and used responsibly. Authority to access data and establishing clear ethical and cultural protocols proactively will enable the government data system to realise the value of data aligned to equitable outcomes. For data to be protected, there must be transparency of who has what data, who and how it can be accessed, by whom and for what purposes it can be used. Understanding purpose and outcomes sought from the use of data is critical in supporting appropriate actions around the protection of data and those about whom it relates. For example, only collecting (directly or indirectly) data aligned to the purpose and aligned with the protocols set out in privacy impact assessment (PIA), Memorandum of Understanding (MOU) and Approved Information Sharing Agreements (AISAs). This also extends to the retention duration and not holding it any longer than necessary. As more data is brought together to provide a greater contextual understanding of the world we live in, it becomes more valuable and needs to be protected from inappropriate access and use. This is especially true when giving effect to Te Tiriti and considering culturally appropriate data protections. For some data, particularly data with whakapapa, there are calls for that data to be protected like we would protect property and treasured possessions (a taonga). The decisions made using data should protect and benefit people and communities. This requires a purposeful approach that goes beyond access and use of data. Significantly, it	The design of the government data system will support design practices and governance that include the ethical use of data for secondary purposes [Ministry of Health (2021)]. Additionally, Māori data sovereignty principles will be considered and integrated into data design and governance and management processes consistently across the government data system [Ministry of Health (2021)]. The government data system will develop increased maturity to appropriately incorporate Māori data and information systems [Ministry of Health (2021)] including cultural metadata, such as Traditional Knowledge Labels [Local Contexts (n.d.)] enabling culturally appropriate secondary access and use of data. Additionally, wider adoption of frameworks such as Ngā Tikanga Paihere [Stats NZ (2020)] and Data Protection and Use Policy [Social Wellbeing Agency (2022)] will support analytical and operational data governance and assurance processes. Access to data will systematically protect the privacy of individual's identifiable data whilst being able to link other de-identifiable across federated datasets Privacy preserving techniques[25] [Ram Mohan Rao et al (2018)]. Appropriate guidance and metadata will be included with data to support appropriate access and use. Additionally, the design shows that the capability of all parties handing data must have sufficient understanding and capability regarding all aspects of data privacy, confidentiality, and appropriate use.

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[25] https://journalofbigdata.springeropen.com/articles/10.1186/s40537-018-0141-8#Tab1

requires collaborative relationships with collectors of data to check alignment of purpose from collection, use and reuse perspectives.

Māori that contributed their aspirations for the UNDRIP declaration plan "saw Indigenous data sovereignty and governance of the monitoring as an important feature of any system of effective monitoring of the progress of New Zealand's obligations to Te Tiriti o Waitangi and the [UNDRIP] Declaration."[23] [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Paragraph 140 (2022)].

Increasing use of machine learning and artificial intelligence is creating an increased demand for data. However, this is also raising concerns regarding transparency of privacy, ethical and cultural protocols to protect people from inappropriate automated processes that have insufficient human oversight. This also requires a greater emphasis on data context and provenance (lineage) supported by metadata to ensure appropriate use and reuse of data considers potential bias[24] and appropriate real-word representation. Significantly, this is an essential requirement when making decisions supported by data.

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[23] Note that the main focus is Māori data sovereignty. However, on occasion we may draw upon indigenous frameworks and comparatives where there are lessons that are considered relevant for the data system design.
[24] See the guidelines and capability resources supporting responsible and ethical use of data

Quality

Evidence led decisions leading to good outcomes requires sufficient fit-for-purpose quality data. Partners will determine if data is fit for purpose to support their aspirations.

Why is this important	How do elements of the design enable this?
Government data system participants will determine if data is fit-for-purpose to support their aspirations [LINZ, 2019]. Transparent engagement and understanding of the dimensions and measures of data quality are essential to being able to reliably use data leading to good decisions and outcomes. Data standards and consistent data models within data sharing frameworks will support improved data quality [Ministry of Health (2021)]. However, standards and data models have and will continue to vary across domains, sectors, and legacy systems. Improved discoverability and transparency of data must be supported by the mechanisms used to describe the data (metadata) and its collection context (provenance). Transparency of data collection design and purpose must be supported by appropriate data quality governance and assurance. However, this needs to be sustainable and scalable enabled by the adoption of data provenance standards alongside innovative tools, processes, and mechanisms [Ministry of Health (2021)].	The government data system design establishes interoperability mechanisms to appropriately interpret data as being sufficiently fit-for-purpose. Significantly, this requires purposeful collaboration and data infrastructure such as a standardised approaches to metadata including alignment to domain standards and mapping relationships between domain standardised and non-standardised data and historical versions of data. The design establishes the importance of key roles in the government data system to ensure that data is appropriately managed, accessible, discoverable, fit for purpose and interoperable [MBIE, 2021]. The government data system will make it easy for decision makers to find the data they need [LINZ, 2019]. Managing relationships between suppliers and users of data requires skills such as data brokering, to support data participants in discovery of data and assessing the fitness-for-purpose of that data (including common data). Additionally, data stewardship and governance will be a key focus to ensure that data is reusable and used in an ethical and culturally appropriate manner as determined by government data system participants and the public [MBIE, 2021]. Modern analytical mechanisms will be supported through appropriate, cross domain data access, sharing and reuse improving the quality of the real-world insights gained [Ministry of Health (2021)]. The government data system will support more relevant, timely, integrated, and inclusive data including more data and better data for and about Māori [Stats NZ (2021)].

Feedback processes between those that have data and those that seek to use data will enable discussion around data quality to take place in the context of fitness-for-purpose. Significantly, this discussion centred around data reuse purpose and outcome sought could motivate investment prioritisation in data quality.

Data within the government data system is collected and curated across a wide range of domains, legacy data systems and standards. Therefore, the data system must support the integration and interoperability between domains and specific data catalogues and data dictionaries enabling domains to develop at their own pace. [Ministry of Health (2021)].

Value

The value of data is realised when it is used to take actions that measurably improve outcomes for people in Aotearoa New Zealand.

Why is this important	How do elements of the design enable this?
Measuring the value of data can be achieved by understanding its effectiveness in supporting in improving outcomes for people, communities and especially how government can deliver effective public service and be good Te Tiriti partners (i.e., giving effect to Te Tiriti o Waitangi).	The government data system enables organisations to come together to share their expertise to improve the delivery of their services to the public [LINZ, 2019]. For the value of data to be realised sustainably, the data system needs to be well-governed, connected, accessible and trusted to support organisations to be evidence led [LINZ, 2019].
The value of data within the government data system can be realised when it supports informed policy advice, faster and higher-quality decision-making at scale, and targeting resources to the areas that provide the best value [Inland Revenue, 2021]. Policy and service delivery can best be improved when data can be efficiently combined and brought together to gain insight and intelligence [MOE, 2021]. Specifically, the real value from data is achieved when action is taken based in this insight that measurably improves outcome for people and communities.	Significantly, value needs to be placed on data that enables ethical and cultural protocols to be integrated into all stages of data access and use. Current agreed ethical and cultural principles and guidance need to move beyond policy and be operationalised. This includes identifying common data and capability to be shared and reusable across many data system participants. This enables value from data to be released in an ethical and culturally appropriate manner that is equitable to those who have and use data within the government data system.
Taking action that reliably achieves good outcomes requires evidence-based decisions with fit-for-purpose timely data [Stats NZ (2021)]. Some actions may even require real-time access to operational data to inform cross domain operational decision-making [Ministry of Health (2021)], and operational response [MOE, 2021].	The government data system will also enable the identification of common data sources created by organisations and communities with the appropriate expertise. This common data can be shared with other participants across one or more collaborative data federations [LINZ, 2019]. Data sets will be increasingly accessible and connected where appropriate to enable decision making [LINZ, 2019].
	The value of common data is a significant design consideration, especially data supporting linkage between data sets and data on which aggregations are built. However, it will so be important to establish collective understanding of data between domains and the evolution of data over time (i.e., legacy systems and changing standards).

| | Proactive establishment of interoperability and sustainable operational processes ahead of the operational need is critical to support decision making that relies on linked cross domain data. This also includes identifying how and when important datasets are published to help inform decision making [LINZ, 2019].

Additionally, data will be more accessible and stored in more consistent formats, enabling data access, and sharing so the government data system can develop and use real-time insights for decision-making [Ministry of Health (2021)]. |

Innovation

Innovative practices will redefine how we work together creating a collaborative and sustainable approach to improving equity in the creation and use of data across the government data system [MBIE, 2021].

Why is this important	How do elements of the design enable this?
Sustaining a range of effective and coherent federated ecosystems across many domains and partnerships requires new innovative approaches to the collection, management, and use of data. This includes effective data sharing models, standard, frameworks, contract requirements and consent and delegation frameworks, along with mechanisms to better support innovation and research. [Ministry of Health (2021)]. The engagement for the UNDRIP declaration plan notes innovation is important as it reflects the different skillsets that Māori bring to the table in addition to cultural expertise [Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri, Appendix 2, Page 12 (2022)].	Enhanced business intelligence and data science [Ministry of Health (2021)] techniques need to be purposely designed to enable valuable outcomes by those participating in the government data system. Significantly, innovation in the data management environment and analytical tools will support the ability of the government data system to deliver new sustainable solutions. This could help to address longstanding system and cross-cutting issues facing Māori and wider Aotearoa [MBIE, 2021]. Innovation in semantic data modelling and ontological structures could support consolidated views across multiple data catalogues. This could include capabilities such as search, multi-location store and access of data. For example, public cloud on or offshore and federated access to organisation hosted data via standards-based Application Programming Interfaces (APIs). Significantly, this allows the data system to organically evolve beginning with existing catalogues, specifically, the extensive range of Open Data centrally catalogued in www.data.govt.nz and federated across local government open data initiatives. Delivering elements of the design incrementally will allow everyone to be a part of the government data system evolution. This needs to be driven initially through domain centred innovations addressing immediate sector needs alongside the organic growth and usage of the data system assets already creating value in the system. However, innovation in one domain must be leveraged across domains to grow overall data system capability, maturity, and health.

Progress in collaboration and partnerships have enabled the potential of the post-settlement relationship to be realised as Māori and the Crown move from a focus on grievances to a focus on the future [Te Arawhiti (n.d.)] This has allowed for new innovative ways of using Crown, Māori, community, and private business capability to deliver reciprocal value and enable more equitable participation within the government data system.

The government data system design needs to employ innovative solutions and enable capability [26]shifts to minimise burden to data providers and users while also enabling privacy, security, confidentiality, and ethical and cultural protocols.

The ability to form federations and have new participants join creates an opportunity for new and innovative skills to be added to the federation.

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[26] See the capabilities required to support key shifts

The conceptual model for a federated data ecosystem

A government data system based on federation is one that enables equitable participation in a manner that builds relationships and enhances trust between participants. Trusted relationships support a transparent and open discussion of aspirations and data needs. Supporting equitable outcomes through more effective data reuse and reciprocal benefit for all participants.

Partnerships and relationships will enable an organic evolution in data system capability to deliver equitable participation. Each federated data ecosystem (federation) is essentially a collaboration around one or more agreed outcomes. Each federation has a well-defined purpose and value proposition for society, and its participants, aligned to the agreed outcomes. All federation participants will gain real value and benefit from being a participant.

Federations will contain many types of participants from one or more domains and a participant could be in many federations. Federations will evolve at different rates with their own specific domain, sector, and legacy standards. Some common standards may be adopted consistently across federations. However, this will take time and therefore interoperability mechanisms to translate and map between data standards will be required to support effective reuse of data in the short to medium timeframe. Interoperability mechanisms will support organic and evolving use of data, from range of sources and forms, without needing to wait for all data to 'conform' before being available to achieve the purpose, aspirations, and outcomes of federation participants.

Discovery and transparency of data will be supported by data catalogues with metadata that enables assessment of appropriate data usage for a range of outcomes. Data access may be centralised within a federation hub (e.g., data and capability held in the IDI) or remotely accessible through managed external data interfaces within the source organisation.

Stewardship and governance of data and capability in common across many federations will enable a consistent and sustainable standards, infrastructure and processes that can operate effectively at scale. This requires an integrated and inclusive governance and assurance approach within and between federated data ecosystems. Curation of data must be a collaborative activity between several parties associated with the data and its sustainable access and use across the data system. Significantly, accountability for the governance and curation of common data should sit with the providers, custodians and trustees of common data who are also responsible for its provision, management, and appropriate usage. However, centralised facilitation and support for governance of common data, standards and interoperability mechanisms will ensure there is a coordinated, consistent, effective, efficient and sustainable approaches across federated data ecosystems.

Each federation needs to be appropriately led and stewarded with assurance processes in place to sustain value for all participants. Leadership may come from any of the participating organisations and will not always be the role of a Crown agency. Principles of Māori data governance and sovereignty must underpin stewardship and assurance data system processes to give effect to Te Tiriti and have a te ao Māori world view to create a system that works for Māori by design.

Breadth and scope of the government data ecosystem

The government data system is the government-wide system of policies, practices, processes, and people that are involved in the collection, management, and use of government-held data [Statistics New Zealand [Stats NZ] (2018)].

The breadth of the government data system is represented in Figure 1Figure 3) covers several data domains in which the government operates either directly or indirectly via non-government organisations and local government at a regional level. Additionally, it includes essential, connected data flows between business, communities, Māori collectives, and the government data system. This breadth captures the actual and aspirational partnerships sought by data system participants to improve outcomes for themselves and for all Aotearoa New Zealand.
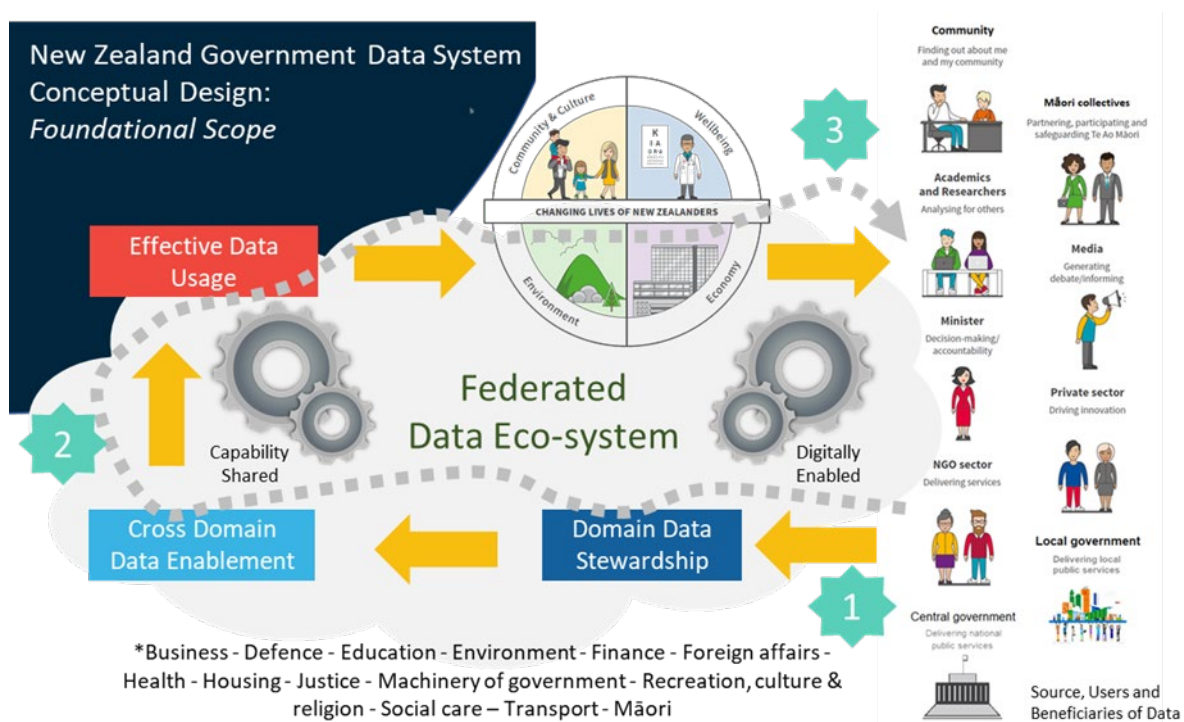
Figure 3 - The government data system

As shown in Figure 3, a government data system founded on federated data ecosystems (federations) is one that has the following features:

- Acknowledges the reality and broad nature of the current government data system domains and form the basis for data federations

- Focuses on data value chains and data reuse across domains and sectors to provide tangible benefit to people

- Supports reciprocity between beneficiaries of the operational and analytical outcomes and those that are also essential to the data supply (many of whom are the same government data system participants)

The scope of the government data system design covers three specific aspects:

- Foundations such as Data Literacy and Capability, Principles and Behaviours, Governance and Assurance

- Infrastructure for Common Capability and Services, Data Source Integration and Interoperability, Data Access and Reuse, Publication of Data

- Outcomes around public service delivery and improving our ability to respond and adapt appropriately to unexpected events in the world in which we live

Evolving the data system in these key areas will enable a shift in capability as seen in the following Figure 4.
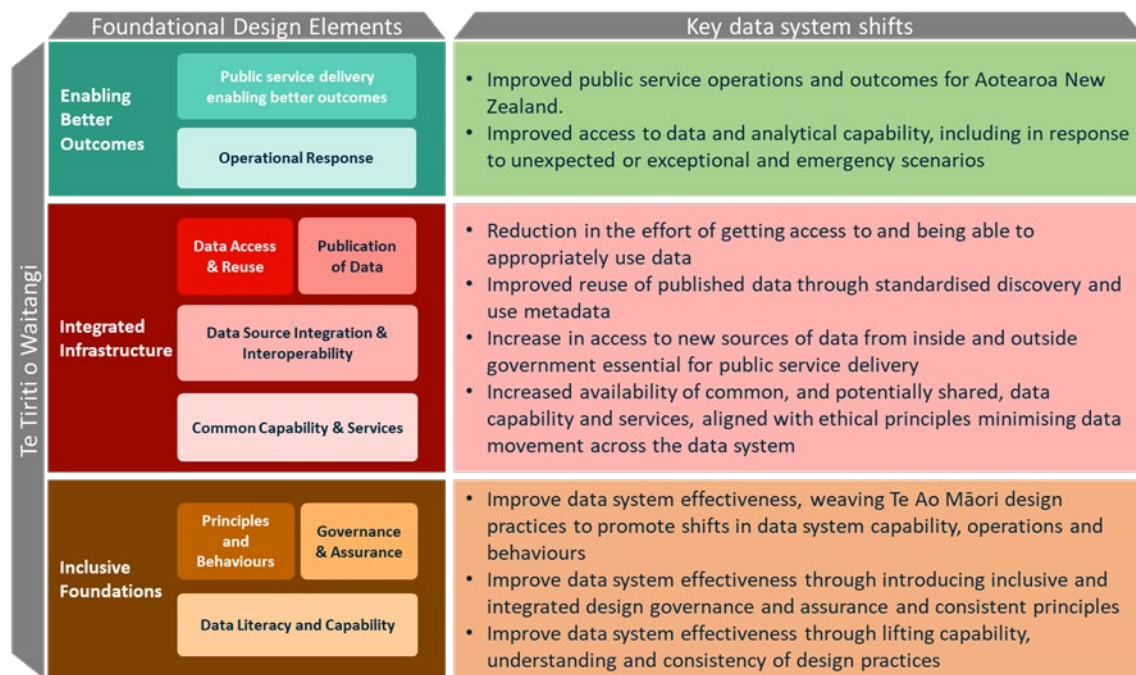
Figure 4 - Foundational design elements and key data system shifts

Collectively, these shifts in the government data system capability support the government working in genuine partnership with Māori collectives. Additionally, specific design elements within the data system will ensure there is equity to participate in a manner that allows for equitable outcomes.

Enabling key shifts in data system capability and outcomes

Achieving this degree of equity requires a design that leverages trusted partnerships where joint capability of the partnerships enables outcomes that no one participant could achieve on their own in a sustainable manner. As the data system evolves towards a more federated model we should see the following shits aligned to the three dimensions of design scope shown above in Figure 4.

Better outcomes

- Communities will have more equitable access to data to enable mana motuhake (independence)

- Works towards creating equitable outcomes for Māori collectives

- through improved design practices and relationship-based partnerships codesigning the creation, collection, management, governance, application of data

- Works towards removal of barriers of access to data empowering sustainable self-determination and self-governance

- Designing for federated data flows enabling more joined up public services

- Enabling a wider range of data domains to be involved in federations, supporting improved innovation in public service delivery and more effective and efficient response to urgent operational scenarios

Integrated infrastructure

- Federation allows more equitable partnership by having all parties determine the value proposition and sharing of data and capability

- Existing government data can be integrated with data collected by Māori collectives for the best possible outcomes for Māori.

- Co-design can occur to develop an infrastructure that is relevant to achieving the aspirations of the federation

- Data and metadata curation (including cultural and ethical protocols) removes barriers by creating context for the data which should enable faster access, less misunderstandings and better use of data

- Derive greater value together by leveraging the federation's capability and resources whilst contributing a unique value proposition (data and/or capability)

- Reduce duplication of effort and expense by leveraging federation data and capability content, knowledge, and standards

- Leverage an existing network of experts in data and analytics saving time and minimising knowledge loss

- Data and metadata curation within and across federations enables faster, effective value generated from data and analytics reuse

Inclusive foundations

- Principles of Māori data governance (currently in development[27]) and sovereignty[28] underpin the government data system to give effect to Te Tiriti and a te ao Māori worldview, to create a system that works for Māori collectives by design.

- Joint federation capability supports participant capability uplift whilst achieving valuable outcomes

- The participation of a Māori workforce in data empowers Māori to make informed decisions to use their data to prioritise Māori collectives' needs and aspirations

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[27] https://data.govt.nz/toolkit/data-governance/maori/
[28] https://cdn.auckland.ac.nz/assets/psych/about/our-research/documents/TMR%2BM%C4%81ori%2BData%2BSovereignty%2BPrinciples%2BOct%2B2018.pdf

- Federation operating principles are inclusive and allow a wide range of organisations to participate (inc. non-government)

- Leadership within federations governs and assures federation partners can add and get value from their contribution

- Data and capability are appropriately curated in line with ethical and cultural protocols

- Joint federation capability supports participant capability uplift whilst achieving valuable outcomes

Key features of a federated data ecosystem

A conceptual view of a reference federated data ecosystem (federation) can be seen in Figure 5. Significantly, it shows the breadth of organisations that could participate in a federation. Key operating characteristics shown include:

- **Value proposition:** A federation has a well-defined long-term purpose and value proposition and is well led and stewarded to assure all participants gain real value safely.

- **Share what makes sense**: Federation participants share only what makes sense and is aligned with the value proposition.

- **Integration interfaces:** Each organisation has a well-known, accessible, and supported interface to the federation.

- **Centralised data**: Some data required by many federation participants could be centralised and hosted in once place within the federation dependent on the specific requirements of shared analytical execution capability. This would be agreed where there is benefit to federation participants.

- **Centralised analytics:** Shared analytical capability could be available to federation participants with close access to common data and federated access to specific participant data through their federation data access interfaces. This would be agreed where there is benefit to federation

- **Federated Data access:** Data access interfaces should be standardised and enable generalised access to local and remotely shared federation data.

- **Genuine value gained:** All federation participants will gain real value and benefit from providing their data and/or capability to the federation.
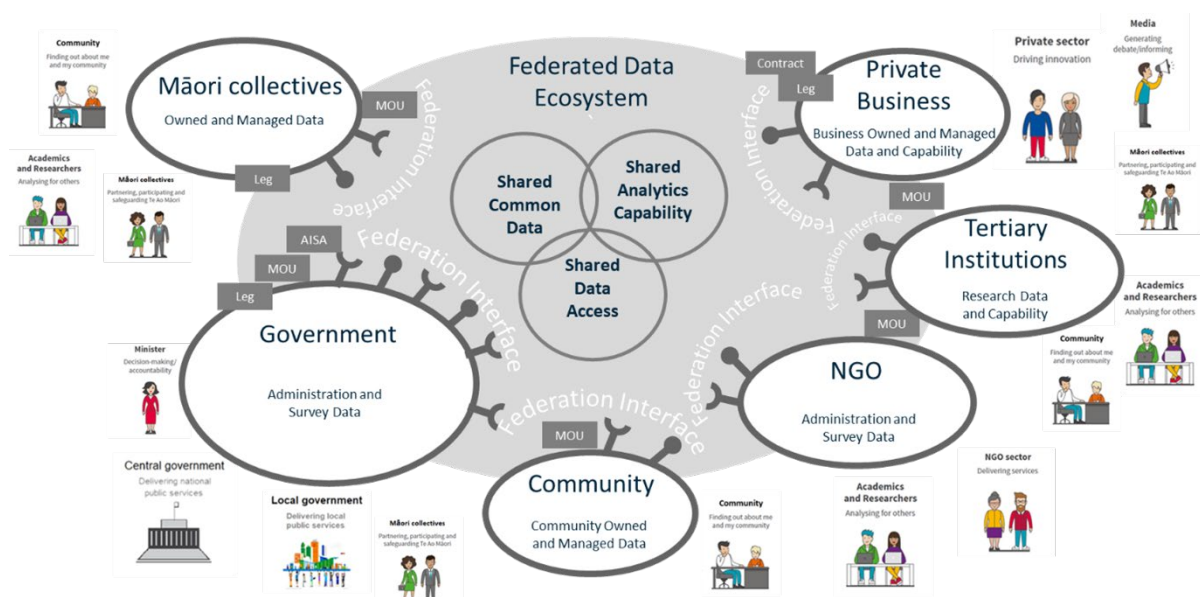
Figure 5 - A diverse federated data ecosystem with many organisations

A federated data ecosystem may have connections to many organisation-based data ecosystems as shown in the reference model above in Figure 5. There are many ways in which an organisation could be connected to a federation including technical connections such as API (Application Programming Interfaces) or secure file exchange, legal agreements such as MOU (Memorandum of Understanding) and AISA (Approved Information Sharing Agreements) or legislation. There will also

be indirect connections between organisations where there is dependency on supply and use of common data via an aggregating data hub or data exchange.

