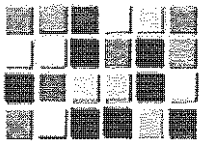
Government of British Columbia
Ministry of Labour, Citizens' Services and Open Government



Concept of Operations

V1.0
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1. Background & Strategic Context

Direction to Government from the Premier and Executive Council:

Our government is changing the style and approach of governing to provide citizens with opportunities to influence and improve policies that impact them and their quality of life.

Opening up government data and information are key foundations to enabling engagement with citizens by using new technologies to connect the public to government and to one another. Making government data and information available online invites individuals and organizations to transform data and information into tools and applications that help individuals, institutions and communities; and to promote partnerships with government to create innovative solutions to the opportunities and challenges faced by British Columbians.

The following specific actions will ensure our government continues to build on the open data and open information tools launched today.

Open Data

1. Ministries must take steps to expand public access to government data by making it available online unless restricted by law, contract or policy;
2. Ministries must re-prioritize and expand data collection efforts towards those that enable citizens and sectors to create value from government data;
3. Ministries must adopt BC's open license for data and ensure data accessibility through DataBC in accordance with BC's Open Data Policy, which includes the requirement that data be published in an open machine-readable format;
4. DataBC must ensure that citizens can give feedback on, and assessment of, the quality of published information and provide input to which data should be prioritized for publication.

Open Information

1. To the extent practicable and subject to the *Freedom of Information and Protection of Privacy Act* and other valid restrictions, ministries should use modern technology to disseminate useful information in a routine way rather than waiting for specific requests under the FOIPPA Act.

Ministers will be expected to provide quarterly reports to Cabinet on their progress in meeting these open government objectives.

Honourable Christy Clark
Premier of British Columbia

Over the past 5 years governments and leading institutions have been awakened to the power of sharing data. Local governments in cities such as Washington DC, Vancouver, London, San Francisco, Ottawa and Edmonton have launched open data portals to both share more information with citizens, encourage private sector and non-government actors to develop applications and services and promote coordination and innovation across government silos.

National governments have also embraced the power of sharing data internally, and externally. The British Government has launched data.gov.uk where, for example, it now shares actual spending data, down to the 500 pound level, for many ministries. The United States government has been almost equally aggressive, sharing thousands of data sets via data.gov.

Key Messages:

- Managing data is not a new area for the Government of BC. Capabilities have already been developed, particularly through the Natural Resources Sector, that can be extended to improve other parts of Government
- Leading Governments around the world have done similar thinking about sharing their data and we can learn from them as we deliver DataBC
- Removing barriers to data sharing will be critical to our success!

Today Australia, New Zealand, France and even Canada have launched data catalogues of their own.

The goal around sharing data is simple. Governments hope to:

1. Encourage public dialogue and participation by giving citizens better access to data about their communities and the operations of their government;

2. Rethink the role of government as a provider of a platform for sharing information that can be leveraged by public servants, non-profits, businesses and citizens to find efficiencies, enhance services or research evidence-based policies; and,

3. Strengthen the economy by promoting a data-based economy that enables local companies to find efficiencies, create new services and spur innovation.

Forward looking jurisdictions are looking to leverage data to achieve these goals because a confluence of circumstances indicates that governments will need to become more effective while consuming far fewer resources. This lesson was at the heart of the Government of BC's Technology and Transformation Strategy: Citizens @ the Centre which noted:

> *"Demographic shifts mean a smaller public service will be called upon to deliver more services to a larger number of citizens. With increased demand on health services, it is likely that there will be fewer resources in other areas. The public service must pursue smarter solutions that allow more efficient access to the services that citizens, communities and businesses rely on."*

We face a perfect storm that will require every government to rethink how it works. Part of the solution will revolve around leveraging the assets we already have, and data, after our social capital, may be the most powerful asset we possess.

These are lessons the BC Government has already learned. In the Natural Resource Sector the BC government has been a leader in creating and sharing data, both internally across government and externally with industry, non-profits and citizens. This sharing has not only improved policies and land management practices, but it has increased debate and democratic participation as well.

The goal of DataBC is thus not to engage in a new practice. It is to bring to the enterprise something that some sectors and ministries have already been doing with enormous success for over a decade: treating data as an asset and finding the best way to share it with the widest possible appropriate audience. In the ideal case, this audience will include all British Columbian citizens (as with "open data"), or shared broadly across the Government of British Columbia where restrictions for sharing externally apply (as with "enterprise data"). Achieving this goal will also require finding ways to reduce barriers to data sharing.

2. Why Data Matters

2.1. Data Makes the Difference

Two years ago, during a TED talk in Southern California, Tim Berners-Lee, the inventor of the World Wide Web, stood up and asked everyone – governments especially – to share their data. What Tim Berners-Lee recognized, and what the Government of British Columbia is seeking to enhance with the DataBC program, is the idea that government data is a public asset whose value is realized when shared – both internally to promote better efficiencies and insight, and externally to promote development of new businesses and improved citizen engagement.

Key Messages:

- Data is a public asset that provides value both within Government and outside Government
- The value of data results from its wide adoption and use – the wider the use the greater its value
- The Government of BC is already using data in some areas to improve its services and operations, and can extend this to other Sectors, Ministries and the Public.