Case study One[29] provides a use case for the federated data ecosystem model in the context of homelessness data. The specific aspects of this use case outline how the federated data ecosystem operating model could better support the complex range of relationships and data sharing across government, private industry, non-government organisations, communities, and populations of interest such as Māori and Pasifika. An important aspect of this use case was the ability of the operating model to better support place-based approaches to services delivery and utilise the partnership based approach to improve access to capability and capacity.

Connections between federated data ecosystems could also be present where federations want to remain independent but find of useful to share specific common data between them to support their respective aspirations (illustrated in Figure 6).
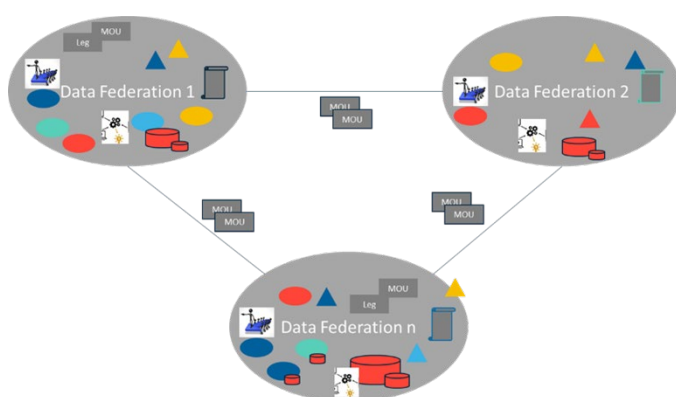
Figure 6 - Interconnected federated data ecosystem

However, collaboration at the scale shown would most likely become common once the evolution and maturity of the government data system reaches 'Horizon 3 -Optimise' stage as shown in the Investment and Implementation Roadmap Summary.

Agility to evolve to meet participant aspirations

Over time, it is anticipated that a federation could themselves evolve as the overall federated operating model expands and matures as illustrated in Appendix E. Alignment of purpose could support the convergence of one or more federations into a larger federation with the same shared purpose and aligned outcomes. While others may split as the purpose of participants diverge or common capability is extracted and shared between federations with difference purposes.

Common data and capability supporting many outcomes

There are some data elements that may be common across participants. Where it makes sense, this common data should be shared within the federation. At the same time, participants will bring

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[29] Case study 1 - Reviewing the proposed future/target state Government data system architecture/design with Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development in the context of homelessness data

unique skillsets some of which may be shared to help build up capability among federation participants.
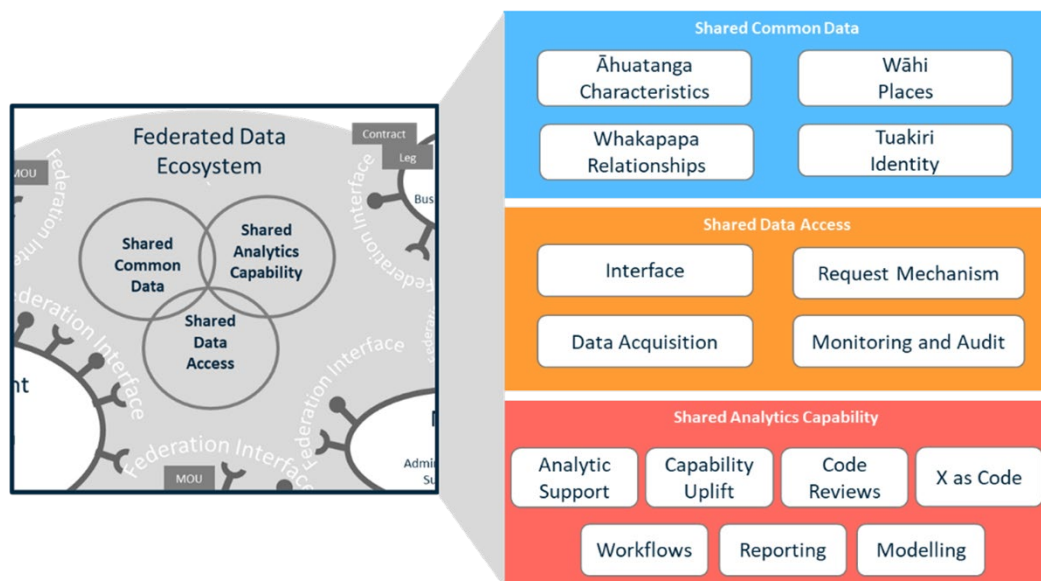
Figure 7 - Common data and capability

Examples of common data could include:

- characteristics such as ethnicity, gender or age, business industry type or regions

- polygons of interest such as deposit plans[30], building information management or areas of interest for Māori such as rohe areas

- relationships between data (including people and the land)

- identifiers that can be used to connect multiple datasets and

- back-office master data managed as part of the Common Process Model[31]

The federation must disaggregate data at a level that is sufficient to meet the purpose of the federation. For instance, information might be aggregated at ethnic level, whakapapa level, regional level, or community level. This requirement also aligns with principles of Māori data sovereignty[32].

Partners in the federation must provide the data necessary to perform the agreed disaggregation. A federation should agree on what data is common and ensure that this data is made available. The federation must access data through an approved mechanism. Additionally, the data access mechanism should be monitored and audited as an additional check that only appropriate people are accessing the data.

Common data may be accessed in a centralised or decentralised manner. However, the manner of access needs to be agreed with the primary custodians of the data. Regardless of its location, the access controls and governance and assurance processes must be in place to protect against inappropriate usage.

As part of building up capability within the system, shared data infrastructure and analytics capability should be established to level the playing field among participants. These capabilities

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[30] https://www.linz.govt.nz/products-services/land-records/types-land-records/cadastral-survey-plan
[31] https://www.digital.govt.nz/products-and-services/products-and-services-a-z/common-process-model/
[32] https://www.temanararaunga.maori.nz/s/TMR-Maori-Data-Sovereignty-Principles-Oct-2018.pdf

could include shared infrastructure, code reviews, workflows, training, or other types of analytic support. For example, workflow or data processing pipelines support sustainable and streamlined processes, including data curation, from data source to output, which can be replicated across many federated data ecosystems.

Base registers of common data

Common data sets used by many government data system participants should have specific design, governance, and assurance processes. Many organisations will increasingly rely on common data in the delivery of public services. Additionally, organisations outside of government that use common data within the government data system expect significant rigor around consistency and coherence of common data.

Registers of common data will emerge from the discussions within and between all sectors and data domains across the government data system. For example, common data related to Identity Management[33] and location or places[34] is already widely in use government agencies (i.e., within geospatial data management systems). Further discussion will take place and evolve our understanding of what data is common and what makes sense to be shared.

This will also include the emergence of data 'hubs' that curate data either aligned to domains or multi-domain data and analytical hubs like the IDI. Over time, the range of data considered 'common' will expand to meet user needs and aspirations. This will require the management of consent particularly when collecting data indirectly. This places emphasis on the importance of establishing the identity of the person granting consent and recognising their personal data held or transferred by an agency of holder of data.

Governance of data standards and interoperability across many domains and federated data ecosystems will need to be supported by centralised capability. Significantly, this provides a means to facilitate and bring together many domain specific perspectives and increase harmony across the government data system.

Additionally, centralised facilitation, capability and support for common, potentially shared infrastructure and tooling will be required to minimise the amount of duplication across the government data system. It also enables a more equitable approach to standing up data management capability. Moving towards a federated data system ensure this evolution is transparent, more inclusive and stewarded based on enabling practices and behaviours described in the eight pillars.

Common metadata and data standards

Common data will also include data related to standards used within common datasets such as standard code lists and metadata describing the meaning of elements within a dataset. This is especially important to those roles involved in the brokering of access to, and curation of, data. However, limitations of the processes and systems can constrain the degree of standardisation possible. Therefore, priority must be given to establishing positive enduring relationships and equitable partnerships between those that have and those who need data.

Once established, these partnerships will enable progressive discussion around opportunities to align to standards as resources and capability allow. Additionally, with the involvement of data brokers in data access and curation activities, greater insight can support prioritisation of change to maximise benefits common data and metadata investment.

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[33] https://www.digital.govt.nz/standards-and-guidance/identification-management/identification-management-standards/

[34] https://www.linz.govt.nz/our-work/property-information-system/property-data-management-framework

User experience and journeys

It is important to understand the past experiences of communities within the data system, to better inform their future experiences within it. The following two generic journey maps highlight many of the key cross cutting elements required of the government data system future design.
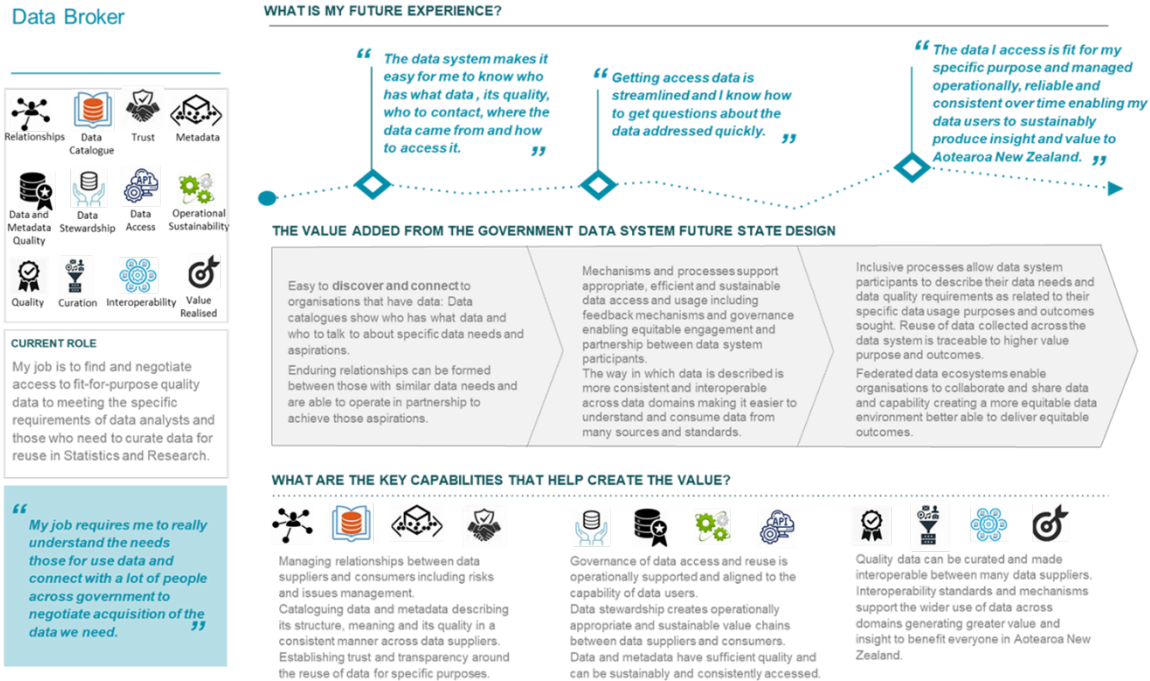
Figure 8 – User experience journey – Data Broker
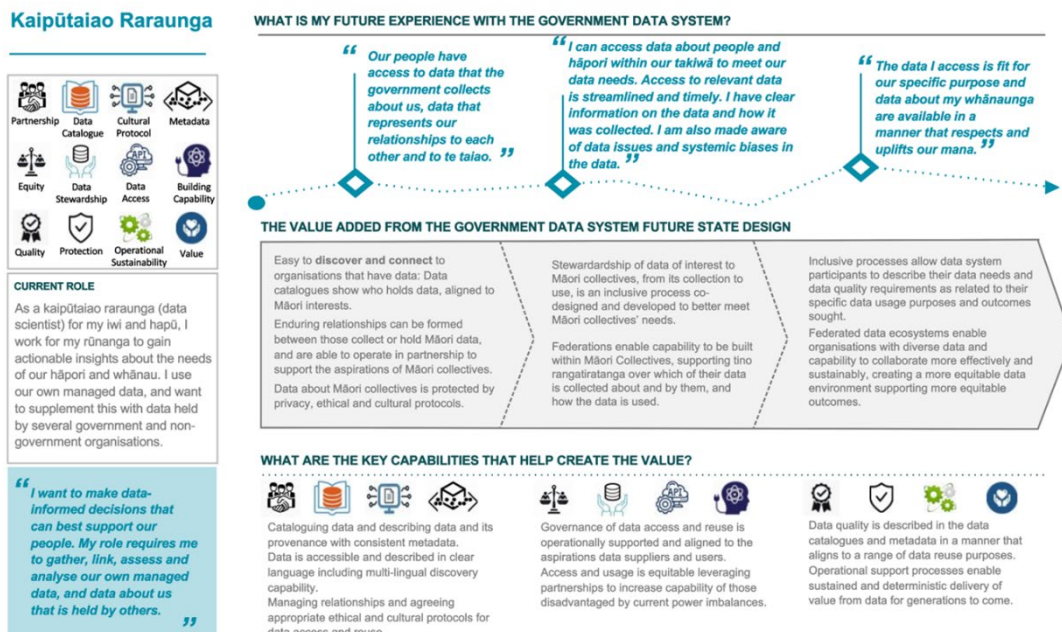
Figure 9 – User experience journey – Kaipūtaiao Raraunga

As part of taking a people centred approach to the design, the design considers how people are commonly interacting with the government data system currently. Different experiences for users are noted for data discovery and relationship management, data acquisition and management, and data reuse and publication. These experiences have been based on literature reviews that touch on iwi data sovereignty and public perspectives on the IDI [Te Kāhui Raraunga (2020)]35, [Thabew et al (2022)]36 and the personal experience of data system users. In considering user journeys through the data system, tensions and blind spots were uncovered, allowing for the definition of future state design elements that could minimise or remove these tensions. Taking this approach has ensured that the needs of users of the government data system are a primary consideration in the future state design. In this exercise, four user groups were considered: 1) Tertiary education researcher, 2) Communities (individuals and whānau), 3) Māori collectives and 4) Government organisation. Some of the common key experiences that can be addressed are summarised below. These experiences may overlap across user groups. An example of the detail behind each of these user journeys can be seen in Appendix D.

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35 https://www.kahuiraraunga.io/_files/ugd/b8e45c_499e6dc614cd4aa089fe9344c47701ec.pdf
36 https://journals.sagepub.com/doi/pdf/10.1177/15562646221111294

The federated data ecosystem operating model

A government data system based on federation is one that enables equitable participation in a manner that builds relationships and enhances trust between participants. Trusted relationships support a transparent and open discussion of aspirations and data needs. Supporting equitable outcomes through more effective data reuse and reciprocal benefit for all participants.

Achieving significant equity in the government data system will take time and requires investment in the operating concepts supporting healthy federated data ecosystems (federations). A partnership based operating model and value chain need to equitably support the participants within a data ecosystem and allow agility and scale to support many integrated and interoperable federations. Significantly, this includes:

- Establishing and growing equitable and trusted relationships between data system participants
- Discovery and discussion of data needs and aspirational outcomes
- Acquisition and authority to use data for a purpose
- Data usage, publication and the outcomes and value derived
- Operational support processes and infrastructure that support the effectiveness and sustainability of a federation and enables consistency and scale across the government data system
- Ensure the government is in partnership with its Te Tiriti partners including providing equitable access to data and capability to use data effectively
- Ensure there are ethical and cultural protocols supported by organisations participating in the federated data system and applied consistently within all federation value chain processes.
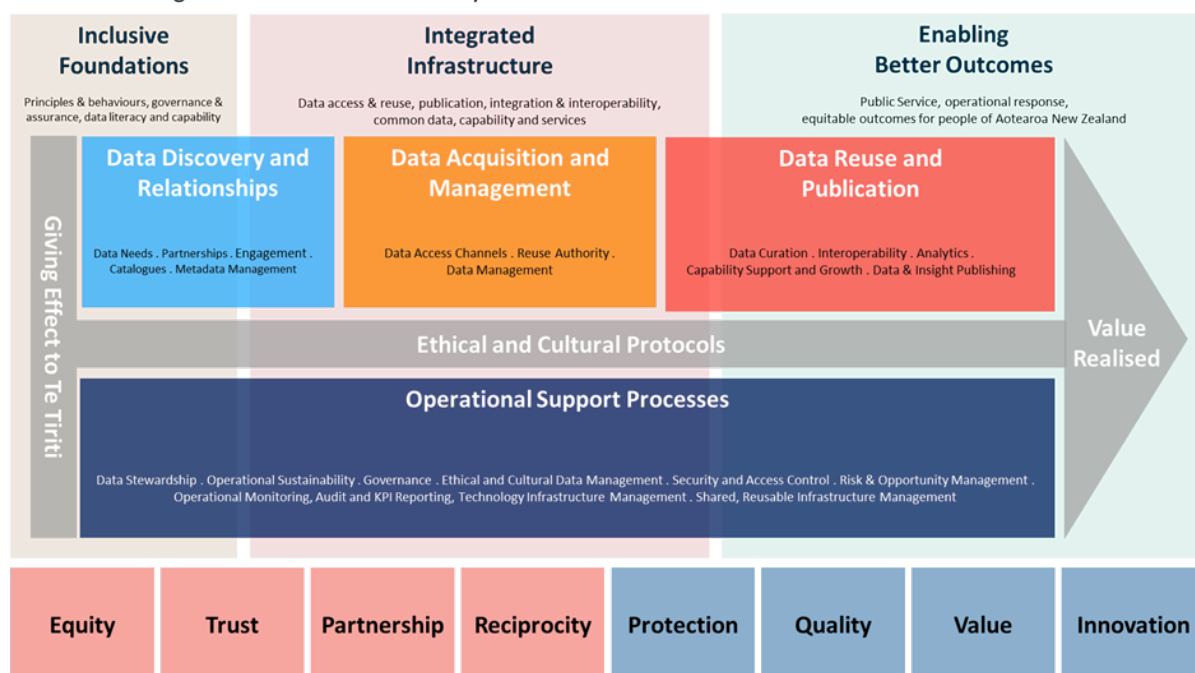
Figure 8 – Foundational design elements, Federation operating concepts and Federation design pillars

Ethical and cultural protocols

Māori have long held kawa and tikanga that describe how they cared for their mātauranga. As [Te Whiu (2021)][37] said, "Tika, pono and aroha is why and how we protect our data". There are also values that focus on connection such as whakapapa or whanaungatanga. These values and other Māori values can be applied to create a more connected and effective data system.

The design gives effect to Te Tiriti as follows:

Preamble: Relationships are at the start of the data system design and are considered key to building trust in the data system and its participants. The relationships are genuine and focus on an ongoing connection rather than a transactional event. These relationships may even span multiple people across multiple generations. Guidance for forming and nurturing such relationships can be found in various cultural protocols.

Article 1: Cultural protocols are incorporated from the beginning stages of the relationship right through to how data is used to achieve a specific outcome to ensure that data is protected throughout the value chain.

Article 2: Some of the cultural protocols such as Māori Data Sovereignty speak to the principle of rangatiratanga which is demonstrated through governance by Māori to support Māori-led decision making. Applying cultural protocols that give Māori the right to choose their involvement rather than being told or not involved should help break down barriers to achieving tino rangatiratanga.

Article 3: Cultural protocols aim to create a more equitable data ecosystem by acknowledging and incorporating a Māori way of thinking. In turn, data that is discoverable, accessible, and appropriately used should lead to more equitable outcomes for Māori.

Wairuatanga: Cultural protocols should be built upon Māori world views and values relating to wairua. Applying them ensures that wairuatanga is present in the data system design.

Protocols for discovery

Ethical, cultural, technical protocols and expectations must be established early in the operational lifecycle of a federated data ecosystem (federation). To realise value, federation participants need to understand what data is available. Discovering data will require metadata that helps provide rich context. Whakapapa or connections to the data are important so that the wider context is understood. At a minimum this should include provenance and purpose of collection [Te Mana Raraunga (2018)][38].

Protocols will enable a wide range of data sources to be discovered as well as providing appropriate context during the discovery phase so that federation participants can determine if the data should be used for purpose the federation had in mind. Examples, of enabling discovery include traditional knowledge labels[39] to provide provenance, cultural protocols, and permission and the Mukurtu[40] concept of categories to organise and browse content. Categories are flexible, bilingual, and defined by the community kaitiaki. In addition, adequate descriptions of the data

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help identify relationships to Māori collectives and also help improve discoverability as demonstrated in Kā Huru Manu[41].

Organisations such as Ngā Taonga Sound & Vision (Ngā Taonga) are already piloting traditional knowledge labels (see Case Study 3) whilst in the community Te rohe o Whakatōhea have successfully integrated biocultural labels into their biological data housed in the Manaaki Whenua systematics collections data[42]. Archives New Zealand have also carried out mahi[43] to understand how Māori would like to identify, search and access content, taonga and mātauranga they hold and are in the process of creating a Māori Metadata Solution. A set of Māori kupu to enable data discovery is also available via the National Library[44].

Protocols for access

Access to data must be appropriate, governed and aligned with expected use of the data. Protocols regarding access should be co-developed between federation participants[45]. Considering Māori Data Sovereignty principles such as kotahitanga to ensure that people will derive benefit from accessing data rather than causing harm. Some federation-like structures such as Digital Pasifik operate a take-down policy to prevent future access if kaitiaki are concerned about people accessing data[46]

Kaitiaki relationships are important to ensure that data is cared for and protected. Kaitiaki also have a role in determining who should access data. Rauika Māngai suggests a sliding scale that could be used to determine the type of kaitiaki relationship[47]. Other examples include the Tiakina kiatiaki relationship framework by Ngā Taonga[48].

Another important Māori Data Sovereignty principle is kaitiakitanga making sure that Māori decide what data is tapu and requires more controls and which data is noa and can be accessible. There have been examples of balancing tapu and noa from Te Whata, the iwi pātaka. There is information that is noa available on the publicly facing website presented at an iwi-aggregated level. However, the more tapu information requires a log in for access which can only be obtained by working on behalf of an iwi authority[49].

Metadata is of critical importance to help determine what data should be accessed. To identify which data is considered tapu and which is considered noa data needs to be classified in a way that supports community restrictions on certain data. The protocols, such as traditional knowledge labels, should also help in determining access.

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[41] https://www.kahurumanu.co.nz/cultural-mapping-story/cultural-mapping-project-begins

[42] https://scd.landcareresearch.co.nz/Specimen/CHR%20365035

[43] https://www.archives.govt.nz/manage-information/updates-for-information-managers/taonga-tuku-iho

[44] https://natlib.govt.nz/librarians/nga-upoko-tukutuku

[45] https://irp.cdn-website.com/855a29e4/files/uploaded/Wai262-Report-Rauika-Ma%CC%84ngai-1.pdf

[46] https://digitalpasifik.org/about-us#our-review-process

[47] https://irp.cdn-website.com/855a29e4/files/uploaded/Wai262-Report-Rauika-Ma%CC%84ngai-1.pdf

[48] https://www.ngataonga.org.nz/system/resources/W1siZiIsIjIwMjAvMDcvMDcvN2ZqdHIydmx1bl9LYWl0aWFraV9SZWxhdGlvbnNoaXBfRnJhbWV3b3JrX1Nob3J0X1ZlcnNpb25fRmluYWxfNl9KdWx5XzIwLnBkZiJdXQ/Kaitiaki_Relationship_Framework_Short_Version_Final_6_July_20.pdf?sha=48d1dd5c54192dad

[49] https://tewhata.io/iwi-data-administrators/

Protocols for use

The way data is used to achieve federation objectives and outcomes needs to be underpinned by protocols and behaviours that preserve the trust and respect of the people represented in the data[50]. Rauika Māngai recommends the co-development of such protocols to protect sharing of project information[51]. Manaakitanga should be considered, and data should be used with appropriate consent which could be free informed prior consent[52] or something such as meta-consent[53] to reduce the administrative overhead of people consenting every single time data is used.

There are examples, including the OHI data navigator, which require you to accept terms and conditions where you specifically agree to Māori data sovereignty principles and access will be revoked for inappropriate use[54]. Having processes that considered cultural rights would help ensure appropriate use.

There are other protocols[55] that have whakapapa in ethics that are also worth considering when it comes to use of data. The Model Development Life Cycle [NC and MSD (2021)][56] covers topics such as approaches for evaluating and managing biases as well as communication regarding use of the data. This life cycle can serve as a guide to identifying bias that should inform the use of data.

The Privacy Human Rights and Ethics framework (PHRaE)[57] has several questions regarding benefits, risks, impacts for Māori including, Māori collectives, and asks for the extent of consultation. Insufficient answers to these questions should result in projects being delayed until the project produces a suitable plan that addresses these questions. The PHRaE also asks about whether using the data for a project is lawful. It is worth noting that even though the use of data falls within the law or what is articulated in the privacy notice, there are examples where people have not been aware of the extent of an agency's ability to collect, use and share data [Thabrew et al (2022)][58]. The PHRaE also asks a question regarding individuals being concerned or surprised about the use of the data which should encourage reflection about whether the use of data is ethically or culturally appropriate.

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[50] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Maori_Data_Futures_Report-2018.pdf
[51] https://irp.cdn-website.com/855a29e4/files/uploaded/Wai262-Report-Rauika-Ma%CC%84ngai-1.pdf
[52] https://cdn.auckland.ac.nz/assets/psych/about/our-research/documents/TMR%2BM%C4%81ori%2BData%2BSovereignty%2BPrinciples%2BOct%2B2018.pdf
[53] https://onlinelibrary.wiley.com/doi/full/10.1002/lrh2.10206
[54] https://www.datanavigator.nz/terms-conditions-of-use/
[55] The Algorithm Charter, https://data.govt.nz/toolkit/data-ethics/government-algorithm-transparency-and-accountability/algorithm-charter/ is available, however not included in the culture and ethical protocols section of this document as feedback from Te Mana Raraunga stressed that the algorithm charter is insufficient for protecting Māori rights and interests https://static1.squarespace.com/static/58e9b10f9de4bb8d1fb5ebbc/t/5e79c0fb3ccc1d093689c06d/1585037565865/TMR+Submission+on+the+Algorithm+charter+Feb+2020.pdf Similar feedback was surfaced through the algorithm charter review https://data.govt.nz/assets/data-ethics/algorithm/Algorithm-Charter-Year-1-Review-FINAL.pdf
[56] https://www.msd.govt.nz/documents/about-msd-and-our-work/work-programmes/initiatives/phrae/mdl-data-science-guide-for-operations.pdf
[57] https://www.msd.govt.nz/about-msd-and-our-work/work-programmes/initiatives/phrae/index.html

[58] https://journals.sagepub.com/doi/10.1177/15562646221111294

Relationship management and data discovery

Connections are very important including connections to people (including those who have past and those who have yet to come), places and the environment. Māori data is a digital representation of people, environments, and places. Relationships and knowing that data the data exists (discoverable), play a key role in those connections.

The design gives effect to Te Tiriti as follows:

Preamble: Relationships and relationship management feature first in the value chain to reflect the importance of beginning with relationships. In the spirit of partnership, the relationship recognises that one party may hold a dataset with information about another party so there is a responsibility to ensure that data is discoverable.

Article 1: The principle mahitahitanga[59], means that Māori collectives can connect and work together to achieve common goals. Connections in the data are achieved by providing the whakapapa of the data and a richer context to ensure that data is discoverable.

Article 2: Māori collectives can self-determine establishing their own federations, relationships, and processes for data discovery to meet their aspirations. This may include Māori collectives choosing not to involve Government[60].

Article 3: Connections improve equity within the data system by ensuring enduring relationships with a common purpose exist and that Māori can have better access to data by being aware of Māori data that other participants hold.

Wairuatanga: Being able to discover data, which carries mauri, can feel like reconnecting with a whanaunga, tīpuna or turangawaewae which can contribute a sense of belonging that enhances wairua. Finding people and establishing relationships with those who have a common purpose can also uplift wairua.

Building data and capability relationships

All federated data ecosystems will increasingly rely on equitable and collaborative partnerships where data, knowledge and capability can be shared and brought together. Trust and equity are built and maintained through effective, ongoing partnership and relationship management.

The value proposition and expectations for participation as part of a federation needs to be clearly established prior to joining. Many organisations could be participants within a federation. How the responsibility for supporting inclusive relationship management will fall to lead organisation(s) within the federation. Significantly, leadership may come from outside government including iwi-led data federations.

Any change of strategic direction and purpose for the federation must be agreed between federation participants.

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[59] https://www.digital.govt.nz/assets/Documents/DPUP/PDF/DPUP-Principles-6-page-Printable.pdf
[60] https://www.linkedin.com/pulse/data-hapu-sovereignty-whina-te-whiu/

Agree data protocols usage

Ethical, cultural, technical protocols and expectations must be established early in the operational lifecycle of a federation. Additionally, this must support appropriate supply, access, and reuse of data consistent with the purpose and value proposition of the federation.

Case studies Two and Three in this design document[61],[62] outline examples of processes that have been used to agree the cultural and ethical protocols aligned with the purpose. These protocols are then applied to the collection, access, and use of data with processes put in place to give effect to these agreed protocolsFor example, in case study 2, Te Rourou – Vodafone Aotearoa Foundation has developed the Principles of Safe Use[63] and in case study 3, Ngā Taonga have developed their Kaitiaki Relationship Framework, Tiakina[64].

Enabling data discovery

The data needs of federation participants are discussed and understood as part of the relationships. As part of this process, a record of where data aligned to needs exists, its form and lineage will be captured. Additionally, these discussions determine how data that is needed, but is not currently available, can be captured by whom and appropriately made available to the federation. Data discovery and transparency will be supported by metadata that includes data type, structure, licence, access method and provenance will enable transparency of data in use and data available. Additionally, metadata will outlive the data to which it relates preserving the historical record of federation data usage.

Data catalogues will enable collation of data from many sources and provide the linkage to metadata that enables current and potential data users to ascertain if the data is fit-for-purpose for their specific use case and aspiration. Initially, the data system will contain many data catalogues. For example, existing data domains such business data (e.g. NZBN (New Zealand Business Number) Register) and spatial data (e.g., land and property) and cross domain data such as open data catalogues in data.govt.nz and those held and maintained by local authorities (e.g. Christchurch City Council).

Sustainability enabled by data transparency

Increased capability in data discovery and transparency across the government data system will be required to support a sustainable and evolutionary approach to data access and usage. Data transparency needs to be accessible to all current and potential future government data system participants. However, the way in which data is described must evolve and increasingly align to how the value of data available can create more equitable outcomes for all stakeholders connected to the government data system.

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[61] Case study 2 - Reviewing the proposed future/target state Government data system architecture/design with Te Rourou – Vodafone Aotearoa Foundation in the context of OHI Data Navigator
[62] Case study 3 - Reviewing the proposed future/target state Government data system architecture/design with Ngā Taonga in the context of their audiovisual archive data system
[63] https://www.datanavigator.nz/principles-of-safe-use-2/
[64] https://www.ngataonga.org.nz/about/partnerships-with-kaitiaki-and-maori/tiakina-kaitiaki-relationship-framework

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Data acquisition and management

Māori always had their own tikanga to determine what data should be accessible. Kaitiakitanga is a form of guardianship that protects mana and tapu. The concepts of tapu and noa are important to recognise when data access should be restricted and when data is readily available to access without restriction. Māori data is often collected by organisations such as the Crown specifically for the purpose of the collector rather than for Māori aspirations. Access to data is often cited as a barrier for Māori to measuring strategic aspirations [Te Kāhui Raraunga (2021)][65].

The design gives effect to Te Tiriti as follows:

Preamble: The relationship between Māori and the Crown is unique. The Crown recognise their role as kaipupuri of Māori data and also recognise the kaitiaki roles that Māori hold with regard to Māori data that is held by the Crown.

Article 1: Cultural protocols are used to determine data access and management. This is highlighted in depth by the kaitiakitanga principle in the Māori Data Sovereignty principles which, includes concepts of guardianship, tapu and noa with regard to data access.

Article 2: Māori can collect and manage access agreements regarding the use of their own data.

Article 3: To improve equity of access, measures such as shared capability are put in place to ensure that Māori can access data and manage access to their data regardless of current technical expertise.

Wairuatanga: No specific mention of wairuatanga for this section.

Appropriate data access

Access to data must be appropriate, governed and aligned with expected usage of the data made available. Usage of government data will vary significantly and include both operational and analytical/research use cases.

Aligned to agree protocols

Protocols established as part of the relationship management and data discovery process will control how data is physically accessed and form the basis for governance and assurance processes. Specifically, legal, cultural basis and licence to access data must be established prior to access and will follow a transparent process between data custodians and intended data users. Additionally, the authority for data access must be clearly indicated as part of metadata and data catalogues through which data is discoverable.

Appropriately located data access

Federation participants are the custodians of their data regardless of how the data was collected or is accessed. Participants can choose to push (share) their data physically into a central point (or hub) under the control of federation participants that supports both cultural and technical protocols for access and reuse. Participants can also choose to provide access to their data through

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[65] https://www.kahuiraraunga.io/iwidataneeds

federation standardised and supported data access interfaces (e.g., APIs (Application Programming Interfaces)).

Operationally supported access mechanisms

Regardless of the data access method, SLAs (Service Level Agreements) will be in place and recorded in the metadata to support initial usage evaluation and fit-for-purpose decisions against the outcomes and value released from its use. Any changes, including access removal must be communicated in advance to enable timely outcome and value impact assessments and risk mitigations to be designed and implemented. Additionally, operational support processes will support governance and assurance processes that enable transparency of who can, and who, has access to data.

Data reuse and publication

Māori values are highly applicable when working with data. The principle of manaakitanga describes ways to demonstrate respect and kindness to uphold the mana of the people represented in the data. Inappropriate secondary use has often been identified as a challenge in how Māori data is used[66]

The design gives effect to Te Tiriti as follows:

Preamble: The Government recognises the relationship Māori have with the Crown and together they will enable transparency of data reuse and publication.

Article 1: Cultural and ethical protocols will guide reuse and publishing decisions. In recognition of manaakitanga, consent will be obtained to use data from the people the data is about or the kaitiaki of the data. Further recognition of manaakitanga is achieved through Māori controlling reuse via traditional knowledge labels or other mechanisms to ensure that data analysis and stories have the appropriate context and are not told from the traditional deficit lens which reduces mana.

Article 2: Māori have the right to set up their own locations for publishing such as Te Whata to share data on their terms and create their own narratives that tell a more complete picture.

Article 3: Challenges with accessing and reusing data can create inequity of outcomes [Courts of New Zealand(2021)]. Both collective and individual benefit should be considered when determining access to data. In other words, personal information should be shared appropriately when there is a public interest (Office of the Privacy commissioner, 2021) [67] to help create more equitable outcomes.

Wairuatanga: The Ngā Tikanga Paihere concept of wairua speaks to the wellbeing of the community and minimising any potential harm. Re-use and publishing of data, which carries mauri, should only be done when it enhances the mauri and the wellbeing of the people it represents.

Governance and alignment to agreed ethical and cultural protocols

Data reuse and publication must be consistent and aligned to the ethical and cultural protocols agreed by data federation participants. Significantly, this includes data and/or insight published within and/or outside the federation.

Data reuse must be appropriately governed and assured to use fit-for-purpose data. Real-world collection context and coverage must be made available to data users prior to use by federation participants. Additionally, this must consider specific aspects such as any inherent bias in the data as described evidenced in lineage and provenance metadata.

Data interoperability and curation

Data curation and interoperability should be a joint responsibility between data custodians and data users. Specific governance and assurance processes must enable feedback on data quality and interoperability as related to specific reuse purpose. All federation participants should be able to

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[66] https://www.youtube.com/watch?v=YgPfWUdtjig

[67] https://www.privacy.org.nz/blog/analysis-high-court-2021-review-of-ministry-decisions-about-maori-vaccination-data/

discuss data curation needs to ensure the equitable spread of burden. Additionally, there should be governance processes to assess opportunities to optimise the curation process upstream of the federation if viable and feasible to do so.

Interoperability between data sets must be supported by centrally facilitated, standardised metadata, coding, classification, concepts, and ontological structures to lower the friction and burden of reusing data from different domains and legacy datasets.

Curation of interoperability mechanisms and semantic data structures is a joint responsibility of all government data system participants. However, centralised functional leadership, investment, prioritisation, and coordination will be required as these mechanisms and sematic structures should be reusable across many federated data ecosystems. For example, the Archives New Zealand, All of Government Ontology initiative has tested some semantic approaches potentially reusable in the future state.

Joint capability uplift and benefit

Support for effective and efficient data reuse will be provided by the federation participant community. Data users within a federation should benefit from the combined capability of federation participants. Significantly, this should support equitable capability growth around data use practices, analytics, and data & insight publishing. Collaboration between insight analysts and participant data providers, alongside ethical and cultural protocols, will support appropriate reuse of data to achieve valuable outcomes.

Appropriate data location for use

Data will be appropriately located to support the technical and functional execution of analytical code along with insights that will be published within and/or outside the federation. Irrespective of location data will be well governed and align with federation technical, ethical, and cultural protocols and purpose. This will be supported by governance and assurance processes that will provide effective transparency of data use and reuse to all federation participants. Support for effective and sustainable data reuse will be provided by the federation participant community.

Operational support processes

Tikanga describes the right way of doing things in a te ao Māori world. Tika is the right way to act from a te ao Māori perspective. Pono describes the ethics of an action. Having a focus on tikanga and acting in a way that is tika and pono helps enhance operational support processes. It is important to note that tikanga should be formed according to the participants world view (since different rōpū have different tikanga).

Due to the impacts of colonisation Māori have had less of a role in data system design elements such as operational support. Engagement on the UNDRIP declaration plan[68] noted "participants wanted hapū and iwi to have a role in monitoring to be responsive to local needs and aspirations and opportunities to incorporate positive data for Māori."

The design gives effect to Te Tiriti as follows,

Preamble: Relationships are created between Māori and the Crown with those that provide operational support. These relationships are created in a way that is tika that recognises the right ordering and acknowledges the mana of the participants.

Article 1: To create support processes that are tika and pono which, provides accountability, ethical and cultural protocols are incorporated into operational support processes.

Article 2: Principles of Māori Data Governance and Māori Data Sovereignty regarding rangatiratanga are incorporated into operational support processes.

Article 3: Māori collectives are given the opportunity to be involved in monitoring which would place more emphasis on highlighting and addressing inequities.

Wairuatanga: No specific comment on wairuatanga.

Supporting equitable and sustainable data system evolution

Operational support processes are essential for a reliable, safe, effective, and sustainable government data system. Additionally, processes and mechanisms common to many federations across the government data system should be consistently implemented including reuse of common technical mechanisms such as monitoring, security, control processes and data management capability.

Significantly, maximising reuse and consistency will support an equitable, evolutionary move towards increased federation. This will also ensure a greater chance the evolution is operationally sustainable from a technical, functional, and financial perspective.

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[68] https://www.tpk.govt.nz/en/mo-te-puni-kokiri/corporate-documents/cabinet-papers/all-cabinet-papers/united-nations-declaration-on-the-rights-of-indige

Operational data stewardship and governance

Data stewardship best practice[69] must underpin federation data operations. Governance and assurance[70] of the federation's operation will support an inclusive process including upholding the principles and aspirations of Māori Data Governance and Sovereignty. Additionally, the federation should adhere to ethical best practice including cultural protocols of the federation agreed by participants.

Additionally, data stewardship and governance of common data used across federations will be centrally facilitated to ensure there is consistency across the government data system.

Measuring and monitoring operational success

A data federation's operation should be monitored against agreed key measures of success and assured on a continuous basis. Insight from these measures should materially contribute to operational decisions and potential infrastructural design changes to meet the federation's operational objectives and purpose. Additionally, this should be a collaborative and inclusive process where shared IT (Information Technology) infrastructure, tools and interfaces are reused across many federations.

Tools and capability shared and in common between federations must be supported by robust, collaborative, and distributed technical community support (for example Open-Source code and Agile change).

Monitoring and governance of data quality against purpose

The availability and flow of data into and within a federation needs to be aligned to the purpose and objectives agreed by federation participants. Setting appropriate measures and monitoring the flow of data against those measures must be inherent in the capability of the federations underlying operational processes. Exceptions to data quality expectations should be a key part of data governance processes within the federation.

Centralised governance and support

Federations should be largely self-governing based around their stated operational purpose. However, over time, federations will rely increasingly on common data and data system capability. This will necessitate the need for more centralised governance processes to support consistency and sustainability across many federated data ecosystems including:

- Common data and metadata standards enabling consistent reuse of data

- Common approach to master data management across the government data system including back-office agency processes

- Interoperability mechanisms such as ontological structures that support reuse of data based on different domain standards (often internationally driven or embedded into domain specific software systems)

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[69] https://www.data.govt.nz/toolkit/data-stewardship/a-data-stewardship-framework-for-nz/
[70] https://www.data.govt.nz/toolkit/data-governance/odgf/

- Support for common approach to cataloguing data (open and close data) across the government data system.

Security governance

Data and metadata will be appropriately[71] secured and continuously risk assessed against the latest environment shifts. Additionally, protective security best practice and processes should be implemented within a federation including meeting mandatory governance requirements[72].

Risk and opportunity management and governance

Operational support processes must enable balanced, inclusive, and transparent discussion of both risk and opportunities. Trade-off decisions will inevitably be required and should be made transparently between all federation participants and their relevant key stakeholders. Additionally, there must be an ongoing commitment to measuring and assuring benefits of any change against potential opportunities.

Furthermore, active, and continuous risk and mitigation planning should also be a regular feature of a federation's governance processes. Significantly, risk mitigation and assurance should be connected to and able to revalidate the trade-off decisions already made.

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[71] https://www.nzism.gcsb.govt.nz/
[72] https://protectivesecurity.govt.nz/governance/mandatory-requirements/

Value realised

There can be different views of value which can reflect the connected nature of te ao Māori. These views can include considering the collective value but also thinking intergenerationally about what value future descendants will have as a result of decisions today. Connections through strong relationships are seen as important foundation to realising aspirations.

The design gives effect to Te Tiriti as follows:

Preamble: Trusted relationships between Māori and the Crown are established so that more value can be realised.

Article 1: Several mechanisms exist within the design to ensure that value can be realised now for the collective and for future generations. This includes sharing pūkenga to build up capacity, co-determining the kaupapa for the federation alongside other participants and applying cultural protocols to help gain trust.

Article 2: The data system design helps reduce barriers to tino rangatiratanga by providing data that is relevant to Māori to enable better self-governance and further advance Māori aspirations.

Article 3: The system design acknowledges the unique pūkenga that each participant brings (including Māori collectives) and works collaboratively to achieve better outcomes. Value is realised through more equitable participation and access to data.

Wairuatanga: The design pillars demonstrate the intent of the data system design is that people feel heard, respected, and have more meaningful involvement. These aspects can help replenish wairua which is valuable from both a perspective of hauora and also helps continue to move towards aspirations that Māori have for their whānau, communities and future generations.

Forms and modes of value release

The value released from a federated data ecosystem (federation) can be observed from several points of view.

Firstly, there is the value derived by federation participants in the form of capability uplift and outcomes they directly deliver using federation data. For example, outcomes could include improved agency/public service delivery, validating the effectiveness of specific agency policy as evidenced in data, more efficiently directing agency resources based on public need as evidenced in data, and could also include insight from data that enables community organisations to provide more targeted support to improve the wellbeing of those they serve in the community.

Secondly, there is the value delivered to parties outside the federation. This value will be aligned to the stated purpose of the data federation and be something all federation participants have a role in delivering.

Thirdly, there is the value to those who supplied the data or who are represented in the data. The transparency of this type of value is critical to establishing trust and confidence in how the government and its partners use data for the benefit of individuals in Aotearoa New Zealand.

Guiderails of value release from data

Ethical and Cultural Protocols must underpin, and support, value realised from the data system. These protocols support all federation data processes and behaviours from establishing and maintaining strong relationships to delivering valuable insight that drives genuine positive change for real people.

All participants have equitable access to data and analytical capability, subject to cultural and ethical protocols. Additionally, these protocols must be applied in a manner to ensure data is used appropriately when delivering value and supports growth of trust and confidence in those using data.

Structuring to deliver value from data

All participants must realise value and a net-gain from being a federation member. This net-gain may be observed in several forms, material, non-material, direct and indirect.

A federation must also have the ability to structure itself in a manner to appropriately align to its stated purpose and do so in an equitable manner. Additionally, a federation must have the ability to structure itself in a manner to improve our ability to respond active and emerging operational scenarios especially those requiring data from a diverse range of government and non-government organisations.

Significantly, the federation must clearly deliver value collectively to its participant community and the community outside the federation it serves.

Equity of participation and outcomes

Before equity of outcome can be realised, we must first improve equity of participation in the government data system.

The Government Data Strategy and Roadmap (2021) outlined the following fundamental system issues to be resolved:

- Data about and for some important topics and communities does not exist

- Settings to realise the rights and interests of Māori and iwi do not exist

- Many agencies lack capability to take advantage of the power of data

- It is difficult to find, retrieve and re-use data across the system

In addition, research undertaken on Waitangi Tribunal settlements and Māori collectives documentation highlights key challenges to address in the government data system design:

- Supporting Māori collectives to build up their capability rather than building up the Government's capability.

- Data access challenges related to a lack of iwi or rohe data

- Ethical data use, including requiring re-consent for secondary data use

- The lack of acceptance of Māori values, including tapu or whakapapa, as valid reasons for not having others use the data

- The absence of co-design and co-governance

- Licensing and contractual arrangements for access

- The lack of transparency and two-way conversations

The development of future state design has considered how a government data system founded on federated data ecosystem would begin to address these barriers.

Equity of access to data

Many communities such as iwi, hapū and marae will have their own collected data. To lower the barrier of making data that is collected by a community available/accessible to the federation. Data that is made available/accessible to a federation can be in any format, and intermediary resources can be used to standardise the data when it is needed. In the longer term, it is important that where required Māori collectives can access data literacy capability building so that communities can collect data in a way that is consistent with their aspirations without the need for an intermediary resource to make data available/accessible to a federation.

The government data system needs to consider the different needs of its participants, including how they receive data that is of interest to them. First, the data system should be built to support non-digital access to data. This is supported by a strengthened Māori workforce to allow for kanohi ki te kanohi relationships with Māori participants. For people who prefer digital solutions, there should also be the ability to create dashboards with automated insights in plain English and te reo Māori.

Historically, the government has not collected data in a way that works for Māori. In the short term, applying Māorification [Taiuru (2022)] to existing datasets can make existing data collected about Māori more accessible from a Māori way of thought. Modules can be built to link existing datasets to Māori codes such as rohe areas, marae datasets (traditional[73], non-traditional[74], urban[75]) and hapū dataset[76] [Taiuru (2022)]. Going forth, data in a federation can be collected in this format so that Māori communities can link it with data that they collect.

Establishing trust to realise the value of data

For value to be realised, trust must be built from the outset. Giving effect to Te Tiriti can help expand on trust and confidence between stakeholders such as government or non-government agencies and Māori communities. Taiuru offers a Kaitiaki Engagement Model (based on the original table by Riley Taitifong (2019), proposing that when engaging with kaitiaki, the following principles model should be considered to ensure safety of kaitiaki and a meaningful relationship ([Taiuru (2022)][77].

Trust must first be built with kaitiaki of the data in a federated system. Drawing from the Kaitiaki Engagement model and broadening the model to be specific to a federation, federation

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[73] https://github.com/ktaiuru/Traditional-Marae-Data-Sovereignty-Data-Set-
[74]
  https://github.com/ktaiuru/NonTraditionalMarae
[75] https://github.com/ktaiuru/Urban-Marae-Data-Set
[76] https://github.com/ktaiuru/Hap-Data-Sovereignty-Dataset-2.0-.-
[77] https://www.taiuru.maori.nz/guidelines-for-dna-research-storage-and-seed-banks-with-taonga-materials/

participants should:

Centre Māori self-determination (Tino Rangatiratanga) – only collect data about Māori when authorised by the appropriate community partners, and recognise that consent is not a guaranteed outcome of partnership.