2.2. Sharing Data with the Public

Indeed, in places where data has been made open, changes are already making people's lives easier and safer. Developers in the United States have created a dial in number where you share the shape and colour of a pill and a computer tells you what type of medicine it is – a potential lifesaver and important resource. Others have built mobile applications that track bus and train schedules, locate free parking spots, or show the crime rate for the location where you are standing. Have you ever been uncertain about the safety of a neighbourhood you're unfamiliar with? Here in Canada, developers at Microsoft have created emitter.ca – a website that uses government data to show you how much pollution industrial facilities emit near your home. In each of the examples above, a new space was carved out by non-government actors by leveraging the government's assets. They weren't replacing government's work, but enhancing it. The opportunities for how data can and will be used are limited only by the data that the government shares, and its citizens' capacity for imagination.

Of course we all already use some open data. We take for granted that at virtually anytime, anywhere, we can find out the weather. This is possible because for decades (centuries in some places) governments have collected and shared weather data. We simply rely on media companies like the CBC and CTV to repackage it and share it with us. But others, like transportation and logistics firms, also use this data to plan shipping routes and schedules. Think of all the ways you can get weather data – radio, TV, mobile phone, internet – and the millions of decisions, small and large, made every day that depend on that information.

Cumulatively these decisions translate into millions, even billions of dollars in savings, efficiencies, productivity gains and other benefits. In the United States it is estimated that the industry of value-added services such as consulting, visualizing and reporting of free government weather data is worth between $1.5 billion to $2 billion a year. In British Columbia, a place significantly impacted by weather, the benefits to citizens and businesses of weather data are as clear as a cloudless sky. So imagine – what if we shared other government data as effectively as we share weather data?

Already we have pockets of success. Forestry data created and shared by the province has made the sector's companies more effective and also given environmental non-profits better information by which to contribute to public policy debates. Sites like HectaresBC merge Government of BC data with environmental non-profit data, and allow any citizen regardless of their expertise to search, study, and understand the rich eco-diversity and land management challenges confronting the province. In short, HectaresBC takes what used to be a complicated and technical task and makes it available to ordinary citizens. This also adds to the transparency and democratic discourse of our province.