Replace the deficit model of engagement (Mana) – do not conflate unidirectional efforts with participatory community engagement, and actively pursue participatory approaches to community engagement.

Integrate mātauranga Māori (Tikanga) - identify culturally specific values and concepts relevant to context of data on hand, draw on culturally specific values and knowledge to co-design questions in continued research and decision making related to context of data on hand.

Essential design capabilities

A capability is generally described[78] as the ability for a business to do something. Capabilities typically require a combination of roles, processes, data/information, and tools/technology to achieve. The purpose and value of defining capabilities is to help develop the shared understanding of what support is needed to implement operating models and deliver services.

In the general context of data there are a number of capability models available. These include:

- The Data Capability Framework. A skills-based framework published by the New Zealand Government Chief Data Steward

- The Common Statistical Data Architecture. A reference data architecture which provides a data centric" view of data architecture, putting emphasis on the value of data and metadata, the need to treat data as an asset. CSDA is published by the High-Level Group for the Modernisation of Official Statistics (Section X)[79].

- Health data and information governance and capability framework. A domain-based framework published by the Canadian Institute for Health Information

- There are also best practice based international models (not traditionally described as capability models) such as:

    - The Data Management Body of Knowledge published by the Data Management Association International

    - The Skills Framework for the Information Age (SFIA). MBIE and the Department of Internal Affairs (DIA) have co-funded an all of New Zealand license for SFIA. SFIA does not cover data capabilities, but does include associated capabilities and skills such as information management and enterprise architecture

These capability models outline the standard data capability foundations for this design. In this document we do not further explore or describe these models.

Figure 11 below provides a summary view of the Federated data ecosystem operating model and the essential design capabilities that have been identified that are; new, new in a data context, or require a significant shift to achieve the ambition of the Government data system future state design. For all other capabilities there is sufficient alignment with standard best practice definitions, such as those outlined above.

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[78] For example https://pubs.opengroup.org/togaf-standard/business-architecture/business-capabilities.html
[79]
https://statswiki.unece.org/display/DA/Data+Architecture+Home?preview=/129177312/238617543/CSDA%20 Guidelines.docx. The GCDS are currently developing a Data Maturity Assessment framework and process for the New Zealand government. This is provided FYI while that is in development.

Operating Model – Essential Capabilities - Summary

Data Discovery and Relationships	Data Acquisition and Management	Data Reuse and Publication
Data Needs . Partnerships . Engagement . Catalogues . Metadata Management	Data Access Channels . Reuse Authority . Data Management	Data Curation . Interoperability . Analytics. Capability Support and Growth . Data & Insight Publishing

Cross cutting essential capabilities

Stewardship and Governance
Codesign
Māori Engagement

Essential capabilities

DATA AND METADATA QUALITY	AUTHORITY	COMMON CAPABILITY
METADATA MANAGEMENT	DATA ACCESS	CURATION
DATA DISCOVERY	PRIVACY AND CONFIDENTIALITY	INTEROPERABILITY

Figure 9 – Essential design capabilities

The following sections provide a description of the essential design capabilities required to support the federated data ecosystem operating model[80] Each capability is outlined, the key shifts identified and includes information on current resources that are available to support achievable and practical implementation. Each capability has a call out describing giving effect to Te Tiriti. The candidate requirements for each capability are detailed in Appendix B – Candidate Design Capability Requirements.

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[80] The federated data ecosystem operating model

Federated data ecosystem operating model - cross cutting essential design capabilities

Māori engagement, codesign, stewardship and governance

Māori have traditionally been designers. However, colonisation has had an impact on the ability to have an active role in the design of data ecosystems [Cormack et al (2020)][81]. Recently, there have been shifts in the design and co-governance space to ensure that Māori play a greater role in stewardship, and governance, (co)design and engagement such as Te Whata and the Māori Data Governance mahi. The design continues these recent shifts.

The design gives effect to Te Tiriti as follows:

Preamble: Māori and the Crown will create relationships when it comes to establishing essential design capabilities through frank conversations that allow each party to share their aspirations.

Article 1: Government should ensure that where Māori are interested, there are opportunities for governance, stewardship, and co-design roles at a level of engagement that Māori desire.

Article 2: Kaupapa traditionally led by Government that are important to both Crown and Māori should be co-designed and co-governed as described in the Māori Data Governance mahi[82]. Some kaupapa will be led by Māori with little Crown involvement.

Article 3: Māori will have a decision-making role rather than a consulting role to give Māori more power to improve equity.

Wairuatanga: Māori will have a voice at the decision-making table. That feeling of being heard and empowered will enhance the wairua of Māori.

Drivers

The cross-cutting capabilities of stewardship and governance, codesign and Māori engagement are essential to the federated data ecosystem operating model. Deliberate shifts in operational data governance and stewardship, codesign and Māori engagement are required to support equitable partnerships that are sustainable and committed to achieving the agreed outcomes.

Capability – stewardship and governance

The ability to create, collect, manage, and use data carefully and responsibly.

Shifts required: Data stewardship will be a key focus to ensure that data is used in an ethical and culturally appropriate manner. Operational governance and assurance of the data design are critical to meeting the agreed purpose and outcomes.

The Māori Crown Relationship framework enables change across the public service to support the improved Māori Crown relationship necessary for desired stewardship and governance capability.

Candidate requirements: Refer Governance and assurance.

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[81] Cormack, D., Kukutai, T., & Cormack, C. (2020). Not one byte more: Data colonialism to data sovereignty. In A. Chen (Ed.), *Shouting zeroes and ones digital technology, ethics and policy in New Zealand*.

[82] https://www.data.govt.nz/toolkit/data-governance/maori/

Available support resources	Development needed
• CO (19) 5 Te Tiriti o Waitangi / Treaty of Waitangi Guidance (Cabinet Office) • Data Stewardship Framework (GCDS) • Data Stewardship Toolkit (GCDS) • Operational Data Governance (GCDS) • Crown engagement with Māori (Te Arawhiti) • Māori Crown Relations Capability Framework for the Public Service - Organisational Capability Component (Te Arawhiti) • Vision Mātauranga resources (Rauika Māngai) • Tiakina kaitiaki relationship framework (Ngā Taonga) • Kaitiaki engagement model (Taiuru K)	• N/A • Māori data stewardship is not in framework • General refresh • Māori Data Governance – in development • The Operational Data Governance guidance requires a refresh and update to incorporate ethical and cultural protocols required by the future state design • N/A • Whāinga Amorangi phase two organisational development – in development[83] • N/A • N/A • N/A

International support resources	Development needed
• First Nations Governance Strategy (First Nations Information Governance Centre) • First Nations Principles of OCAP (First Nations Information Governance Centre)	• N/A • N/A

Capability – codesign

The ability to undertake design practices with, not for, partners.

Shifts required: Creating equitable outcomes for Māori collectives through improved design practices codesigning the creation, collection, management, governance, application of data.

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[83] Capability lift and associated agency guidance for Whāinga Amorangi phase two organisational development to be further defined and distributed 2023. This guidance will underpin the framework and describe the 'how'

Available support resources	Development needed
• [Auckland codesign lab Co-design Capability and Conditions Framework](#)	• Co-design Capability and Conditions Framework is not a formally adopted framework for use in Government
• [CO (19) 5 Te Tiriti o Waitangi / Treaty of Waitangi Guidance](#) (Cabinet Office)	• N/A
• [Codesign Review Report](#)[84] (TKR)	• Te Kāhui Raraunga must be contacted to obtain this document
• [Data Capability Framework](#) (GCDS)	• General review – note this covers generic data related capabilities, specific cultural aspects of these capabilities need to be added or reference.
• [The Policy Project](#) (DPMC)	• N/A
• [A guide to good survey design - Fifth edition](#) (Stats NZ)	• N/A

Capability - Māori engagement

The ability to undertake and participate in engagement with Māori and Māori collectives appropriately and effectively. Engagement can vary from being informed, consulted, collaborated, co-designed or empowerment [Te Arawhiti (2018)][85]

Shifts required: Te Tiriti gives Māori and Māori collectives rights beyond consultation. The type of engagement depends on the importance of the kaupapa to Māori and Māori collectives. As each agency implements their Whāinga Amorangi plan, there will be a lift in the public sector's ability to engage effectively with Māori.

Available support resources	Development needed
• [Māori Crown relations framework guide](#) (Te Arawhiti)	• N/A
• [Māori Crown Relations Capability Framework for the Public Service - Individual Capability Component](#) (Te Arawhiti)	• N/A

[84] The Co-Design Review Report presents a Māori-Crown Co-design Continuum as an analytical framework which can provide guidance for co-design in other Māori and Indigenous contexts.
[85] https://tearawhiti.govt.nz/assets/Maori-Crown-Relations-Roopu/6b46d994f8/Engagement-Guidelines-1-Oct-18.pdf

• Guidelines for Engagement with Māori (Te Arawhiti)	• N/A
• Whāinga Amorangi (each agency has submitted plans)	• As each agency implements their plan we will see a lift in the public sectors ability to engage effectively with Māori
• 17 Habits of a Valued Treaty Partner (Flying Geese)	• N/A

Data discovery and relationships – essential design capabilities

Data and metadata quality, metadata management and data discovery and transparency

In the iwi data needs paper, key data principles have been emphasised to ensure that data is fit for purpose, including: timely data, data relevant to their needs, data appropriate for their needs and, data that is freely available and accessible. [Te Kāhui Raraunga (2021)]. Currently the majority of data produced by the Crown does not meet these needs.

There is existing work in the data quality space, metadata and data discovery that can be drawn upon such as the Māori data triangle[86] to apply a lens over data quality, traditional knowledge labels and existing work in the Galleries, Libraries, Archives and Museums (GLAM) sector such as the Ngā Upoko Tukutuku subject headings for cataloguing.

The design gives effect to Te Tiriti as follows:

Preamble: Relationships are established so that Māori are able to co-design data quality frameworks, metadata data standards and data cataloguing that is relevant to their aspirations.

Article 1: Data quality frameworks, metadata data standards and data cataloguing incorporate Māori perspectives on data quality, have enough context in the metadata and have bilingual cataloguing where appropriate. Bilingual cataloguing will have appropriate encoding so that macrons display correctly.

Article 2: Māori can collect and manage their own data quality frameworks, metadata standards and categories for cataloguing.

Article 3: Māori will be able to make use of metadata and cataloguing to help improve data discovery and enhance equity by knowing what data is available that may help with their aspirations.

Wairuatanga: No specific mention of wairuatanga.

Data and metadata quality

Drivers

In the context of this document data quality must also apply to metadata. Elements of mana (authority and responsibility), value and intent come from the provenance (lineage) and cultural protocols that are most often available in metadata therefore it is important that data quality is also considered for metadata.

Establishing the equitable, agreed outcomes/purpose, associated major uses of the data, costs, and conditions and circumstances that affect quality and user expectations are important in determining the fitness-for-purpose of quality.

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[86] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Maori_Data_Futures_Report-2018.pdf

Additional context of drivers

The dimensions of quality are inter-related, an action taken to address or modify one dimension of quality tends to affect the other dimensions. The priority of the dimensions may vary across different groups of users. These dimensions when collectively prioritised, with appropriate trade-offs, describe fitness-for-purpose. The evaluation of the impact (successful or unsuccessful) of any policy or service delivery outcomes is reliant on the fitness-for-purpose of the data that was used to generate the supporting insights and evidence.

List of Conformed Dimensions of Data Quality
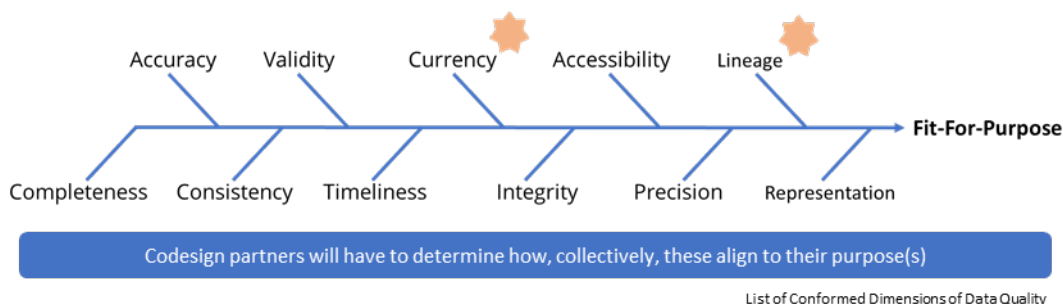
Recognising the currency and lineage of data as important dimensions of data quality and undertaking codesign to determine if the data is fit for purpose will improve the equity of participation in the data system. Viewing the outcomes from a more holistic lens and assessing transparency of ownership and stewardship will also strengthen trust in the data.

Capability – data and metadata quality

The ability to establish the equitable and agreed purpose(s) allowing the collective prioritisation of the dimensions contributing to the fitness-for-purpose of quality data and metadata.

Shifts required: Improving the assessment and transparency of data and metadata quality is critical to increase trust in data and the government data system.

Candidate requirements: refer data and metadata quality

Available support resources	Development needed
• [Māori data futures hui – Intellectual property](#) (SfTI 2019)	• N/A
• [Steady States/Quality Gates](#) (GCDS)	• Data Quality Framework for use in NZ Government. There are many data quality frameworks, including those developed for specific domains of data use. Data quality is achieved through addressing, managing, and balancing, over time, the various dimensions that contribute to improved quality
• [Mandated Data Standards](#) (GCDS)	• Consideration of non 'data content' standards for mandated data standards process
• [The Data Investment Plan](#) (GCDS)	• The Data Investment Plan (DIP) utilises fitness-for-purpose (quality) as one of the

	criteria in the prioritisation process for investment in essential data assets. The DIP is reviewed annually with significant revisions every three years

International support resources	Development needed
• [UK Government data quality framework](#) • [Conformant Dimensions of Data Quality](#) • [Statistics Canada Data Quality Assurance Framework](#) • [UN quality assurance framework for official statistics](#) (United Nations)	• N/A • N/A • N/A • N/A

Metadata management

Drivers

Improved discoverability and transparency of data is only possible with improved metadata and provenance. The data needs of federation participants are discussed and understood as part of the relationships. As part of this process, a record of where data aligned to needs exists, its form and lineage will be captured.

Capability – metadata management

The ability to manage the data (metadata) that describes other data to aid discovery, access, and appropriate use of data from creation and throughout the data lifecycle.

Shifts required: Improving the description of government held data using consistent agreed metadata (including standards, data dictionaries, documentation re methods and processes) will help users discover, understand, and interpret the data correctly. It will also help users know when data is fit for purpose.

Candidate requirements: refer metadata management

Available support resources	Development needed
• [Steady States/Quality Gates](#) (GCDS) • [Data Dictionary](#) (GCDS) • [What is a data custodian and what do they do](#) (GCDS) • [What metadata should I include with my dataset](#) (GCDS)	• General review • General review • General review • **Open Data focus**. Expand to closed data (see international support resources

	(metadata fields at catalogue entry level)
• [Mandated Data Standards](#) (GCDS)	• Consideration of non 'data content' standards for mandated data standards process
• [ARIA](#) (GCDS)	• **Investment required** to support system access
• [Kōrero ārahi-guidance](#) (LINZ)	• N/A

International support resources	Development needed
• [Traditional Knowledge Labels](#) (Local Contexts)	• This and all of the following are N/A excluding ISO (International Standards Organisation) 11179
• Potential range of metadata fields at catalogue entry level for a dataset, for example: https://guidance.data.gov.uk/publish_and_manage_data/harvest_or_add_data/harvest_data/#complete-the-description-field	
• [UTF-8](#) for data and metadata encoding	
• [ISO 639 xxxx](#) for language encoding	
• Standardised and linked metadata - As part of the data versioned API (Application Programming Interfaces) standard (e.g. [OData](#))	
• [ISO 11179](#)	• This standard (ISO 11179) requires payment (link is to Standards New Zealand)
• Self-described - As part of the data encoding standard (e.g. https://sdmx.org/?page_id=5008 SDMX (Statistical Data Metadata Exchange)))	
• Loosely coupled as part of the data API (Application Programming Interfaces) high-level protocol (e.g., data and metadata content management resources could be separately managed and accessed. Note: Needs to be kept in sync by data providers) (e.g. [CKAN](#))	

- OGC (Open Geospatial Consortium) (references a range of geospatial data standards)

- Data preservation and dissemination Data Documentation Initiative (DDI)

- Metadata schema capable of bridging domain standards (e.g. DDI-CDI)

- Provenance metadata standards, PROV-DM (W3C)

Data discovery and transparency

Drivers

Discovery and transparency of data, particularly of common data, will be supported by data catalogues with metadata that enables assessment of appropriate data usage for a range of outcomes. Data access may be centralised within a federation hub (i.e., data and capability) or remotely accessible within the source organisation. An example of an existing centralised hub of data and capability would be the IDI for statistics and research.

Capability – data discovery and transparency

The ability to discover data from many sources and including the metadata that enables current and potential data users to ascertain if the data is fit-for-purpose for their specific use case and aspiration.

Shifts required: Improved discoverability and transparency of data, particularly of common date, must be supported by the mechanisms used to describe the data (metadata), its collection context (provenance) and where possible be available in te reo Māori. The data needs of federation participants are discussed and understood as part of the relationships. As part of this process, a record of where data aligned to needs exists, its form and lineage will be captured. Initially, the data system will contain many data catalogues. For example, existing data domains such business data (e.g. NZBN (New Zealand Business Number) Register) and spatial data (e.g., land and property, LINZ Data Service) and cross domain data such as open data catalogues in data.govt.nz and those held and maintained by local authorities (e.g. Christchurch City Council).

Candidate requirements: refer data discovery/data catalogue and common data and common capability

Available support resources	Development needed
- data.govt.nz - about (GCDS)	- **Open data only.** Expand or complement with closed data option. Confirm future of data.govt
- Error! Hyperlink reference not valid.	- N/A

• Integrated Data Service - Integrated Data Infrastructure and Longitudinal Business Database (GCDS)	• Requires investment
• NZBN (New Zealand Business Number) Register (MBIE/B4B)	• N/A
• Official information Act 1982 (MoJ (Ministry of Justice))	• N/A
• Public Records Act 2005 (DIA)	• N/A
• All of Government Ontology (Archives NZ)	• In development
• Ngā Upoko Tukutuku (National Library)	• N/A
• Government Portals: o Various	• Stock take needs to be undertaken and reviewed for purpose of each

International support resources	Development needed
• Catalogue Metadata Standard: o DCAT++ (what extensions would we need for NZ? E.g., TK Labels) https://www.w3.org/TR/vocab-dcat-2/#dcat-scope	• Catalogue metadata standards adherence something to evolve towards, for example, could or should data.govt.nz incorporate this range?
• Provenance metadata standards, PROV-DM (W3C)	• N/A
• The "3C's": Communities, Cultural Protocols, and Categories (Mukurtu)	• N/A
• FAIR principles (GOFAIR)	• N/A
• What Is FAIR? (video StatCan)	• N/A

Data acquisition and management – essential design capabilities

Authority, data access, privacy, and confidentiality

Iwi want to be able to look at wellbeing from their perspective and pursue opportunities to improve their wellbeing [Te Kahui Raraunga (2021)]. Māori data is often collected by organisations specifically for the collector's purpose rather than for Māori aspirations. A recent publication showed Māori were surprised to hear data was being accessed in large Government research databases [Thabrew et al (2022)][87]. The research had recommendations regarding more explicit consent and Māori having a centralised authority function. The Māori Data Audit Tool[88] also provides helpful questions when considering sharing data access with other participants. The design acknowledges the importance of consent, authority, and concepts such as tapu and noa are considered.

The design gives effect to Te Tiriti as follows:

Preamble: The relationship between Māori and the Crown is unique. The Crown recognise their role as kaipupuri of Māori data and also recognise the kaitiaki roles that Māori hold with regard to Māori data that is held by the Crown.

Article 1: Federations are able to set up their own authority structures and agreements regarding the access to Māori data. Consent is more explicit in the data system and can take different forms such as free prior informed consent or the burden of consent can be managed by applying meta-consent. The level of consent is dependent on the kaupapa and how tapu the data is.

Article 2: Māori can determine their own procedures for consent, authority to access data and privacy which may be based upon Māori tikanga which may have fewer rules but more discretionary authority to decide what is tika with regard to data access.

Article 3: Equity of opportunity is provided by having provisions put in place to ensure that Māori can manage consent, authority, privacy, and confidentiality regardless of current technical expertise.

Wairuatanga: No specific mention of wairuatanga for this section.

Authority

Drivers

The authority for data access must be clearly indicated as part of metadata and data catalogues or any other discovery/access mechanism.

Capability – authority

The ability to document, and make discoverable, authority for data access including authority related to culturally appropriate data protections such as tapu and noa.

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[87] https://journals.sagepub.com/doi/10.1177/15562646221111294

[88] https://static1.squarespace.com/static/58e9b10f9de4bb8d1fb5ebbc/t/59152b7db8a79bdb0e64424a/1494559615337/M%C4%81ori+Data+Audit+Tool.pdf

Shifts required: Legal, cultural appropriateness and licence to access data must be established prior to access. This will follow a transparent process between data custodians and intended data users.

Candidate requirements: refer data access, authority (to access and use data).

Available support resources	Development needed
• [NZ GOAL Framework](#) (GCDS)	• Cultural authority and Māori, and Māori collectives authority incorporated or development of alternative mechanisms such as policy and legislative settings
• [Open Data](#) (GCDS)	• N/A
• [Privacy Act 2020 Codes of practice](#) (OPC)	• N/A
• [Approved information sharing agreements](#) (OPC)	• N/A
• [Māori Data Sovereignty principles](#) (TMR)	• N/A

International support resources	Development needed
• [CARE principles](#) (Global Indigenous Data Alliance (GIDA))	• N/A
• [Meta-Consent](#) (BMC Medical Ethics)	• Informed consent and meta-consent – currently academic papers only
• [First Nations Principles of OCAP](#) (First Nations Information Governance Centre)	• N/A

Data access

Drivers

Data access requirements and methods including the associated ethical and cultural protocols will be in place and recorded in the metadata. Any changes, including access removal, must be communicated in advance. Operational support processes will support governance and assurance processes that enable transparency of who can, and who has, access to data

Capability – Data access

The ability to agree and document data access, management agreements and associated ethical and cultural data access protocols through service level or data sharing agreements (or equivalent) for example MOU's and AISA's and assess adherence to that access.

Shifts required: Data will be more accessible and stored in more consistent formats, enabling data access, and sharing so the government data system can develop and use real-time insights for

decision-making. Data must be accessed through an approved mechanisms which must be monitored and audited to validate that only appropriate people are accessing the data.

Strengthening trust, transparency, and accountability of data access and the associated data sharing and use through establishing positive enduring relationships and equitable partnerships between those that have and those who need data.

Candidate requirements: refer data discovery/data catalogue, data access and authority (to access and use data)

Available support resources	Development needed
• Ngā Tikanga Paihere (GCDS)	• Ngā Tikanga Paihere extended to apply to more than research or analytical activities
• Māori Data Sovereignty principles (TMR)	• N/A
• Māori Data Audit Tool (TMR)	• N/A
• Official information Act 1982 (MoJ)	• N/A

International support resources	Development needed
• FAIR principles (GOFAIR)	• N/A
• What Is FAIR? (video StatCan)	• N/A
• CARE principles (GIDA)	• N/A
• First Nations Principles of OCAP (First Nations Information Governance Centre)	• N/A

Privacy and confidentiality

Drivers

An effective and enduring government data system is built upon trust. Increasingly the linking together of data across the boundaries of private industry, Government, communities, and our personal lives offers some of the greatest opportunities but brings with it significant responsibilities and accountabilities related to public trust and confidence.

The use of machine learning and artificial intelligence is creating an increased demand for data. However, this is also raising concerns regarding transparency of privacy and cultural protocols to protect people from inappropriate automated processes that have insufficient human oversight.

Capability – privacy and confidentiality

The ability to protect the privacy of individual's identifiable data. Appropriate guidance and metadata will be included with data to support appropriate access and use.

Shifts required: Privacy and confidentiality protocols must be applied appropriate to ensure appropriate data use and support growth of trust and confidence in those providing and using data. Increase/implement the use of modern confidentiality and Privacy preserving techniques [Ram Mohan Rao et al (2018)][89] to enable appropriate sharing of appropriately deidentified data.

Candidate requirements: refer data access and authority (to access and use data)

Available support resources	Development needed
• Ngā Tikanga Paihere (GCDS)	• Ngā Tikanga Paihere extended to apply to more than research or analytical activities
• Māori Data Sovereignty principles (TMR)	• N/A
• Privacy Act 2020 Codes of practice (OPC)	• N/A
• Approved information sharing agreements (OPC)	• N/A
	• N/A
• Privacy and risk (GCDO (Government Chief Digital Officer))	• N/A
	• N/A
• New Zealand Information Security Manual (GCSB (Government Communications Security Bureau))	• N/A
• Privacy, security, and confidentiality (GCDS)	• Check alignment with Privacy and risk (GCDO)

International support resources	Development needed
• FAIR principles (GOFAIR)	• N/A
• What Is FAIR? (video StatCan)	• N/A
• CARE principles (GIDA)	• N/A
• First Nations Principles of OCAP (First Nations Information Governance Centre)	• N/A `
• UN Handbook on Privacy-Preserving Computation Techniques (United Nations)	• N/A

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[89] https://journalofbigdata.springeropen.com/articles/10.1186/s40537-018-0141-8#Tab1

Data reuse and publication – essential design capabilities

Common capability curation and interoperability

The Māori Data Futures 2018 report described an ideal Māori data future as Māori having strong data capability and partnerships for relevant skills and resources[90]. Availability and accessibility of data are key aspirations [Te Kāhui Raraunga (2021)] and curation serves as a mechanism to ensure data has context, is discoverable and used appropriately.

There are examples of existing work under way to curate data and help with interoperability such as the All-of-Government ontology[91] designed from a cultural perspective which requires Māori concepts and te reo Māori. Examples such as traditional knowledge labels provide potential starting points for weaving cultural perspectives that promote interoperability. Research has highlighted the balancing act between having fully customised fields providing rich local context and fully standardised fields that enable interoperability[92] [Montenegro (2019)].

The design gives effect to Te Tiriti as follows:

Preamble: As a treaty partner, the Crown can acknowledge that their relationship can be strengthened by working with Māori to support development of common capabilities, curation, and interoperability.

Article 1: Common capabilities will take into account cultural protocols such as Ngā Tikanga Paihere or Principles of Māori Data Sovereignty. The system will evolve organically to support interoperability and Māori will be involved in that decision making process. The design will create curation processes that support cultural protocols such as traditional knowledge labels.

Article 2: Māori data experts may want to offer opportunities for Māori collectives to upskill in the space of Māori data capability, curation, and interoperability so that they can use these skills to enhance self-determination.

Article 3: Equity is achieved through curating data to ensure that it is easily discoverable. Equity of opportunity is achieved through capability being built up over time by partnering with other participants who can share those skills.

Wairuatanga: Building up capability and involving rangatahi who are more familiar with data and technology can serve as a mechanism to help achieve Māori wellbeing.[93]

Common capability (infrastructure, ethics, and data literacy)

Drivers

Equity of participation is supported through leveraging the joint capability of partners. Māori collectives, and small-to-medium agencies do not have the capability or capacity to meet the increasing expectations in the integration, interoperability, and use of data.

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[90] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Maori_Data_Futures_Report-2018.pdf
[91] https://www.archives.govt.nz/about-us/publications/all-of-government-ontology-options-paper
[92] https://www.emerald.com/insight/content/doi/10.1108/JD-08-2018-0124/full/html
[93] https://www.sftichallenge.govt.nz/assets/Uploads/Download-PDFs/Maori_Data_Futures_Report-2018.pdf

Data users should benefit from the combined capability of federation participants. This should support equitable capability growth around data literacy, data use practices, analytics, and data and insight publishing.

These common capabilities could include shared infrastructure, code reviews, workflows, ethical and cultural protocols, training, or other types of analytic support. Common infrastructure must be supported by robust, collaborative, and distributed community support.

Capability – common capability (infrastructure, ethics, and data literacy)

The ability to generate capability uplift whilst achieving valuable outcomes through leveraging joint capability across infrastructure, ethics, and data literacy.

Shifts required: As part of building up capability within the system, shared data infrastructure, ethics and data literacy should be established to level the playing field amongst participants. Increasingly leverage diversity of partners across ethnicity, societal and cultural perspectives, providing the opportunity to increase the ability to successfully deliver ethically on agreed outcomes.

Candidate requirements: all of Appendix B – Candidate design capability requirements

Available support resources	Development needed
• Ngā Tikanga Paihere (GCDS)	• Ngā Tikanga Paihere extended to apply to more than research or analytical activities
• Data and Statistics Act 2022 (Stats NZ)	• N/A
• Algorithm Charter (GCDS)	• Responding to algorithm charter year 1 review[94] findings and considerations
• Privacy, Human Rights and Ethics (MSD)	• N/A
• Model development lifecycle (NC and MSD)	• N/A
• Privacy and risk (GCDO)	• N/A
• Privacy, security, and confidentiality (GCDS)	• Check alignment with Privacy and risk (GCDO)
• Public Records Act 2005 (DIA)	• N/A
• Identity Management (DIA)	• N/A
• Māori Data Sovereignty principles (TMR)	• N/A

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[94] https://www.data.govt.nz/assets/data-ethics/algorithm/Algorithm-Charter-Year-1-Review-FINAL.pdf

International support resources	Development needed
• FAIR principles (GOFAIR)	• N/A
• What Is FAIR? (video StatCan)	• N/A
• CARE principles (GIDA)	• N/A
• European Interoperability Framework (EIF)	• N/A
• First Nations Principles of OCAP (First Nations Information Governance Centre)	• N/A
• Data Literacy Training (StatCan)	• N/A

Curation

Drivers

Data and metadata curation (including cultural perspectives) removes barriers by creating context for the data which should enable faster access, less misunderstandings and better use of data. Curation of interoperability mechanisms and semantic data structures is a joint responsibility of all government data system participants. However, centralised functional data leadership, investment, prioritisation, and coordination will be required as these mechanisms and sematic structures will be reused across many federations.

Capability – curation

The ability to prepare, organise (structure, index, catalogue) and maintain data and data sets so access and use is improved for all data users and is responsive to the purpose of use.

Shifts required: Successful curation will see increasingly standardised metadata, coding, classification, concepts, and ontological structures to lower the barriers to reuse and interoperability across data from different domains and legacy datasets. Accountability for the curation of common data should sit with the custodians of common data who are also responsible for its management and use and could be undertaken in common data 'hubs'. There should be governance processes to assess opportunities to optimise the curation in upstream processes if viable and feasible to do so. Initially this may be a combination of manual and automated processes. However, this could evolve to be more automated supporting data processing pipelines. This would enable sustainable and streamlined processes from data source to output, which can be replicated across many federated data ecosystems.

Candidate requirements: all of Appendix B – Candidate design capability requirements

Available support resources	Development needed
• Integrated data service (Stats NZ)	• Investment required
• LINZ data service (LINZ)	• N/A

• [Data Dictionary](#) (GCDS)	• General review
• [What is a data custodian and what do they do](#) (GCDS)	• General review
• [What metadata should I include with my dataset](#) (GCDS)	• General review
• [Mandated Data Standards](#) (GCDS)	• N/A
• [ARIA](#) (GCDS)	• **Investment required** to support system access
• [Kōrero ārahi-guidance](#) (LINZ)	• N/A

International support resources	Development needed
• [Traditional Knowledge Labels](#) (Local Contexts)	• This and all are N/A
• [UK Government data quality framework](#)	
• [Conformant Dimensions of Data Quality](#)	
• [Statistics Canada Data Quality Assurance Framework](#)	
• Potential range of metadata fields at catalogue entry level for a dataset, for example: [https://guidance.data.gov.uk/publish_and_manage_data/harvest_or_add_data/harvest_data/#complete-the-description-field](#)	
• [UTF-8](#) for data and metadata encoding	
• [ISO 639 xxxx](#) for language encoding	
• Standardised and linked metadata - As part of the data versioned API standard (e.g. [OData](#))	
• Self-described - As part of the data encoding standard (e.g. [SDMX](#))	
• Loosely coupled as part of the data API high-level protocol (e.g., data and metadata content management resources could be separately managed and accessed. Note: Needs to be kept in sync by data providers) (e.g. [CKAN](#))	

- OGC (Open Geospatial Consortium) (references a range of geospatial data standards)

- Metadata schema capable of bridging domain standards (e.g. DDI-CDI)

- Provenance metadata standards, PROV-DM (W3C)

Interoperability

Drivers

Interoperability mechanisms will be required between data domains to support appropriate translation, interpretation, and reuse of multi-domain datasets. Some common standards may be adopted consistently across federations. However, this will take time and therefore interoperability mechanisms to translate and map between data standards will be required to support effective reuse of data in the short to medium timeframe.

Curation of interoperability mechanisms and semantic data structures is a joint responsibility of all government data system participants. However, centralised functional data leadership, investment, prioritisation, and coordination will be required as these mechanisms and sematic structures will be reused across many federations.

Capability – interoperability

The ability to have different (usually digital) systems and devices exchange data and process or use the exchanged data, regardless of its source.

Shifts required: The data system must support the integration and interoperability between domains and specific data catalogues and data dictionaries enabling domains and sectors to develop at their own pace. Interoperability mechanisms must support organic and evolving use of data, from range of sources and forms, without needing to wait for all data to 'conform' before being available to achieve the purpose, aspirations, and outcomes. Interoperability between data sets must be supported by standardised metadata, coding, classification, concepts, and ontological structures to lower the friction and burden of reusing data from different domains and legacy datasets

Candidate requirements: all of Appendix B – Candidate design capability requirements

Available support resources	Development needed
- Integrated data service (Stats NZ) - LINZ data service (LINZ) - Data Dictionary (GCDS) - What is a data custodian and what do they do (GCDS)	- Needs investment - N/A - General review - General review

• [What metadata should I include with my dataset](#) (GCDS)	• General review
• [Mandated Data Standards](#) (GCDS)	• N/A
• [ARIA](#) (GCDS)	• Investment required to support system access
• [Kōrero ārahi-guidance](#) (LINZ)	• N/A
• [Social sector data sharing Standard](#) (SWA)	• Social sector - No link to standard – this is just to a video

International support resources	Development needed
• [Traditional Knowledge Labels](#) (Local Contexts) • Potential range of metadata fields at catalogue entry level for a dataset, for example: [https://guidance.data.gov.uk/publish_and_manage_data/harvest_or_add_data/harvest_data/#complete-the-description-field](#) • [UTF-8](#) for data and metadata encoding • [ISO 639 xxxx](#) for language encoding • Standardised and linked metadata - As part of the data versioned API standard (e.g. [OData](#)) • Self-described - As part of the data encoding standard (e.g. [SDMX](#)) • Loosely coupled as part of the data API high-level protocol (e.g., data and metadata content management resources could be separately managed and accessed. Note: Needs to be kept in sync by data providers) (e.g. [CKAN](#)) • [OGC (Open Geospatial Consortium)](#) (references a range of geospatial data standards) • Metadata schema capable of bridging domain standards (e.g. [DDI-CDI](#)) • Provenance metadata standards, [PROV-DM](#) (W3C)	• This and all following are N/A

Design testing case studies

Case study 1 - Reviewing the proposed future/target state Government data system architecture/design with Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development in the context of homelessness data

Solving Aotearoa New Zealand's big societal challenges requires efficient data flows between people, organisations, sectors, and domains. Linking data across the boundaries of private industry, Government, non-government, communities and supporting granular populations of interest such as Māori and Pasifika are increasingly important capabilities required to understand and measure improved equitable outcomes in areas such as homelessness.

The need for more granular housing affordability and homelessness measurement is identified as one of the highest priority investment opportunities in the Data Investment Plan 2021[95].

Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development (HUD) is an intensive user of the data system in a broad context, including significant non-government and private/commercial data sources. Better use of data is needed to support decisions and actions and to enable improved communication on housing and homelessness.

HUD have noted some growth in the maturity of the broader data system to provide the data required, but maturity is not consistent across the housing market, people, and statistics. There is some work underway to improve overall supply of relevant data, increased sources of data and the timeliness of data.

Cross-agency efforts have strengthened some key enablers in the data system which demonstrate the value of making the best use of the data that is available. The focus of most of these enablers is to support improved reporting and communication of homelessness information. These include:

- The Government Housing Dashboard – a single place to track the progress of key parts of the Government's housing programme

- The 2018 estimate of Severe Housing Deprivation

- Rangahau – Wai 2750 research – preparation of research and data to support the Kaupapa Inquiry into Housing Policy and Services.

- Monitoring HUD's key organisational outcomes.

- Evaluation of initiatives or programmes.

Other key work underway includes:

- The Aotearoa Homelessness Action Plan Data and Evidence Initiative

- Developing MAIHI Ka Ora, Ka Mārama – Māori Housing Dashboard

- Developing affordability indicators

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[95] Data Investment Plan 2021 https://data.govt.nz/docs/data-investment-plan/. The 2022 plan update is not yet available, this reference will be updated – The priority need for this data has not changed – but will need to confirm.

To continue to strengthen the homelessness evidence base enabling more responsive policy development and service delivery access to a broader range of data is critical for HUD. Contracted providers, large and small, with diversity of capability, have the richest data. The ability to access data from multiple suppliers is critical to measure and track progress across the multi-faceted and complex social issue that is homelessness. Factors contributing to homelessness include the ability to access safe, healthy, affordable housing, and security of tenure. Factors contributing to reductions in homelessness are less well understood, but include housing location related to family, community, whānau and whakapapa.

HUD experience a number of data related issues and tensions related to the current Government data system and have highlighted areas where they would anticipate improvements enabling them, both in the specific context of homelessness and more broadly in their housing system lead role. Not all of these expectations fall into the remit of the design, for completeness they are definition of home and categorisation of need.

The issues and tensions related to the design are detailed below:

- **Access to data to support action and service delivery:** Currently it is very difficult to understand if homelessness is getting better or worse for some critical populations such as iwi. It is also difficult to validate that the correct resources are available in the correct locations and communities. There is not a lot of data about need, and even less about the journey to homelessness before assistance is received, this includes data on crowding between censuses, and unmet need including where people are turned away from housing options. HUD would like to have the data and evidence base needed to better develop causality and correlation models to support the improved design of, and investment in, solutions/actions/services based on "what works".

- **The right data sharing model and data infrastructure[96]:** To appropriately support community-based initiatives significant improvements are needed to put in place the right data sharing model(s)/partnerships and data infrastructure for providers, iwi, community organisations (such as churches, foodbanks, missions, Salvation Army, Women's Refuge etc.), researchers and the public. Enabling these organisations to partner in, and potentially lead, data collection and sharing is critical as these are often the sources of the richest data including lived experience of homelessness and understanding of people who are at risk of homelessness. The ability for data to be shared covers, the micro level (provider to provider or community organisation etc.) and at the macro level to HUD.
  Another key data sharing model is that between HUD, and other central agencies such as MSD (Ministry of Social Development), and local government. Increasingly actions and services are being developed and delivered at the local level, the relationships and data sharing between central and local government is limited. There are some examples where this is done well, however, the overall data infrastructure to support this needs to be improved for this to increase.
  HUD also, increasingly, have the need to have data sharing models with commercial/private organisations, including banks, property brokers, tenancy boards, rental agents (including

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[96] **data infrastructure** - The way in which data must be designed and managed to ensure it is fit-for-purpose and that the collection, storage, flow and use of data complies with relevant legislation, regulations, and governance. This includes data principles, practices, standards, and architecture patterns etc this is collectively referred to as the 'data infrastructure'

decline rates), Air BnB (housing stock impacts), the construction sector and trade me. Sharing models across government organisations for these commercial arrangements are also a factor

- **Privacy:** HUD data sourcing requirements do not require the need to identify individuals or members of households. Sharing identifiable data re homelessness is an extremely sensitive area, however, understanding of homelessness journeys etc. is needed for improved insights and service delivery.

- **Measuring outcomes:** Currently measures are typically related to spend and delivery of service, not outcomes. Measuring "what is working" is very difficult, funding decisions could be better targeted with a stronger evidence base.

- **The ability to link (bridge) the gap between individual centric and household data.** The journeys of individuals and households in and out of homelessness, are currently difficult to link using data. The data is often only available on an individual, e.g., primary tenant basis. In the longer term the ability to link across various sources of support would support HUD to monitor that no one "falls through the cracks" and support collaboration across service providers. Housing is often not the only support needed. Particularly in relation to understanding what has led the individual and/or the household to this point.

- **Data quality:** The quality, standardisation and granularity of homelessness data is extremely variable. Mandated standards are relatively new and currently only apply to central Government, however, very different capability and capacity exists across data provers and sources, and we need to be sensitive to these circumstances.

Key insights

Significant elements of the design approach were tested against the issues and tensions described by HUD.

This testing highlighted the overall approach of evolving towards federated data ecosystems would support the complexities of homelessness data and, in particular, support the place-based approach HUD are increasingly developing and supporting. HUD have significant strategic and collegial partnerships which could be leveraged to form data partnerships (federated data ecosystems) between central Government, local Government, iwi, community organisations and providers.

These data partnerships provide an opportunity to improve access to shared capability and capacity across the partnership and to bring in additional partners to enhance the functioning of the partnership(s).

The testing identified several improvements to areas of the design. The changes to the design and the reason for the change are outlined in the following section.

Actions taken in the design

The following outline the actions that have been taken based on the key insights from the HUD case study.

- A new capability focus area for brokering has been incorporated into the design. This is to support the move from multiple bilateral data sharing agreements to the federated data ecosystem design.

- A new capability focus area for the role of curation and intermediary partners undertaking activities such as collection, quality, coherence, and coding (including geospatial coding) to support improved use of data and enable opportunities for increased valuable reuse. This is to support the broader system management of the variations of data issues and to provide well curated data for reuse. (i.e., cannot fix old systems, cannot historically standardise data, variations of quality of collection, capability etc.). Including additional guidance to support documentation of data flows and the development of steady states (curated/processed data to a known level of quality).

- A new capability focus area for privacy preservation/enhancing techniques. This is to support the ability to use privacy preserving standards, tools and techniques enabling the sharing of this data in a way that preserves privacy.

- Highlight the significant importance of location/place-based data and system infrastructure. This would include, where practical, having location information attached to as much data as possible.

- Highlight the significant importance of investment for Māori, iwi and hapū data and data infrastructure. This is to support iwi requirements, including investment in iwi data and infrastructure that relate to rohe which are currently unable to be met through HUD regions or Territorial Authorities.

- Highlight the significant importance of enabling successful participation irrespective of capability and resources.

- Additional data catalogue guidance to include non-curated/processed data

- Questions from workshop 2, related to the viability of implementation and evolution, were captured for the ongoing development of the design (particularly action 9 below) and the associated frequently asked questions document.

The implementation and evolution options have been moved earlier in the design document to provide visibility of existing capability that could be leveraged to support evolution to the future state.

Case study 2 - Reviewing the proposed future/target state Government data system architecture/design with Te Rourou – Vodafone Aotearoa Foundation in the context of OHI Data Navigator

Te Rourou, Vodafone Aotearoa Foundation, works with communities to advocate for and support young people experiencing exclusion and disadvantage. As part of this kaupapa, Te Rourou developed the OHI Data Navigator (the Data Navigator), which brings together government administrative and survey data from the Integrated Data Infrastructure (IDI) to present a picture of the challenges faced by rangatahi in communities throughout Aotearoa.

This case study tests design elements regarding data publishing principles and behaviours, as well as governance and assurance.

The tensions and alignments of the Data Navigator with the Data System Design are detailed below:

Authority, partnerships and engagement

Kaitiaki and kaipupuri - In considering authority for the Data Navigator, Te Rourou asked themselves, "kei a wai te mana?" The answer to this was that rangatahi are at the heart of OHI, the data is collected from them, and their wellbeing is the purpose of the project.

In the context of data, kaitiaki are considered to be spiritual guardians with a tangible connection to the data. As such, rangatahi, along with their whānau, iwi and hāpori, are the kaitiaki of the data presented in the Data Navigator. To uphold kaitiakitanga, Te Rourou consider themselves to be in the position of kaipupuri. As the people who are working with the data, who have been intimately involved in the collection and analysis of the data, and who understand it in detail, they are responsible to kaitiaki.

To give effect to their role as kaipupuri, the Data Navigator team's role as kaipupuri entails:

Upfront and ongoing engagement with rangatahi to understand how they wish to see themselves in the data.

Broader engagement with whānau, iwi and hāpori to take account of the lived experiences of rangatahi, as well as those who are invested in their future, and to understand local contexts. The priorities and aspirations of communities are not always the same as nation-wide issues. In smaller communities, these conversations take on a more personal, rangatahi-centric tone.

Actively ensuring there is ongoing participation and representation of rangatahi in the project, including through partnership with communities

Common capability, governance, and data access

Experience of the IDI and Ngā Tikanga Paihere - By giving communities access to IDI data – often seen as inaccessible, and the domain of government and university researchers – democratisation of data is a key objective of the Data Navigator.

The Data Navigator is supported by user education, engagement with communities to encourage use and interpretation of the data and sharing of insights. Although these activities don't often accompany use of the IDI, they are seen by the Data Navigator team as critical to the safe use of IDI data, particularly at a time of increasingly negative public perceptions about the use of people's personal data, the IDI in an obvious example of this type of data use.

In 2017, when the IDI research project was established, Ngā Tikanga Paihere was not yet in place. The project team noted that, although the IDI project is refreshed annually, Stats NZ have not required the Data Navigator to demonstrate application of Ngā Tikanga Paihere.

Māori data sovereignty – Although there was no explicit requirement to apply Ngā Tikanga Paihere, Te Rourou recognised the value of such frameworks, and looked to principles of Māori Data Sovereignty[56] to guide safe use of data and a focus on the aspirations of rangatahi. This was particularly salient given the datapoints captured in the IDI are largely deficit-driven, and reflect a Pākehā, government focussed system. The Principles of Safe Use[97] developed by the OHI team guide the analytical work specific to this kaupapa and are made publicly available.

As an example of these principles in practice, manaakitanga is demonstrated by the Data Navigator team in the way that narratives accompany the data. Strength-based narratives can uphold and uplift the mana of the rangatahi represented in deficit-based data. Further, the Data Navigator endeavours to present a holistic picture of the events in a young person's life, rather than focusing on single indicators. While they cannot currently ensure all data stories produced by the Data Navigator users are strengths-based, the team leads by example by reporting their own insights and by educating users on how to understand the data, and how it can be interpreted, such as through user workshops. They also make the most of opportunities that arise from engagements and partnerships, facilitating rangatahi to drive their own data stories, or re-shaping existing deficit narratives to centre and protect rangatahi.

Te Rourou recognise that they face practical barriers to Māori data sovereignty as a non-Māori organisation. These include budget and practicality constraints to the onshore storing of data. They recognise that the barriers to Māori data sovereignty might first be addressed by Māori data governance.

Access and risk management – In gaining access to the Data Navigator, users must agree to a set of Terms and Conditions and to the Principles of Safe Use, and state their intentions for using the app. While few applications are rejected, any difficult decisions are considered by the established steering group for the Data Navigator. The spirit in which these decisions is made – for example, allowing access for commercial developers of similar data explorer products – reflects the genuine desire of Te Rourou to share and work collaboratively across sectors for the wellbeing of young people.

Because the Data Navigator aims to put data in the hands of communities that have not traditionally had access to such tools, data literacy and ensuring accessibility are key areas of focus. Te Rourou want to ensure users do not feel intimidated or overwhelmed by the tool. To promote accessibility, the Data Navigator provides outputs with plain language and graphs describing the data, which can easily be generated into an HTML (HyperText Markup Language) file. Access and interpretation are supported by passive and active sharing of insights at wānanga and user workshops and knowing that they can contact the Data Navigator team for support.

Data quality and metadata

Data should be useful, relevant, and timely - For the Data Navigator, data quality is tied to utility. For data to be useful to users, it must be relevant and timely. Relevance implies that the data should be a fair reflection of the lived experience of rangatahi and their communities. The more the voice of young people is reflected in the data, the more relevant, and therefore useful, it is. Te Kupenga and General Social Survey wellbeing data were identified examples of data that is relevant

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[97] https://www.datanavigator.nz/principles-of-safe-use-2/

to users. Administrative data that is filtered through government departments, such as courts, or care and protection data, while useful, is further removed from the experience of young people. To support data relevance, the Data Navigator seeks to validate these aspects with the user community on an ongoing basis, and make changes to the data collection, presentation, and interpretation.

The second aspect of utility for users is timeliness. While administrative data is collected and refreshed in the IDI relatively frequently, the same cannot be said for survey and census data. As a result, the data presented in the Data Navigator combines data that is less than 12 months old, with data from surveys that was collected over four years ago. This presents challenges of relevance and interpretation to the user, exacerbated the most relevant data being the least timely.

Retaining provenance of data - The extensive use of the IDI presents both benefits and challenges to data provenance for the Data Navigator.

To an extent, data sources and terms are well defined in IDI metadata and can therefore form the basis of the publicly available data dictionary. But because the Data Navigator presents a multi-year view of IDI data, it is sensitive to changes in the processes and tools that support the IDI. This year, substantial updates were made to the analytical definitions of administrative data, resulting in changes to the topline figures on exclusion and disadvantage.

Local context provides and illustrative example of provenance challenges. Te Rourou works closely with Murihiku communities, for whom South Invercargill is a relevant geographic area. However, available geographies, e.g., Statistical Area 2[98], mean there is no corresponding Statistical Area. Indeed, the names of many Statistical Area 2s are derived from street names, rather than suburbs, and as such do not resonate with locals. One example is "Crinan", an SA2 (Statistical Areas Level 2) in Invercargill that encompasses multiple suburbs and does not neatly fit within South Invercargill.

As required, the Data Navigator presents the appropriate Stats NZ IDI disclaimer text alongside the tool, as required for all applications of IDI analysis. However, while they can lead by example in direct engagements with users, there is little ability to control the ongoing use of the disclaimer, or other appropriate referencing or contextualisation of the data.

Key insights

- The term kaitiakitanga is often overused, or inappropriately applied. The concept of kaipupuri may be more appropriate

- Engaging with kaitiaki and forming partnerships are crucial elements of the role of kaipupuri

- When it comes to applying IDI processes in practice – such as Ngā Tikanga Paihere or the use of the IDI disclaimer text, many researchers will do this in good faith, in ways that are appropriate to the context and audience. However, there is little centralised oversight or support, creating a risk that these processes are not always followed.

- Māori Data Sovereignty provides a strong foundation for creating principles of safe use of data.

- Democratising data – for example by broadening access to IDI data – presents opportunities to the system, but also challenges of asymmetrical capability and capacity.

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[98] https://datafinder.stats.govt.nz/layer/104271-statistical-area-2-2020-generalised/

Actions taken in the design

- The data system design reflects that the kaitiaki of data are the people who are in the data.

- The data system design acknowledges that each federation participant is the kaipupuri or holders of the data regardless of who else accesses and uses the data – a role separate to the kaitiaki of the data.

- The data system design reflects that Ngā Tikanga Paihere principles are implemented across the government data system, even extending beyond research and analytical activities, which will support users to apply these tikanga consistently.

- The data system design emphasises that data needs to be relevant and timely to be useful to users.

- The data system design reflects that Māori data sovereignty is recognised and understood across the government data system. It also reflects that these principles will underpin stewardship and assurance data system processes to give effect to Te Tiriti and have a te ao Māori world view to create a system that works for Māori by design.

- The data system design reflects that federation partnerships will provide an opportunity to leverage the combined capability of partners. This supports equitable capability growth around data literacy, data use practices, analytics, and data and insight publishing.

Case study 3 - Reviewing the proposed future/target state Government data system architecture/design with Ngā Taonga in the context of their audiovisual archive data system

Ngā Taonga Sound & Vision is the audiovisual archive for Aotearoa New Zealand. Their data, or taonga, comes in the form of audio and video tapes, disks, film, and digital reproductions. In addition to the nearly 800,000 taonga they care for both physically and digitally, Ngā Taonga hold a vast range of metadata, including administrative, descriptive, and technical metadata.

Ngā Taonga, which is a charitable trust, partnered with The National Library and Archives New Zealand for a $40 million Government Budget 2020 investment in digital preservation of their collections, an indication of the scale of storage needed for data held by Ngā Taonga, and the complexities of continuing to store data in perpetuity.

The tensions and alignments of the Ngā Taonga data system with the Data System Design are detailed below:

Governance, assurance, and partnerships

Ngā Taonga has developed a Kaitiaki Relationship Framework, *Tiakina*,[99] which acknowledges Māori collectives as the kaitiaki of their own taonga works and mātauranga, while also acknowledging the legally recognised rights of copyright holders and owners. Ngā Taonga view their own role within this framework as kaipupuri (caretakers) of any material they hold. In practice, this means that they are responsible for preserving, valuing, respecting, and making taonga accessible, in accordance with te Tiriti o Waitangi principles.

Having a good relationship with the rights owners of data is crucial to the success of the Tiakina framework. For example, Ngā Taonga have a good relationship with TVNZ who are on-board with the kaitiaki philosophy. They see a greater improvement with facilitating access and clearances when they are built on good relationships. Further, Ngā Taonga may recognise multiple parties as kaitiaki of data. In the case that two kaitiaki offer different metadata descriptors, Ngā Taonga will allow both descriptions to co-exist.

Audiovisual archiving demands a relationship with communities of origin. As kaipupuri, it is not the place of Ngā Taonga to provide the contextualisation of material. For Māori communities this responsibility lies with kaitiaki. Many iwi have their own archivists, and Ngā Taonga have a long-term vision to have trusted iwi partners that can reach into their system and extract the data they need. While they are keen to provide this access, more education is still needed so that people know what can be shared and where, as clearance is still required from rights owners. In the long-term Ngā Taonga seek to have more of a community-focus with the collections rather than having it all in-house. They believe they need to work with their other partners such as DIA to have this outward looking approach of a common purpose, as they are too small to do it on their own.

Ngā Taonga have partnerships with DIA (National Library and Archives New Zealand) and the wider Galleries, Libraries, Archives and Museums (GLAM) sector, describing it as a "Cross-pollination of learning and experience." These partnerships are all about recognising shared opportunities for a common purpose, such as Budget bids or lending capacity, while each holding separate identities.

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https://www.ngataonga.org.nz/system/resources/W1siZiIsIjIwMjAvMDcvMDcvN2ZqdHIydmx1bl9LYWl0aWFraV9SZWxhdGlvbnNoaXBfRnJhbWV3b3JrX1Nob3J0X1ZlcnNpb25fRmluYWxfNl9KdWx5XzIwLnBkZiJdXQ/Kaitiaki_Relationship_Framework_Short_Version_Final_6_July_20.pdf?sha=48d1dd5c54192dad

As a charitable trust, rather than a crown institution, Ngā Taonga can bring a different perspective, and have more flexibility.

Utaina, the multi-year digital preservation project for at-risk magnetic media[100], is a priority project for Ngā Taonga in partnership with Archives NZ and the National Library, as "it's likely that [they] only have until about 2025 to digitally preserve over 400,000 items or they'll be lost to future generations of New Zealanders." With the need to digitise a vast amount of taonga at speed, Ngā Taonga sought the service of Belgian archiving specialist, Memnon to digitise the taonga. Additional to the digital data they already store, significant storage is required for the works arising from Utaina, and Ngā Taonga face the challenge of storing records in the cloud hosted off-shore as there is not presently an Aotearoa-based solution that can meet these needs.

Data access and reuse

Nga Tāonga piloted Traditional Knowledge (TK) labels with Whakatōhea, which successfully saw the iwi complete a review of their inventory and public sources, identify taonga, and apply TK labels to the material in a spreadsheet. This has worked in theory, however Ngā Taonga notes that even with the provided spreadsheet, they face a "last mile problem" as the current system is not able to integrate it. Ngā Taonga noted that functionality needs to be built from the get-go; developing TK labels is "just as much of a software development project as it is a theoretical approach."

While Mukurtu was noted as a good example of TK labels applied in a database, audiovisual material presents different challenges. Often relevant TK information is not identified until the material is preserved and accessed. This approach also places a burden on holders of TK, such as iwi, which is not often supported with adequate project management capacity.

In maintaining their collection, Ngā Taonga supports indigenous right of reply in various forms. For example, their take-down policy means their default position is to restrict access to items when issues have been raised, and not to restore access until these have been resolved through engagement with Māori collectives.

The operation of the take-down policy is illustrated in the digitisation of wild footage[101] from an unaired episode of the 1974 television series *Tangata Whenua*. This episode was originally removed from broadcast because whānau were not happy with how they were portrayed. When the material was identified for digitisation, Ngā Taonga sought out the relevant iwi to initiate a connection with the kaitiaki of the footage and start the process of repatriation. The original footage was returned to the iwi to decide how they would like to be portrayed, and, as a result, whānau have now given permission to digitise this and other restricted material so that they can shape the narrative of those too. In this way, the act of digitisation provides an opportunity to address metadata issues in the collection.

Ngā Taonga note that identifying something as mātauranga Māori does not necessarily mean it will be restricted, nor does it mean other taonga will be afforded any less protection. In many cases iwi, hapū and whānau are supportive of their material being publicly available; it is the acknowledging of their tīpuna in the data that is important, "Hononga ā-iwi, ā hapori, ā whānau."

Ngā Taonga work with their contacts to register material of interest to hāpori in a living document so that the hāpori can review descriptive metadata or restrict access. The parties then collaboratively to maintain this document. However, capacity is limited to support the increased

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[100] https://www.archives.govt.nz/about-us/our-work/utaina
[101] Material produced in the course of production.

preservation demand from Māori collectives as more contacts are initiated. It is hard to match taonga to kaitiaki at the granular level of item by item due to resource constraints; to "decolonise the database", Māori collectives need a deposit-line view of all the material that could be of interest to them, of which Ngā Taonga cannot currently provide.

Common capability and supporting equity of participation for Māori collectives

Ngā Taonga develops learning and capability-building opportunities with Māori collectives through a range of pathways. A successful initiative was recruiting three interns from Ngāti Porou, with one being placed with each of Ngā Taonga, Archives NZ, and the National Library, so that they could all work together and see related material of different formats. This deliberate heritage committee-driven process provided mokopuna with hands-on education and showed they can do the work.

Community preservation kits provide another example of community capability building. These involve going to communities such as marae, having conversations about the importance of preserving taonga, explaining what Ngā Taonga does, and supporting Māori collectives to preserve taonga themselves through the provision of mobile preservation kits.

Similarly, the process of repatriation, when requested or required, is not about surrendering material to iwi and removing it from Ngā Taonga. Rather, repatriation involves providing and maintaining access by partnering with collectives. Ka mate kāinga tahi, ka ora kāinga rua: it is better to have two houses – somewhere to back up their digitised taonga – and in many cases Māori collectives do not have the means to archive audiovisual material.

Principles and behaviour

Although in many ways Ngā Taonga are acting as a bicultural organisation, they recognise that the context of audiovisual archival remains euro centric. As such, Ngā Taonga are "doing their best to be strong allies," weaving te ao Māori into their organisation in a meaningful and sustainable way. This commitment to being kaupapa-centred is reflected their Constitution[102], and Mātauranga Māori Strategy. Good allyship is enforced at the leadership level to enable flow on behavioural shifts in the wider organisation. The governance board for Ngā Taonga, has a co-chair model, and Tumu Whakaere - Chief Executive Honiana Love is a wahine Māori. Ngā Taonga have supported the development of specialist mātauranga Māori positions across every area of the archive, rather than concentrating te ao Māori expertise in a single team. Ngā Taonga also provide te reo Māori courses, tikanga training, annual marae visits, and create inclusive environments so staff at all levels have the opportunity to engage, learn and understand.

Ngā Taonga are making this commitment in order to honour Te Tiriti o Waitangi and WAI 262 and encourage people to understand this is not to the detriment of taonga from other cultures: "If it's good for taonga Māori, it's good for taonga."

Key insights

- Repatriation, when requested or required, is not about surrendering material to iwi and removing it from Ngā Taonga

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[102]

https://www.ngataonga.org.nz/system/resources/W1siZiIsIjIwMTcvMDYvMjAvM3kwYnV5dGhwNV9Db25zdGl0dXRpb25fS2F1cGFwYV9OZ2FUYW9uZ2EucGRmIl1d/Constitution_Kaupapa_NgaTaonga.pdf?sha=4c95b3b96861c803

- Organisational principles and behaviour can support the weaving of te ao Māori in a meaningful and sustainable way

- Identifying something as mātauranga Māori does not necessarily mean it will be restricted, nor does it mean other taonga will be afforded any less protection: "if it's good for taonga Māori, it's good for taonga."

Actions taken in the design

- The data system design actively recognises the role and significance of Māori collective data and captures the significance of kaitiakitanga to the data system.

- As kaitiaki of their data, Māori collectives are empowered to provide the metadata context for their data.

- Investment in capability and capacity is required for TK labels to be effective in practice.

Glossary

The glossary is divided into two sections, the first is key terms utilised in this document, the second is Te reo Māori terms utilised in the Te Tiriti call outs and associated areas of the design document.

Key terms utilised in this document

collaborative - A collaborative piece of work is done by two or more people or groups working together. Collins dictionary[103]

common data - Examples of common data could include:

- characteristics such as ethnicity, gender or age, business industry type or regions

- polygons of interest such as deposit plans[104], building information management or areas of interest for Māori such as rohe areas

- relationships between data (including people and the land)

- identifiers that can be used to connect multiple datasets and

- back-office master data

data - Data can mean different things to different users. The Strategy uses the term consistent with the DAT Bill definition: Data is any information in a form capable of being communicated, analysed, or processed (whether by an individual or by computer or other automated means). Data is useful when it can be communicated easily and analysed to gain insights. Data's value stems from its use, re-use, and re-purposing, particularly in large volumes. Government has a vast amount of unused or unusable data, we have an opportunity to unlock its potential to realise its value. To properly realise this value, data must be accurate, reliable, and free from bias. It is also important to ensure the value from its use is applied and distributed fairly. The terms 'data' and 'information' are used interchangeably. Modified from https://ausdatastrategy.pmc.gov.au/sites/default/files/2021-12/australian-data-strategy.pdf

data brokering – Data brokering is the undertaking of data sourcing from multiple internal and external sources. This includes liaison with a wide range of data and business specialists, policy makers, researchers etc to locate potentially useful data to address specific agreed needs, including assessing fitness for purpose. Data brokering includes oversight of the reliability of ongoing supply and any limitations on its use. Statistics New Zealand

data curation - The ability to prepare, organise (structure, index, catalogue) and maintain data and data sets so access and use is improved for all data users and is responsive to the purpose of use. Statistics New Zealand

diverse - If a group or range of things is diverse, it is made up of a wide variety of things. Diverse people or things are very different from each other. Collins dictionary

data infrastructure - The way in which data must be designed and managed to ensure it is fit-for-purpose and that the collection, storage, flow, and use of data complies with relevant legislation,

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[103] https://www.collinsdictionary.com/dictionary/english/
[104] https://www.linz.govt.nz/products-services/land-records/types-land-records/cadastral-survey-plan

regulations, and governance. This includes data principles, practices, standards, and architecture patterns etc this is collectively referred to as the 'data infrastructure'. Statistics New Zealand

federated data ecosystem/federation - A federated data ecosystem (federation) is founded on relationship-based partnerships which allows data stewardship to remain with the original custodian. The partnerships are formed from a network of participants such as government agencies, communities, local government, organisations, businesses, non-government organisations, academia, and Māori collectives. The partners within the federation engage in data and capability sharing to contribute to pursuing common purpose and value. In this context, data and capability represent the federation resources for the success and equity of the federation. Statistics New Zealand

government data system - The government data system is the government-wide system of policies, practices, processes, and people that are involved in the collection, management, and use of government-held data. The breadth of the government data system covers several data domains in which the Government operates either directly or indirectly via non-government organisations and local government at regional levels. Additionally, it includes essential connected data flows between business, communities, Māori collectives, and the government data system. This breadth captures the actual and aspirational partnerships sought by government data system participants to improve outcomes for themselves and for all Aotearoa New Zealand. Statistics New Zealand

hub – The use of hub in this document is related to the 'most preferred' (or can be referred to as authoritative) source of data. The central or main part of something where there is most activity. Cambridge Dictionary

integrated data infrastructure/integrated data service/IDI: The Integrated Data Infrastructure (IDI) is a large research database. It holds de-identified microdata about people and households. The data is about life events, like education, income, benefits, migration, justice, and health. It comes from government agencies, Stats NZ surveys, and non-government organisations (NGOs). The data is linked together, or integrated, to form the IDI. Statistics New Zealand

Māori - Māori, indigenous New Zealander, indigenous person of Aotearoa/New Zealand - a new use of the word resulting from Pākehā contact in order to distinguish between people of Māori descent and the colonisers. Te aka Māori Dictionary (n.d.)[105]

Māori collectives – Māori collectives includes "Māori, whānau, marae/rūnanga, hapū, iwi and Māori organisations". Taiuru, K., Māori Data Sovereignty Compilation. (2022)

Māori data - "Māori Data is that which is collected from us, by us, with us, for us, or from our environment that we have connections to." The Māori Data Futures 2018

> In this context 'us' could refer to many kinship connections such as Māori, whānau, marae/rūnanga, hapū, iwi or Māori organisations.

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[105] For more information about the word Māori refer to Baker, S. J. (1945). Origins of the words Pakeha and Maori. *The Journal of the Polynesian Society*, 54(4), 223-231. https://www.jps.auckland.ac.nz/document//Volume_54_1945/Volume_54%2C_No._4/Origins_of_the_words_Pakeha_and_Maori%2C_by_Sidney_J._Baker%2C_p_223-231/p1 or Atkinson, A. S. (1892). What is a Tangata Maori?. *The Journal of the Polynesian Society*, 1(3), 133-136. https://www.jps.auckland.ac.nz/document//Volume_1_1892/Volume_1,_No._3,_1892/What_is_a_Tangata_Maori%3F_by_A._S._Atkinson,_p133-136/p1

Māori data governance – Māori data governance refers to the principles, structures, accountability mechanisms, legal instruments, and policies through which Māori exercise control over Māori data. Te Mana Raraunga

Māori data sovereignty - Māori Data Sovereignty refers to the inherent rights and interests Māori, whānau, marae/rūnanga, hapū, iwi and Māori organisations have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use, and control of data relating to Māori, whānau, marae/rūnanga, hapū, iwi and Māori organisations as guaranteed in Article II of Te Tiriti/Treaty of Waitangi. Taiuru, K., Māori Data Sovereignty Compilation. (2022)

Karaitiana Taiuru definitions relating to Māori data sovereignty

> **whānau Māori data sovereignty** refers to the inherent rights and interests Whānau Māori, whānau have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to whānau Māori as inherited by whakapapa with mana atua, mana tangata and as guaranteed in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Nations Declaration on the Rights of Indigenous Peoples.

> **hapū Māori data sovereignty** refers to the inherent rights and interests of hapū (individual or collectively) in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to hapū as inherited by whakapapa with mana atua, mana tangata and or reflected in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples.

> **marae/rūnanga data sovereignty** refers to the inherent rights and interests of Marae/Rūnanga (individual or collectively) in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to a Marae/Rūnanga as inherited by whakapapa with mana atua, mana tangata and or reflected in He Whakaputanga and or Te Tiriti and provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples.

> **rōpū Māori data sovereignty** refers to the inherent rights and interests of Māori organisations (commercial, not for profit, collectives, representatives, consortiums, religious, etc) have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to Māori organisations Māori Peoples as inherited by whakapapa with mana atua, mana tangata and or guaranteed to Māori Peoples members in He Whakaputanga, Te Tiriti and the provided recognition of rights with the United Nations Declaration on the Rights of Indigenous Peoples.

> **iwi Māori data sovereignty** refers to the inherent rights and interests that iwi have in relation to the creation, collection, access, analysis, interpretation, management, dissemination, re-use and control of data relating to a specific iwi as guaranteed in He Whakaputanga and or Te Tiriti and the provided recognition of rights with the United Deceleration of Rights of Indigenous Peoples.

Mauri – (noun) Life principle, life force, vital essence, special nature, a material symbol of a life principle, source of emotions - the essential quality and vitality of a being or entity. Also used for a physical object, individual, ecosystem or social group in which this essence is located. Te Aka Māori Dictionary.

Relationship based - influence that's founded on trust and shared goals rather than manipulation, coercion, or pressure. Matt Norman, Norman and Associates[106]

te ao Māori – A Māori world view is holistic and considers the hononga or connection between all things. This interconnectedness means data about the environment and resources are also considered Māori data. For the data system design this is reflected in the application of Māori values. It is important to note that this is 'a' rather than 'the' Māori world view because Māori are not a single homogenous group

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[106] https://www.mattnorman.com/the-psychology-of-relationship-based-influence/

Te reo Māori terms utilised in the Te Tiriti call outs and associated areas

Unless another reference is given, these definitions are based on those in Te Aka the online Māori dictionary[107], as this resource is widely accepted.

Te reo Māori	English meaning
Hapori	Section of a kinship group, family, society, community
Hapū	Kinship group, clan, tribe, subtribe. Hapū is a section of a large kinship group and the primary political unit in traditional Māori society. It consisted of a number of whānau sharing descent from a common ancestor. A number of related hapū usually shared adjacent territories forming a looser tribal federation (iwi)
Hui	Gathering, meeting
Iwi	Extended kinship group, tribe, nation, people, nationality, race. Iwi often refers to a large group of people descended from a common ancestor and associated with a distinct territory
Kaimahi	Worker, employee. Kaimahi Māori refers to a Māori worker or employee
Kaupapa	Topic, policy, matter for discussion, plan, subject
Kāwanatanga	Government, dominion, rule, authority, governorship
Mahi	Work, job, trade (work)
Marae	Courtyard - the open area in front of the wharenui, where formal greetings and discussions take place. Often also used to include the complex of buildings around the marae
Mana	Prestige, authority, control, power, influence, status, spiritual power, charisma. Mana is a supernatural force in a person, place or object
Mana motuhake	Separate identity, autonomy, self-government, self-determination, independence, sovereignty, authority. Mana through self-determination and control over one's own destiny

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[107] https://maoridictionary.co.nz/

Manaakitanga	Hospitality, kindness, generosity, support. The process of showing respect, generosity and care for others
Mātauranga Māori	Māori knowledge. The body of knowledge originating from Māori ancestors, including the Māori world view and perspectives, Māori creativity and cultural practices
Noa	To be free from the extensions of tapu, ordinary, unrestricted, void
Pono	Be true, valid, honest, genuine, sincere
Pou	Post, pillar
Rangatahi	Younger generation, youth
Rangatira	High ranking, chiefly, noble, esteemed
Raraunga	Data, database
Rohe	Boundary, district, region, territory, area, border (of land)
Rūnanga	Council, tribal council, assembly, board, boardroom, iwi authority - assemblies called to discuss issues of concern to iwi or the community
Tāngata whenua	Local people, hosts, indigenous people. People born of the whenua – the placenta – and of the land where the people's ancestors have lived and where their placenta are buried
Taonga	Treasure, anything prized – applied to anything considered to be of value including socially or culturally valuable objects, resources, phenomenon, ideas and techniques
Tapu	Restriction, prohibition - a supernatural condition. A person, place or thing is dedicated to an atua and is thus removed from the sphere of the profane and put into the sphere of the sacred. It is untouchable, no longer to be put to common use. The violation of tapu would result in retribution, sometimes including the death of the violator and others involved directly or indirectly. Appropriate karakia and ceremonies could mitigate these effects. Tapu was used as a way to control how people behaved towards each other and the environment, placing restrictions upon society to ensure that society flourished. Making an object tapu was achieved through rangatira or tohunga acting as channels for the atua in applying the tapu. Members of a community would not violate the tapu for fear of sickness or

	catastrophe as a result of the anger of the atua. Intrinsic, or primary, tapu are those things which are tapu in themselves. The extensions of tapu are the restrictions resulting from contact with something that is intrinsically tapu. This can be removed with water, or food and karakia. A person is imbued with mana and tapu by reason of his or her birth. High-ranking families whose genealogy could be traced through the senior line from the atua were thought to be under their special care. It was a priority for those of ariki descent to maintain mana and tapu and to keep the strength of the mana and tapu associated with the atua as pure as possible. People are tapu and it is each person's responsibility to preserve their own tapu and respect the tapu of others and of places. Under certain situations people become more tapu, including women giving birth, warriors travelling to battle, men carving (and their materials) and people when they die. Because resources from the environment originate from one of the atua, they need to be appeased with karakia before and after harvesting. When tapu is removed, things become noa, the process being called whakanoa. Interestingly, tapu can be used as a noun or verb and as a noun is sometimes used in the plural. Noa, on the other hand, can not be used as a noun. (Te Kōhure Textbook (Ed. 2): 237-240; Te Kōhure Video Tapes (Ed. 1): 6;)
Te reo Māori	Māori language
Tika	Truth, correctness, directness, justice, fairness, righteousness, right.
Tīpuna	Ancestors, grandparents - plural form of tipuna and the eastern dialect variation of tūpuna.
Tino rangatiratanga	Self-determination, sovereignty, autonomy, self-government, domination, rule, control, power. Tino rangatiratanga needs to be understood/defined, from a Crown perspective, in terms of the Treaty of Waitangi/Te Tiriti o Waitangi, and the differences between the Māori and English texts. This concept relates to hapū and iwi who were co-signatories of the Treaty with the Crown. This is a reasonable definition of tino rangatiratanga: "the unfettered chiefly powers [tino rangatiratanga] of the rangatira, the tribes and all the people of New Zealand over their lands, their dwelling-places and all of their valuables [taonga]." In contrast, the English version only guarantees Māori possession over their lands and estates. (See Distinguished Professor Dame Anne Salmond's Brief of Evidence for the Waitangi Tribunal (Wai 1040, 17 April 2010) at 11 where she translates Article 2 of the Treaty.) Rangatiratanga can be understood at individual and whānau levels as the ability to exercise one's decision-making capacity in day-to-day

	activities (for example, in cultural, economic, environmental and social spheres), which can nevertheless overlap with collective activities of hapū and iwi
Tūrangawaewae	Domicile, standing, place where one has the right to stand - place where one has rights of residence and belonging through kinship and whakapapa
Wairua	Spirit, soul. Spirit of a person that exists beyond death. It is the non-physical spirit, distinct from the body and the mauri. To some, the wairua resides in the heart or mind of someone, while others believe it is part of the whole person and is not located at any particular part of the body
Wairuatanga	Spirituality
Wānanga	To meet and discuss, deliberate, consider.
Whakaaro	Thought, opinion, understanding, idea
Whakapapa	Genealogy, genealogical table, lineage, descent
Whakawhanaungatanga	Process of establishing relationships, relating well to others
Whānau	Extended family, family group; familiar term of address to a number of people; the primary economic unit of traditional Māori society. In the modern context, the term is sometimes used to include friends who may not have any kinship ties to other members
Whanaunga	Relative, relation, kin, blood relation
Whanaungatanga	Relationship, kinship, sense of family connection
Whenua	Land

References

Came, H., O'Sullivan, D., & McCreanor, T. (2020). Introducing critical Tiriti policy analysis through a retrospective review of the New Zealand Primary Health Care Strategy. Ethnicities, 20(3), 434–456. https://doi.org/10.1177/1468796819896466. Retrieved from https://doi.org/

Cormack, D., Kukutai, T., & Cormack, C. (2020). Not one byte more: Data colonialism to data sovereignty. In A. Chen (Ed.), *Shouting zeroes and ones digital technology, ethics and policy in New Zealand*.

Courts of New Zealand (2021). TE POU MATAKANA LIMITED v ATTORNEY-GENERAL [2021] NZHC 2942 [1 November 2021]. https://www.courtsofnz.govt.nz/assets/Uploads/2021-NZHC-2942.pdf. Retrieved from https://www.courtsofnz.govt.nz/

Cumyn, A, Barton, A, Dault, R, Cloutier, A-M, Jalbert, R, Ethier, J-F. Informed consent within a learning health system: A scoping review. Learn Health Sys. 2020; 4:e10206. Retrieved from https://doi.org/

Department of Internal Affairs Te Tari Taiwhenua (2022). API guidelines. Retrieved from https://www.digital.govt.nz/

Department of Internal Affairs Te Tari Taiwhenua (n.d.). Data Protection and Use Policy (DPUP) Principles. Retrieved from https://www.digital.govt.nz/

Department of Internal Affairs (n.d.). Common Process Model. Retrieved from https://www.digital.govt.nz/

Department of Internal Affairs (n.d.). Identification Management Standards. Retrieved from https://www.digital.govt.nz/

Digital Pasifik (2022). Our review process. Retrieved from https://digitalpasifik.org/

First Nations Information Governance Centre (2020). A First Nations Data Governance Strategy https://fnigc.ca/wp-content/uploads/2020/09/FNIGC_FNDGS_report_EN_FINAL.pdf. Retrieved from https://fnigc.ca/

Government Communications Security Bureau (n.d.). New Zealand Information Security Manual. Retrieved from https://www.nzism.gcsb.govt.nz/

Initiative for Indigenous Futures (IFF) (2021). Keoni Mahelona and Peter-Lucas Jones on Indigenous Data Sovereignty. Retrieved from https://www.youtube.com/

Inland Revenue (2021). Statement of Intent 2021 to 2025. Retrieved from https://www.ird.govt.nz/

Iwi Chairs Forum Pou Tikanga, Human Rights Commission and Te Puni Kōkiri (2022), Key themes from Māori targeted engagement on a plan to implement the United Nationals Declaration on the Rights of Indigenous Peoples. Retrieved from https://www.tpk.govt.nz/

Land Information New Zealand (2019). Strategic intentions He takunetanga rautaki 2019–2023. https://www.linz.govt.nz/about-us/publications/strategic-intentions-he-takunetanga-rautaki. Retrieved from https://www.linz.govt.nz/

Local Contexts (n.d.). TK Labels. Retrieved from https://localcontexts.org/

Manaaki Whenua Land Care Research (2022). Systematics Collections Data - CHR 365035 – Abutilon darwinii Hook.f. Retrieved from https://scd.landcareresearch.co.nz/

Ministry of Business Innovation & Employment (2021). Strategic Intentions 2021-2025. https://www.mbie.govt.nz/assets/strategic-intentions-2021-2025.pdf. Retrieved from https://www.mbie.govt.nz/

Ministry of Education (2021). Statement of Intent 2021-26. https://assets.education.govt.nz/public/Documents/Ministry/Publications/Statements-of-intent/SPG-0775-Statement-of-Intent-2021-2026_AW-Web-1.pdf. Retrieved from https://www.edu.govt.nz/

Ministry of Health (2021). Data and Information Strategy for Health and Disability: Roadmap 2021–2024 - Stronger evidence, better decisions, improved health, and wellbeing. Wellington: Ministry of Health. https://www.health.govt.nz/system/files/documents/publications/13308_data_strategy_roadmap.pdf. Retrieved from https://www.health.govt.nz/

Ministry of Social Development – Te Manatū Whakahiato Ora (n.d.). Using personal information responsibly - The Privacy, Human Rights and Ethics Framework. Retrieved from https://www.msd.govt.nz/

Ministry of Social Development. (n.d.). Te Hiku Social Development and Wellbeing Accord. Retrieved from https://www.msd.govt.nz/

Montenegro, M. (2019), "Subverting the universality of metadata standards: The TK labels as a tool to promote Indigenous data sovereignty", Journal of Documentation, Vol. 75 No. 4, pp. 731-749. https://doi.org/10.1108/JD-08-2018-0124. Retrieved from https://www.emerald.com

National Library (2022). Ngā Upoko Tukutuku. Retrieved from https://natlib.govt.nz/

New Zealand Government (2022). Data and Statistics Act 2022. Retrieved from https://www.legislation.govt.nz/

New Zealand Government (2022). Public Service Act 2020. Retrieved from https://www.legislation.govt.nz/

New Zealand Government (2022). Privacy Act 2020. Retrieved from https://www.legislation.govt.nz/

New Zealand Government (2022). Treaty of Waitangi Act 1975. Retrieved from https://www.legislation.govt.nz/

New Zealand History (n.d.). He Whakaputanga - Declaration of Independence, 1835. Retrieved from https://nzhistory.govt.nz/

Nicholson Consulting and the Ministry of Social Development Model Development Lifecycle (2021). Data Science Guide for Operations Model Development Lifecycle. Retrieved from https://www.msd.govt.nz/

Ngāi Tahu (n.d.). Ngāi Tahu - Kā Huru Manu – Chapter 3 Cultural Mapping Project Begins. Retrieved from https://www.kahurumanu.co.nz/

Ngā Taonga (2022). Tiakina - Kaitiaki Relationship Framework. Retrieved from https://www.ngataonga.org.nz/

Ngāi Te Rangi (2020). Ngāi Te Rangi Iwi AGM - 18 Kohitātea 2020. Retrieved from
https://www.ngaiterangi.com/

Ngāi Tūhoe (2012). Ngāi Tūhoe Service Management Plan. Retrieved from htps://issuu.com

Ngāti Porou (2020). Te Runanganui o Ngati Porou – Ripoata a tau – 2020. Retrieved from
https://ngatiporou.com/

Ngāti Porou (2015). Ngati Porou Case Study Research Reports For Te Mata Ira Report: Informing
Cultural Guidelines for Bio-banking and Genomic Research. Retrieved from https://uploads-
ssl.webflow.com/

Ngā Taonga Sound & Vision (n.d.). Tiakina – Kaitiaki Relationship Framework. Retrieved from
https://www.ngataonga.org.nz/

Office of the Auditor General (2018). Sharing Data. Retrieved from https://oag.parliament.nz

Office of the Auditor General - Haemata Limited (2022). Māori Perspectives on Public Accountability.
Retrieved from https://oag.parliament.nz

Office of the Privacy Commissioner (2020). Health Information Privacy Code 2020.
https://www.privacy.org.nz/assets/New-order/Privacy-Act-2020/Codes-of-practice/Health-
information-privacy-code-2020/Health-Information-Privacy-Code-2020-website-version.pdf.
Retrieved from https://www.privacy.org.nz/

Office of the Privacy Commissioner (2022). Analysis: High Court 2021 review of Ministry decisions
about Māori vaccination data. Retrieved from https://www.privacy.org.nz/

Port Nicholson Block Settlement Trust (2011). Taranaki Whānui ki Te Upoko o Te Ika and The
Soveriegn in right of New Zealand - Whole of Government Accord. Retrieved from
https://www.govt.nz/

Potter, H., & Rauika Māngai. (2022). A WAI 262 BEST PRACTICE GUIDE FOR SCIENCE PARTNERSHIPS
WITH KAITIAKI FOR RESEARCH INVOLVING TAONGA: Lessons from Māori voices in the New Zealand
Science Sector. Dunedin, NZ: Rauika Māngai. Retrieved from https://irp.cdn-website.com/

Productivity Commission (2021). A fair chance for all: Where should we focus? Your feedback.
Retrieved from https://www.productivity.govt.nz/

Protective Security (n.d.). Mandatory requirements. Retrieved from
https://protectivesecurity.govt.nz/

Public Service Commission (n.d.). Kaiārahi rāngai System Leads. Retrieved from
https://www.publicservice.govt.nz/

Ram Mohan Rao, P., Murali Krishna, S. & Siva Kumar (2018), A.P. Privacy preservation techniques in
big data analytics: a survey. J Big Data 5, 33 (2018). Retrieved from https://www.doi.org/

Ruapehu Whānau Transformation (2020). Ruapehu Whānau Transformation Plan - Transformation
Plan 2020. Retrieved from https://www.ruapehuwhanautransformation.com

Ruapehu Whānau Transformation (2020). Ruapehu Whānau Transformation Plan - The Solutions.
Retrieved from https://www.ruapehuwhanautransformation.comSocial Wellbeing Agency (2022).
Data Protection & Use Policy (DPUP). Retrieved from https://www.digital.govt.nz/

San Diego Community Information Exchange (2021). Leveraging Community Information Exchanges (CIEs) for Equitable and Inclusive Data: A Vision for the Future. Retrieved from https://ciesandiego.org/data-equity/

San Diego Community Information Exchange (2021). Leveraging Community Information Exchanges® for Equitable and Inclusive Data: The CIE® Data Equity Framework. Retrieved from https://ciesandiego.org/data-equity/

Science for Technological Innovation NSC, Data ILG, and Te Hiku Media. (2019). Māori Data Futures – Intellectual Property, Te Aurere, Kaitaia, 20-21 March 2019. Wellington, NZ: Science for Technological Innovation NSC. Retrieved from https://www.sftichallenge.govt.nz/

Science for Technological Innovation NSC, Data ILG, and Victoria University of Wellington. (2018). Māori Data Futures – Hui Report, 9 May 2018. https://www.sftichallenge.govt.nz/

Social Wellbeing Agency (2018). What you told us. Retrieved from https://swa.govt.nz/

Statistics New Zealand (2018). Towards new data and statistics legislation: Public discussion document. Retrieved from https://www.stats.govt.nz/

Statistics New Zealand (2019). Te Hiku Iwi- Crown Taumata Rangatira Hui, August 2019. Retrieved from https://statsnz.contentdm.oclc.org/

Statistics New Zealand (2020). COVID-19 Lessons Learnt: Recommendations for improving the resilience of New Zealand's government data system. Retrieved from https://www.data.govt.nz/

Statistics New Zealand (2020). Ngā Tikanga Paihere: a framework guiding ethical and culturally appropriate data use. Retrieved from https://data.govt.nz/

Statistics New Zealand (2020). Algorithm charter for Aotearoa New Zealand. Retrieved from https://data.govt.nz/

Statistics New Zealand (2021). Stats NZ's statement of strategic intentions 2021–2025. https://www.stats.govt.nz/assets/Uploads/Corporate/Stats-NZ-strategic-intentions/Stats-NZs-statement-of-strategic-intentions-2021-2025-web.pdf. Retrieved from https://www.stats.govt.nz/

Statistics New Zealand (2021). The Government Data Strategy and Roadmap. https://www.data.govt.nz/leadership/strategy-and-roadmap/. Retrieved from https://www.data.govt.nz/

Statistics New Zealand (n.d.). Data toolkit. Retrieved from https://www.data.govt.nz/

Taiuru, Dr Karaitiana PhD, JP (2020). Māori Data Sovereignty and Digital Colonisation (2020). Māori Data Sovereignty and Digital Colonisation. Retrieved from https://www.taiuru.maori.nz/

Taiuru, Dr Karaitiana PhD, JP (2022). Compendium of Māori Data Sovereignty (2022). Compendium of Māori Data Sovereignty. Retrieved from https://www.taiuru.maori.nz/

Taiuru, Dr Karaitiana PhD, JP (2022). Data set of Traditional Marae names to enable Marae Data Sovereignty. Retrieved from https://github.com/ktaiuru/

Taiuru, Dr Karaitiana PhD, JP (2022). Non Traditional Marae Data Sovereignty Dataset v 0.1. Retrieved from https://github.com/ktaiuru/

Taiuru, Dr Karaitiana PhD, JP (2022). Data set of Urban Marae names to enable Marae Data Sovereignty. Retrieved from https://github.com/ktaiuru/

Taiuru, Dr Karaitiana PhD, JP (2022). Data set of Hapū names to enable Hapū Data Sovereignty. Retrieved from https://github.com/ktaiuru/

Taiuru, Dr Karaitiana PhD, JP (2022). Tikanga Tawhito: Tikanga Hou Kaitiaki Guidelines for DNA Research, Storage and Seed Banks with Taonga Materials. Retrieved from https://www.taiuru.maori.nz/

Taylor Fry Pty Ltd (2021). Algorithm Charter for Aotearoa New Zealand Year 1 Review. Retrieved from https://data.govt.nz/

Te Arawhiti (2018). Guidelines for engagement with Māori. Retrieved from https://tearawhiti.govt.nz/

Te Arawhiti (n.d.). Māori Crown Relations Capability Framework for the Public Service. https://www.tearawhiti.govt.nz/assets/Tools-and-Resources/Maori-Crown-Relations-Capability-Framework-Guide-Bibliography.pdf. Retrieved from https://www.tearawhiti.govt.nz/

Te Hiku Iwi Development Trust (2015). Iwi led success by connecting with d Government data. Retrieved from https://www.treasury.govt.nz/

Te Kāhui Rauranga (2020). Iwi Data Needs https://www.kahuiraraunga.io/iwidataneeds. Retrieved from https://www.kahuiraraunga.io/

Te Kāhui Raraunga Charitable Trust (n.d.). Iwi Data & Iwi Information Managers. Retrieved from https://tewhata.io/

Te Kotahi Research Institute, The University of Waikato - Kiri West, Daniel Wilson, Ari Thompson, Maui Hudson (2020). Report for the Digital Council. Māori Perspectives on Trust and Automated Decision-Making - Report for the Digital Council. Retrieved from https://digitalcouncil.govt.nz/

Te Mana Rauranga (2018). Principles of Māori Data Sovereignty. Retrieved from https://www.temanararaunga.maori.nz/

Te Mana Raraunga – Māori Data Sovereignty Network (2016). Māori Data Audit Tool. Retrieved from https://static1.squarespace.com/

Te Pōkapū, on behalf of Te Mana Raraunga (Māori Data Sovereignty Network) (2020). Submission on the Review of the Draft Algorithm Charter. Retrieved from https://static1.squarespace.com/

Te Puni Kōkiri Ministry for Māori Development (2022). United Nations Declaration on the Rights of Indigenous Peoples - Update on the development of the Declaration Plan. Retrieved from https://www.tpk.govt.nz/

Te Rourou Vodafone Aotearoa Foundation (n.d.). OHI Data Navigator Access & Data Use. Retrieved from https://www.datanavigator.nz/

Te Rourou – Vodafone Aotearoa Foundation (n.d.). OHI Data Navigator Principles of Safe Use. Retrieved from https://www.datanavigator.nz/

Te Rua Mahara o te Kawanatanga Archives New Zealand (2021). All-of-government ontology options paper. Retrieved from https://www.archives.govt.nz/

Te Rua Mahara o te Kawanatanga Archives New Zealand (2022). Taonga Tuku Iho. Retrieved from https://www.archives.govt.nz/

Te Whiu, Whina (2021). Data & Hapu Sovereignty - Hapu data collection through Covid. Retrieved from https://www.linkedin.com/

Thabrew H, Aljawahiri N, Kumar H, et al. 'As Long as It's Used for Beneficial Things': An Investigation of non-Māori, Māori and Young People's Perceptions Regarding the Research use of the Aotearoa New Zealand Integrated Data Infrastructure (IDI). Journal of Empirical Research on Human Research Ethics. 2022;17(4):471-482. doi:10.1177/15562646221111294. Retrieved from https://journals.sagepub.com/

The Open Group (2022). TOGAF® Series Guide Business Capabilities, Version 2. Retrieved from https://pubs.opengroup.org/

Toitū Te Whenua Land Information New Zealand (n.d.). Cadastral survey plan. Retrieved from https://www.linz.govt.nz/

Toitū Te Whenua Land Information New Zealand (n.d.). Property Data Management Framework. Retrieved from https://www.linz.govt.nz/

United Nations (n.d.). United Nations Declaration on the Rights of Indigenous Peoples. Retrieved from https://www.un.org/

United Nations Economic Commission for Europe – High Level Group for the Modernisation of Official Statistics (2019). Common Statistical Data Architecture (CSDA) project CSDA Guidelines. Retrieved from https://statswiki.unece.org/

Wai 262 (n.d.). Ka Mua - WAI 262. Retrieved from https://www.wai262.nz/

Waitangi Tribunal (2021). The Report on the Comprehensive and Progressive Agreement for Trans-Pacific Partnership – Pre publication version. Retrieved from https://forms.justice.govt.nz/

Waitangi Tribunal (n.d.). A GUIDE TO THE PRINCIPLES OF THE TREATY OF WAITANGI AS EXPRESSED BY THE COURTS & THE WAITANGI TRIBUNAL. https://waitangitribunal.govt.nz/assets/Documents/Publications/WT-Principles-of-the-Treaty-of-Waitangi-as-expressed-by-the-Courts-and-the-Waitangi-Tribunal.pdf. Retrieved from https://www.waitangitribunal.govt.nz/

Appendix A – Background and ideation carried out

During 2021 a group of data practitioners from a range of government organisations shared their experience and challenges from working in the current governance data system. Working groups explored new potential data system design patterns including inherent benefits and constrains (as seen in Figure 12).

Decentralised			Centralised
Bilateral Sharing Unmanaged	**Decentralised Collaborative**	**Federated Managed**	**Centralised Managed**
• Sharing agreements enable customised regular and adhoc sharing of data. • Receiving agencies required to translate data for their operational usage. • Same data provided to many agencies in varied forms.	• Data shared via agreed APIs conforming to standard protocols, metadata and data content. • Standards agreed via cross-agency data and digital governance processes. • Each agency responsible to implementing its API and agreeing with current and potential user agencies.	• 'Common' data is shared via a one or more centralised managed data federations. The scope of common data can grow over time • Agencies connect to the federation to access common data for operational and analytical purposes supported by security and privacy rules and settings • Federation include community, cultural and business data and capability	• Data is stored and accessed via a central facility • Data model harmonised across all data producers and consumers • Very little data sits within an agency • Significant adoption of shared software managing processes that contain common data (e.g. CRM)
Pros • Simple for an agency if you don't need a lot of data from across the system • Relatively quick and easy to setup sharing agreements when data is required	• Significant agency autonomy and control over data ownership and access • Agencies can expose their data gradually as API and data standards are defined to improve data access and the experiences of using government services • Data discovery and catalogues machine readable	• Broad system data available and described in an interoperable manner for operational purposes supporting citizen outcomes in one place. • Reduce data wrangling processes across agencies • Increased ability to develop 'federated' processes • Flexibility to share what makes sense	• All government data in one place enabling faster and easier access • Could support 'de-duplication' efforts across agencies
Cons • Duplication across agencies processing the same data • Time to access and link a broad range of data to meet new system challenges (e.g. Covid-19, biosecurity) • Citizen outcomes remain as per the current state with the citizen being the integration point	• Insight from linked data across the system needs to done locally • Takes time for enough data to become available in a standardised manner • Agencies need to manage impact of change to many consuming agencies	• Security and access controls required to ensure appropriate data usage aligned to legislation • Requires agencies to describe their shared data in an interoperable manner	• Significant security design • Time to agree data models between agencies • Challenging non-functionals to support critical agency operations • Support / migration of legacy software

Harder to get buy-in

Increasing legislation impact and social license required

Enables Te Ao Māori

Figure 10 - Decentralised to centralised data sharing patterns

Additionally, a range of data sharing patterns in use internationally (e.g., Forrester) were explored that could potentially implemented in Aotearoa New Zealand. Wider socialisation resulted in tentative support for moving intentionally to a federated model but noted that a degree of agility and political support would be required includes understanding the implications of a more centralised government data system.

Incorporation of a Te Ao Māori worldview and the support needed for small agencies to benefit equally from the broader Government data system were seen as good tests of the potential of a more federated data system.

However, it was acknowledged that the design of the data system will need to allow the agility to support a range of patterns rather than trying to change everything at once. Additionally, the agility and flexibility to share what makes sense needed to be designed into the future state from the outset.

Appendix B – Candidate design capability requirements

A significant range of aspirational requirements have been collated in the process of forming the content for this first iteration of the future state design for the government data system. Many of these aspirations have been incorporated in the main body of the design. However, some aspirational requirements related to more detailed aspects of the design and should be considered in future iterations when solution and implementation detail are considered.

The following sections describe the candidate requirements for each design feature.

Data and metadata quality

11010	Expectations of data quality 'fit-for-purpose' take place early during Relationship Management and Data Discovery to ensure the federation can support organisation data needs.	
11015	Having the discussion at the start during the relationship management ensure that federation members co-decide data quality elements rather than be consulted about something that has already been decided. In addition, a better understanding of the quality of the data and plans to ensure data is fit for purpose helps strengthen trust	
11020	A Data Quality framework with dimensions of data quality supports consistent language and meaning when talking about data quality aligned to fit-for-purpose data requirements	
11025	Agreeing an appropriate path in adoption of data quality dimension standards and mechanisms must be a key part of Relationship Management	
11027	Data Quality is described in a manner easily understood by all data users and range of data related capabilities	
11030	There is sufficient data that is fit-for-purpose supporting equitable participation and outcomes as a prerequisite to being a part of one or more federated ecosystems.	
11300	Data quality also applies to metadata including how elements of mana, value, lens, and intent come from the provenance and cultural protocols. For example, a lack of completeness or up to date data can impact on these dimensions	
11310	The additional dimensions of mana value lens and intent will help ensure more equitable outcomes by thinking clearly about who data belongs to, the reasons for use and viewing the purpose from a more holistic lens	

11900	Data Quality mechanisms can be organically improved based on the collective capability and resources of those who supply and/or use the data for a purpose.	
11950	Fit-for-purpose could vary significantly from the data origination processes from the custodial supply organisation	
12000	Feedback mechanisms exist to appropriately enhance Data Quality to improve fit-for-purpose from a data users' perspective	
12010	Governance and Assurance Facilitates Flow of Data Quality Transparency and Feedback addressing Value, Risks and Constraints to collective benefit	
12020	Feedback from observation and reuse of data drives Data Quality improvement processes centred within Relationship Management and supported by connected governance and assurance processes	
12030	Value of improving Data Quality is described in a qualitative and/or quantitative manner but aligned to one or more purpose and/or strategic intentions for a user perspective and described using consistent data quality language.	
12040	There are processes for connecting Data Quality Governance and Assurance mechanisms at organisation (e.g., agency) and federation levels (e.g., ecosystem of multiple organisations)	
12110	Data collected by Māori can be subject to their own data quality frameworks	
12120	Feedback with Māori as Te Tiriti partner; it is essential that Māori co-design data quality frameworks for data that is relevant to their aspirations	
12540	Data Quality mechanisms are implemented in a way that can be organically improved based on the collective capability and resources of those who supply and/or use the data for a range of purpose across the data system	
12720	Where there is common usage of the same dataset between data federations, specific mechanisms and processes will ensure data quality feedback appropriately transparent and understood by all current and potential common dataset users.	
12740	There will be capability brokering and support to ensure data quality feedback is made available to and gathered from data system participants with a range of data literacy and capability	

14010	Support a progressive path of standards adoption and sophistication that allows for organic adoption and gradual capability growth as opportunity and funding allows.	
14020	Minimises analytical effort and better enabling data users to deterministically link data from different sources must be supported by understanding the degree to which data conforms to a data standard (domain or cross domain)	
15010	Accountabilities for processes connected to data quality must be clearly stated early in the lifetime of a data federation	
16210	Discoverable, linked metadata (e.g., as part of a data catalogue) is used to provide transparency on data quality prior to its access and use including data provenance, constraints and standards alignment as described by standard dimensions of data quality measurement	
16500	Metadata linking 'purpose' and 'fit-for-purpose' standard quality measures allow data users to choose data that best aligns with their purpose and aspirations	
17000	Feedback from Data brokers regards the time spent on understanding and evaluating data quality is used to optimise data quality metadata to avoiding cost in future data quality evaluations	

Data discovery/data catalogue

21010	Data available to the federation should be listed and described in a data catalogue in a manner that enables searchability by federation members.	
21020	Data listed in a data catalogue is described using standardised, linked metadata [see FAIR principles]	
21120	Data Catalogue structure will conform to common standards	
22010	Multiple data catalogues are supported across multiple domain specific data	
23010	Data is described using metadata in an interoperable manner between different domain specific data catalogues	
23110	Data catalogues support bilingual data and searchability	

23120	The data system will support searchability across multiple data catalogues	
23210	Support the ability to see a unified view of catalogued data across the data without impacting domain catalogue evolution	
24010	The Data system supports and range of catalogues for open and closed data, domain specific catalogues and federation specific catalogues	
24110	Any federation data ecosystem participant can create data catalogue entries for data they own or are custodians for that data	
24210	Data catalogue entry management is carried can leverage the capability of a trusted partner participant (e.g., another agency or service delivery agent)	
24310	Data previously catalogued within an organisation, domain or more broadly in the data system can be made available to the federation if it is aligned to the federations value proposition and purpose subject to agreements and access controls	
24320	Responsible parties for catalogue entries listen to feedback by those using the catalogue for data discovery, data reuse evaluation and governance assurance processes and be prepared to act on feedback where it will materially improve the effectiveness of data access and reuse	
24410	Data catalogue supports indicators of data access reliability to provide consistent expectations of supply into the data curation process supporting insight analysis to operational and/or research processes	
24420	Provides contact information regards data and metadata questions (e.g., understanding fit for purpose)	
24510	The government data system will provide reusable elements to support data discovery in a consistent and sustainable manner across many federated data ecosystems including: Reference catalogue infrastructure and metadata storage Potential for a complete end to end reference implementation that could provide base capability and equity for emergent collaborations that could evolve into more formal data federations if there is sufficient realised value and delivered real-world outcomes	

Common data and common capability

31010	Participants, facilitated by lead organisation(s), can discuss their common data, analytics, and data access points early in the federation's lifecycle and continuously as part of ongoing relationship management processes.	
31020	Centralised data brokering capability provides common data and analytics consistency and transparency across many federated ecosystems	
31025	Data kaitiaki will be appointed to care for the data and ensure that culturally appropriate practices are followed	
31030	Kaitiaki and protocols of common data to be established	
31030	Common data may be classified tapu or noa and this will determine where an appropriate storage location for common data or whether additional governance is required	
31037	Roles will be created to allow the kaitiaki and other roles appropriate access to the data and applications	
31037	Analytics capabilities such as reviews will take into account cultural protocols	
31040	Kaitiaki to review and grant consent as needed to access and use common data	
31050	Change management process will Kaitiaki of data to work through the process of adding, removing, or modifying data transparently and in partnership with users of their data	
31060	MOUs (Memorandum of Understanding) or a legal mechanism will allow access to the data by other parties in addition to kaitiaki approval. Both the legal basis and kaitiaki basis will have to agree to permit access	
31060	Common data will follow an agreed set of standards to make it easier to work as a federation	
32010	Common data will have appropriate and consistent metadata including cultural protocols to ensure appropriate use and technical metadata low friction data usage	
32020	Well managed and supported technical interfaces will provide access to common data regardless of its location	

32030	SLAs will apply to the common data and infrastructure elements that meet the purpose and needs of the federation
32035	KPIs (key performance indicators) created to ensure that the federation continues to track towards its aspirations*. *This is for the federation to choose but could include things such as how frequently data is updated, percentage of key datapoints that are accessible, MPS (Māori promoter score)
33010	Common data can be kept in its original location or pushed to a central data store depending on usage needs and protocols
33015	Each organisation in the federation can choose where to store their raw copy of the data. If the data is to go into a central hub, then the federation must agree on the location of the central data store and may use concepts such as tapu and noa, cost assessments, meeting NFRs (Non Functional Requirements) and other factors to make such a decision
34010	Data can be processed by the organisation that holds it or in a central hub. If a hub exists it will be co-governed by Māori and Tangata Tiriti to ensure appropriate data access and use.
34020	Where possible, infrastructure as a Code will be used to make it easier to stand-up and reuse common components across federations
35010	Māori collectives' data capability will be built up over time with the support of federation partnership organisations
35020	Existing common infrastructure can be leveraged to publish content to such as Te Whata or other secure portal subject to agreement by existing data and infrastructure stewards
37010	Lineage will be preserved at the dataset level identifying which data sources have contributed to published data and insights. For example, using "steady-states" documentation.
38010	Data will be presented in a strength-based manner that acknowledges systemic barriers and not problems with individuals
38020	Analytical results are shared by the community participants in the federation to the wider community to support increased transparency on how common data and capability is used

39010	Common data is stored in a manner that meets Māori data sovereignty and technical protocols.	
39020	Federations are able to involve Māori collectives' co-governance of common data	

Metadata management

41010	Metadata is capable of describing different forms of data, including tabular, structured, non-structured text, binary and streaming variants of these types	
41050	Metadata that includes data type, structure, licence, access method and provenance will enable transparency of data in use and data available but not used by the federation	
41060	Cultural and technical protocols [embedded in and enabled by metadata] are established to support appropriate supply, access, and reuse of data consistent with the purpose and value proposition of the data and analytics federation	
41060	Catalogue metadata provides information on data collection and decisions made about the data	
41070	Metadata enrichment and inclusion of Māori metadata	
41190	Metadata structure and content meets FAIR principles	
41290	Metadata supports data discovery and usage aligned to CARE principles. Specifically, Data for governance, Governance of data, for minimizing harm and maximizing benefit. Ethical data are data that do not stigmatize or portray Indigenous Peoples, cultures, or knowledges in terms of deficit.	
41295	Metadata and Data governance should take into account the potential future use and future harm based on ethical frameworks grounded in the values and principles of the relevant Indigenous community. For example, metadata should acknowledge the provenance and purpose and any limitations or obligations in secondary use inclusive of issues of consent	
41300	Provenance metadata will be referenced to provide sufficient understanding of the data origination context to determine fit-for-purpose	

	and appropriate reuse of data for any analytical or operational value proposition
42010	Metadata will outlive the data to which it relates preserving the historical record of federation data usage
42010	Metadata can reference content standards (e.g., codes and classifications) applicable to all data domains and data contexts (including links to cultural and ethical protocol metadata standards)
42015	Codes and classifications include those already mandated, and wider standards and classifications used across government held in Aria
42020	Provides a historical record of data availability, form, and custodial accountability
42020	Metadata aligns to industry content and encoding standards such as UTF-8 for data and metadata encoding and ISO 639 xxxx for language encoding. Catalogue metadata conforms to a widely used industry standard. For example, DCAT with extensions for a NZ context see more detail here and usage guidance here . Also relevant are standards such as ISO 11179 and DDI-3/4 will also be used for metadata encoding.
42030	Supports provenance metadata standards such as PROV-DM (W3C)
42040	Metadata supporting data of interest to Māori. Examples include a person of Māori descent or affiliation, spatial area within Iwi and/or Hapū confines, a Māori business. See more in the Common Data section of the design
42050	Ensure all data and metadata is encoded in UTF-8 to support multi-lingual character sets and language
42110	All metadata is versioned and ideally bitemporal, applying to all metadata management within Catalogue and Content Structural Metadata. For example, will enable transparency of what data was available at any point in time and what it contained and will remain as an archive after data is no longer accessible (e.g., potentially useful to government enquiries such as Commitment 11)

44010	Key common data domain relationships can be specified in metadata including but not limited to: spatial scope, whakapapa, business type, activity or wellbeing or environmental measurement etc	
45010	SLA (Service Level Agreement) monitoring based on dataset metadata. Need to allow same dataset different SLA via different catalogue entries to support different access mechanisms and licence modes (e.g., pay for better SLA)	
45020	Catalogue metadata should be capable of enabling validation proactively for data access and use assurance to lowers burden on users current and future and ideally, machine readable and testable to a SLA. Ie does not wait for failure during usage before raising with data suppliers.	
45030	Catalogue metadata links to access channel and endpoint along with licence, SLA, environment, and authorisation metadata required to access the data	
46010	Metadata related to the Public Records Act 2005 will be referenced including; responsible party, security classification, disposal metadata	
46010	Mandatory metadata fields identified and why (i.e., metadata master data management)	
49010	Encode metadata and data with no loss of fidelity from its published or released form	
49200	Consistent metadata implementation within and across data federations whilst also enabling equity of participation in use of metadata by a range of data capabilities	

Data access

| 51010 | Data access may be localised within a federation data ecosystem and or remotely accessible within a source organisation depending on the specific needs of ecosystem analytics (i.e., some data may need to be collocated with the analytical processes) | |

51110	Data access interfaces will conform to an industry standard and be usable by a wide range of data processing and analytical tools in use by current data system users. See NZ government API guidelines from GCDO108	
51120	Data interfaces will support authenticated and authorised access where appropriate	
51210	Data access interfaces will support access to a wide range of data forms and their metadata.	
52010	Data accessed will protect the privacy and confidentiality of Parties listed or represented in the data (e.g., privacy preserving techniques and confidentiality methodology)	
52030	Authority by which data access is granted is an integrated part of the data access interface (e.g., MOU, licence, legislation)	

Authority (to access and use data)

61010	Data kaitiaki and data suppliers will provide consent for data to be used for specific purposes	
61020	Kaitiaki could provide the authority to use data	
61030	Data Kaitiaki are determined during the discovery and relationship management phase	
61040	Kaitiaki will consider factors such as the purpose of using the data, the value gained and alignment with a holistic worldview lens	
61210	Data users are able what authority has been provided regards appropriate use of the data listed in a data catalogue	
63010	Consenting processes will seek to inform people what their data is being used for without being too burdensome. For example, Meta-consent109 is one option that seeks to balance these tensions	

63020	Consent process is transparent and accessible. For example, discoverable via a portal or other open access mechanisms	
63110	Data lineage will be maintained throughout the value chain in a form which enables appropriate verification of authority to access and reuse data for a purpose	
64010	Cultural protocols will also be used to ensure that authority to access and use data is an integrated feature of data discovery, access, and usage	

Interoperability

71010	Data usage interoperability mechanisms allow data aligning to many standards to be consistently understood and reused	
71020	Data system allows interoperability between different levels and versions of standards including organisation, domain, and system wide standards	
71030	Interoperability mechanisms enable data from legacy systems and collections to be readily reused against other, more standards compliant, datasets. For example, allowing immediate use vs waiting for data to be standardised	
72010	Interoperability support processes enable relationships and networks including data brokers to broker transparency in data and metadata multi-domain alignment	
72020	Support organisation interoperability through alignment of supply and reuse purpose, including 'fit-for-purpose' in metadata.	
73010	Data system support technical interoperability through standardised metadata describing data format usable by existing analytical tool sets	
73010	Metadata supports legal interoperability through standardised licence and authority to use data including cultural appropriateness, legislative enablement, MOU (Memorandum of Understanding) and 'metaconsent'	
74010	Mechanisms and processes support semantic interoperability through metadata linked to dictionaries, standards and ontological structures bridging domains and language specific representations	

| 75010 | Governance and assurance mechanisms to maintain and improve interoperability based on feedback from data system participants (i.e., data users) especially, those who broker, curate, process, and reuse data. | |

Governance and assurance

81010	A data federation will govern and assure data quality in relation to data reuse purposes (within and across federation ecosystems)	
81020	A data federation will govern and assure federation outcomes and dependency management (data, capability, processes, technology, people, relationships, engagement)	
81030	A data federation will govern and assure data curation and interoperability	
82010	A data federation will govern and assure privacy and security certification and accreditation	
82020	A data federation will govern and assure risk and opportunities management including assessment, trade-off and monitoring including business innovation, research, and future design improvements	
82030	A data federation will govern and assure ethical and cultural protocol implementation and adherence	
83010	A data federation will govern and assure data discovery mechanisms and standards	
83020	A data federation will govern and data access and authorisation including initial data acquisition and ongoing audit and access for a purpose assurance monitoring	
84010	A data federation will govern and assure operational sustainability including fiscal and functional to ensure federation can continue to deliver valuable outcomes within several operating constraints	
85010	A data federation will govern and assure stakeholder engagement (e.g., data supply, usage, or beneficiary of value of usage) within and outside the data federation	

85020	A data federation will govern and assure engagement and transparency of data usage and beneficial outcomes / value delivered including Māori Crown engagement and community engagement	
85030	A data federation will govern and assure participant equity and capability support	
86010	A data federation will govern and assure federation ecosystem lifecycle including initiation, start-up, operation and future tear-down.	

Appendix C – Insight from perspectives outside of government

Māori Data futures 2018 mahi

Opportunity to draw upon [Māori Data futures 2018 mahi](#). Note this is from 2018 so there will already be some steps taken so this section will need to be updated to reflect that.

The following is an extract from the Māori Data Futures 2018 report:

HOW DO WE MOVE TOWARDS THIS FUTURE?

- COMPLETE THE FOUNDATIONAL WORK OF DEFINING MĀORI DATA AND ITS VALUE WITHIN A MĀORI FRAMEWORK

A great deal of work has already been carried out here, so the current task may be to refine and disseminate.

- ESTABLISH A SET OF PROTOCOLS THAT APPROPRIATELY LINK DATA AND MĀTAURANGA MĀORI
  An important discussion that many are interested in is whether Māori (as a collective) want to try to have the government acknowledge that we own our data, OR do we simply not trust them in this space and try instead to restrict their access?
  Developing a set of national protocols will require us to put in place tikanga (rules and protocols) that are appropriate at both national and regional levels.
  Encryption is a complex issue that is directly relevant to Māori Data Sovereignty. Advances here will be important if we choose to store our data on others' infrastructure. Sophisticated encryption will also enable Māori to create layered data stories where different people have access to different levels of depth.

- ESTABLISH PHYSICAL INFRASTRUCTURE THAT IS GOVERNED BY MĀORI (INCLUDING THROUGH PARTNERSHIPS)
  work to do around determining what needs to be created afresh, and what can be used that already exists; decisions must always return to the need to create positive outcomes for Māori

- BUILD CAPABILITY

Create a set of basic tech terminologies/ kupu and other resources to be widely disseminated.

There is much to be learned from two-way sharing as rangatahi share their technology knowledge and older generations share their cultural knowledge.

Important to remember this is not simply a tech challenge – this concerns everybody, so it needs collaboration across disciplines. For example, law and policy makers need to factor Māori Data Sovereignty into their work.

A general shift from talking about data sovereignty towards enacting practical governance in collection, ownership, and the tech itself.

'Mentoring pipelines' are useful – how do we better connect those with skills/capacity in the tech field to those who want to learn?

Appendix D – Detailed example user journeys

Actor	Tertiary Education Researcher	Communities (individuals and whānau)	Māori collectives	Government organisation
Scenario + Expectations	Undertaking research in Stats NZ IDI[110]	Wanting to access data about themselves	Wanting to access data about their iwi, hapū, whānau or by other identification	Collect data about individuals through administrative interactions, surveys, the Census
Journey Phases	Apply to access IDI, including using Ngā Tikanga Paihere

Research undertaken involving coding, output checking and publishing insights | Data is collected about individuals through interactions with government agencies

Must ask government agencies specifically for their data

Can see themselves in a broader sense when data insights are published nation-wide, may know that their data is being used to inform policies | Geographical administrative data are not collected by rohe areas

Data are not collected to capture marae, waka, tupuna level. Would have to access individual data

Published insights are often at the Māori or iwi level and not at the hapū level or further

Presented insights often view Māori | Data are collected using Western methodologies and positioning. MDS[111] is not considered

Data is hosted across agencies or in the IDI, and is used to inform policies and/or fed into algorithms

The same data is given separately to many agencies by those using public services

Results are reported publicly |

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110 IDI – Integrated Data Infrastructure
111 MDS – Māori Data Sovereignty

			communities from a deficit lens	through webpages, dashboards
Actions, Mindsets and Emotions	Not all tertiary institutions place an emphasis on proper consultation with relevant communities or how to work safely with Māori data. Researchers may resort to tick-box exercises without proper understanding Researchers may feel overwhelmed as to how to use the copious amounts of datasets, especially if they have little coding experience	Communities are not aware of who has access to their data, nor who can use their data, which can lead to fear or mistrust Communities are arguably not giving informed consent for all their data to be held in such a way Individuals can only request access for their own data from government agencies. But cannot see data about their whānau Data requested from government agencies is not integrated. Individuals would have to request data from multiple agencies	Risk of data about communities being misused or presented to suit a certain narrative. Māori are more wary of data misuse than other demographic groups specifically with health data Māori collectives are not aware of who has access to their data, nor who can use their data, which can lead to fear or mistrust Māori collectives are arguably not giving informed consent for all their data to be held in such a way Māori collectives are at risk of misinformation	The government does not make clear what happens with people's data after its original collection purpose Public services could be more joined up leveraging the data already provided by those who interact with services across many agencies Hard for agencies to get access to data outside their accountability to support analysis of policy effectiveness Dashboards are often aggregated at such a high level that the information is not as useful as it could be for communities

				Kaitiaki of data are unclear
				Māori are not represented at all levels of the data workforce
				Legal obligations make the system rigid and oppose change inhibiting whakaaro Māori
Opportunities	Researchers are supported to understand culturally appropriate ways of working with data and to understand MDS principles

IDI has pre-built modules for accessing specific datasets with fully explained documentation | Meta-consent supports data collection about communities

There is increased awareness about the integration of their data that exists in the IDI and about who can use it

Individuals and whānau can access their own data through appropriate federation partnerships | Kaitiaki of data are established from collection to use

Māori collectives are provided data that is timely, accessible, available to use, and is relevant to their aspirations

Capability is built within Māori collectives to have tino rangatiratanga over which of their data is collected and can be collected by them

Māori collective-specific | There is proper Māori data governance

Government and kaitiaki can be co-governors of data within federations

Government leverages the data already supplied to create more joined up public services and better outcomes for communities.

Government ensures that metadata supports all data sources |

			aspirations and ways of thought can supplement research if/when their data is being used	Government actively partners with communities to alleviate distrust
			Data collected by government has been suitably disaggregated (capturing information on marae, waka, tupuna, rohe)	MDS and Ngā Tikanga Paihere are given life across the data system
			TK (Traditional Knowledge) labels are in place for what data can be used and how, deciding which data are tapu and noa	Māori data workforce are strong in government across all levels
			Data about Māori collectives are presented in a strengths-based manner that acknowledges systemic barriers and not problems with individuals	Government increases capability to work with data in culturally appropriate ways (including consultation, co-design, and collaboration) – Te Arawhiti

Appendix E – Potential federated data system evolutions

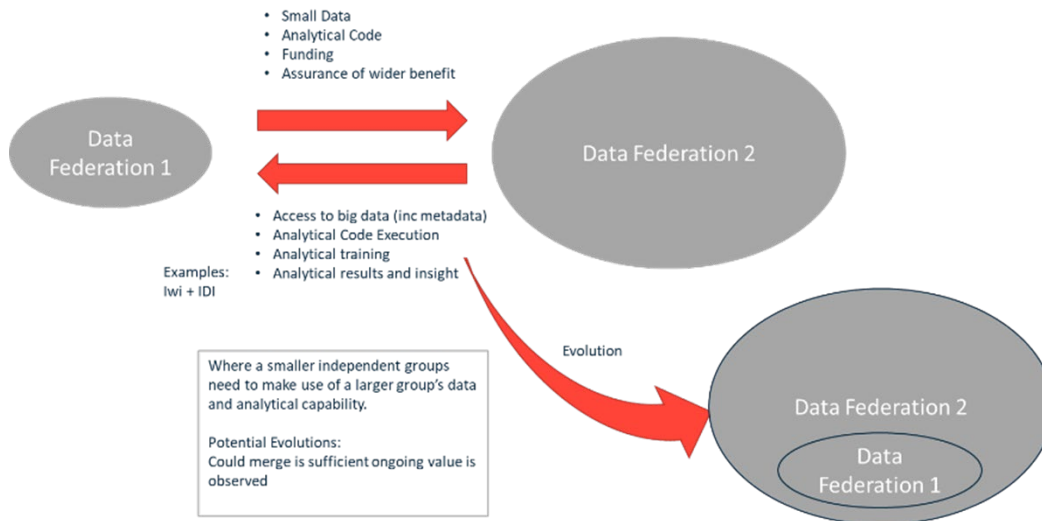## Merge to form a larger, single federation data ecosystem

Figure 11 - Merging of federated data ecosystems

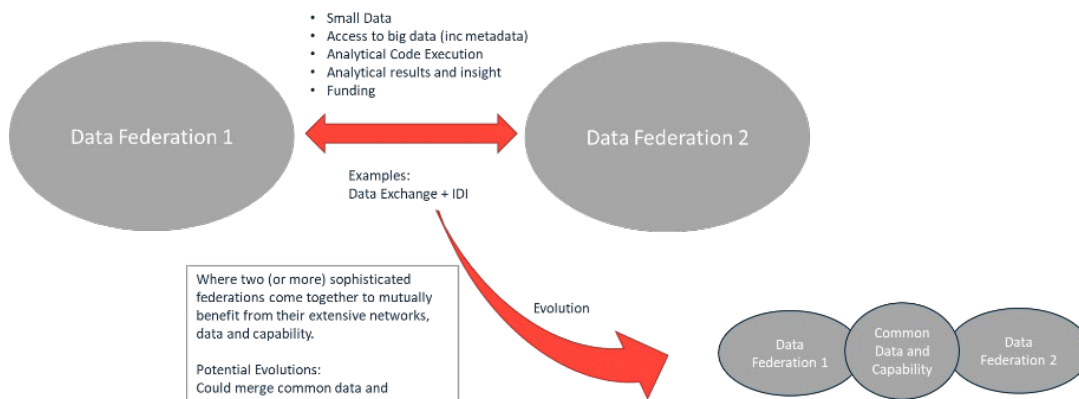## Split out common data and capability to be shared between federated ecosystems

Figure 12 - Splitting of a federated data ecosystem

Appendix F – Process for choosing case studies

One of the key requirements of the data system design is testing against the real world. Case studies are one way this can be achieved, by understanding how existing data systems are tangibly implementing the foundational elements that are included in the Government future state data system design. These observations are used to see how the design aligns with systems that have successfully (or unsuccessfully) implemented these elements. Three case studies have been selected to test a range of design components.

Te Tūāpapa Kura Kāinga – Ministry of Housing and Urban Development (Homelessness data) – This case study was undertaken by Stats NZ who asked if any agencies were working in a complex cross-domain data area and would be prepared to help test the design. Te Tūāpapa Kura Kāinga agreed.

Te Rourou – Vodafone Aotearoa Foundation (OHI Data Navigator) and Ngā Taonga (Audiovisual archive data system) - The team at Nicholson Consulting conducted interviews with the remaining two case studies. They first created a shortlist of potential case studies providing detail about how each data system gives effect to Te Tiriti o Waitangi, a key element to the operating model of the data system design. The shortlisted data systems were scored on how well they incorporated the following elements, prioritised in order of necessity to the design:

- Foundational elements of the data system

- Māori data sovereignty principles

- Uaratanga from Māori data governance mahi

Te Rourou and Ngā Taonga scored the highest and were finalised as case studies.

Case study questions for the organisations were designed based on the elements and principles that were deemed as implemented in these data systems.

In line with the kaupapa of the data system design, and with Statistics NZ's koha policy, koha was organised for each of the organisations to recognise their expertise and time that they have generously given.