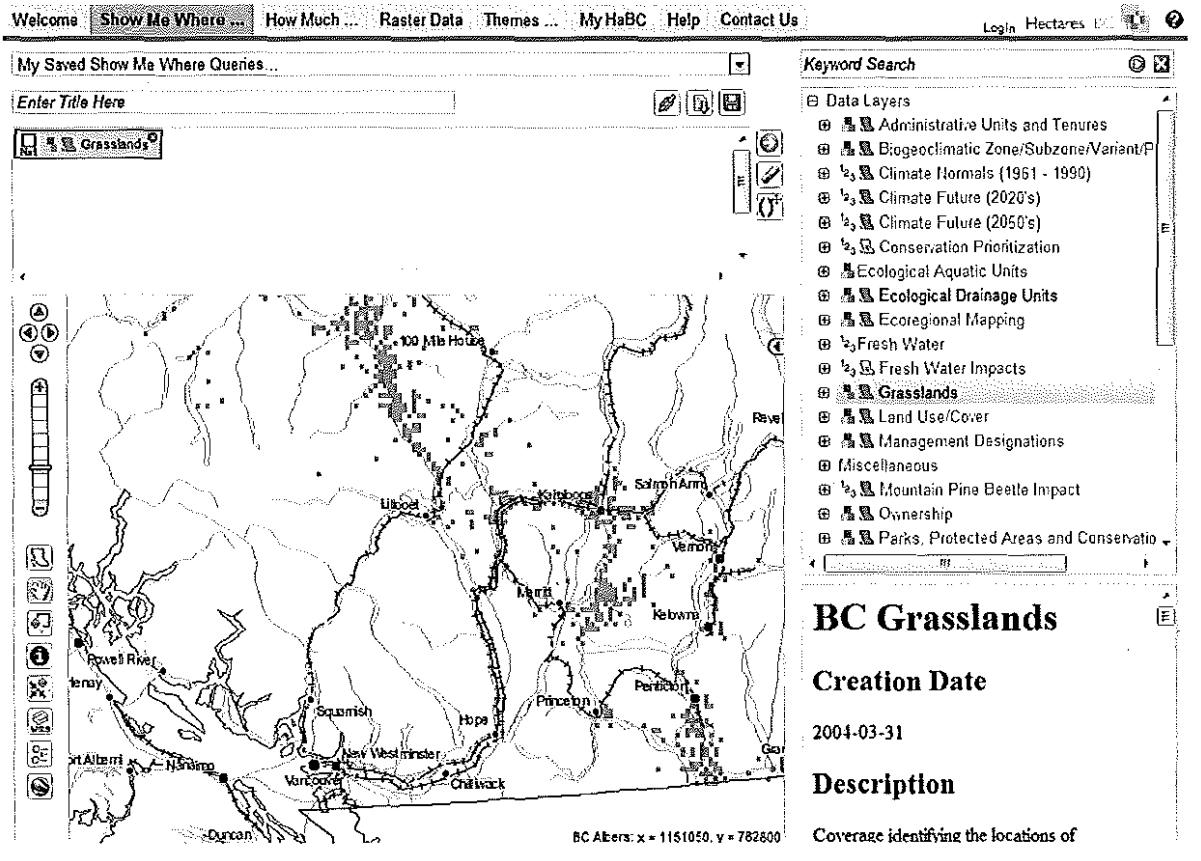


Figure 1: HectaresBC Site Showing Distribution of Grasslands in BC

Thus, as a result of sharing data our companies are stronger, our lands are better used and protected, our workers are more efficient and our citizens are better able to engage in the important issues facing us. This is precisely the type of outcomes we want DataBC to create.

2.3. Sharing Data within Government

The impact of DataBC isn't limited to those outside of government. While we see Data as being critical to making stronger companies, more effective non-profits, and a more informed and engaged population, DataBC is also designed to change how government works.

Let's re-examine HectaresBC. In addition to the public that use the site to enhance their understanding and interact with environmental data, public servants also use the service and do so for a variety of reasons. Some public servants lack the deep technical skills historically required to interact with environmental data, while other public servants have the technical skills but still prefer to use an application like HectaresBC as a highly usable, quick reference for getting an answer that they need (e.g. amount of timber affected by the pine beetle).

To be effective in the 21st century the Government of BC is going to have to become faster, more efficient and able to leverage all of the province's assets and social capital, both inside and outside of government. This is particularly relevant in light of an impending significant shift in the public sector workforce demographic as more and more public servants become able to retire – effective use of data can alleviate the strains of these demographic shifts by making processes more efficient and promoting new services that are highly automated. This was one of the major drivers for the recently published document "Citizens @ the Centre: B.C. Government 2.0: A Transformation and Technology Strategy for the BC Public Service."

Citizens @ the Centre calls on the public service to

1. empower citizens to create value from open government data,
2. save citizens' time in their interaction with government and make it easier to access better quality services, and
3. encourage collaboration in the public service because it is integral to delivering quality service to citizens.

DataBC is an integral part to meeting all three Citizens @ the Centre missions as it seeks to turn the data generated by the province into more than just information that serves a particular unit, but into an asset that can transform how we work together and with citizens.

How will data change the way government works? Look at the enormous impact it has had on the evolution of the private sector over the past two decades. For example, consider two companies that, on the surface, appear identical: Kmart and Wal-Mart. Both are retailers, and both sell to a similar demographic. But scratch deeper and a critical distinction emerges.

Kmart saw its core competency as retailing. Selling was its focus. In contrast, Wal-Mart understood that data was its most important resource. The retail giant constantly processed data to assess selling opportunities and drive efficiencies. Indeed, some analysts describe Walmart as a logistics and data management organization masquerading as a retailer – that is how core data is to its operations. But by constantly analyzing data Walmart is able to anticipate what its customers will want and need. When Hurricane Katrina hit, Kmart was

shipping its normal loads to stores in the gulf, meanwhile Walmart was stocking up on bottled water and pop tarts – two items that are in high demand during hurricanes.

More profoundly, this difference in understanding between the two companies – data analyzer vs. retailer – also explains how Walmart grew to become a global giant (with more employees, over 1 million, than any company in the world) while Kmart has languished in bankruptcy protection.

Historically, governments have been like retailers: focused on delivering services like healthcare and licenses, as well as products like roads, and a legal infrastructure to the public. But that is starting to change. Governments are becoming more aware that data – the quantitative information about their services and the communities they serve – is not simply a by-product of operations, but a valuable strategic asset. DataBC is at the core of British Columbia's effort to make data an asset that any public servant can use to assess programs, assist in the development of public policy, and identify opportunities for service improvement. Reliable, authoritative and accessible data is essential if the BC public service is to do more with less, streamline internal operations, and meet the policy challenges of tomorrow.

2.4. Case study: BC Forests

Challenge

The BC Ministry of Forests, Lands and Natural Resource Operations manages the Provincial Forest Cover dataset, which describes all trees growing on the approximately 95 million hectares in BC. This dataset is used by almost all natural resource management employees, non-government organizations, and industry groups.

Historically, this dataset was distributed as physical map sheets at a fee of $200/sheet to consumers. This fee was largely in place to recoup the cost of two full-time employees who were required to maintain the production and distribution of the paper maps, and to create often complicated exchange agreements to allow the ministry to share its information. The high demand for this data, combined with the lengthy order processing, production and distribution times led to dissatisfied and frustrated consumers.

What made the difference

The Ministry decided to provide their Forest Cover dataset for free online, primarily because it was becoming increasingly difficult to recoup the cost of producing the map sheets and developing exchange agreements. The move, however, had several subsequent benefits:

1. Improved efficiency and reduce bureaucracy: Organizations that required this data could now instantly have access where orders previously took up to three weeks to fulfill.

2. Shift to value-added work: Staff that were previously processing orders for the data could start to focus instead on the quality of the data – a value added service that provided greater job satisfaction.

3. Greater consistency: Centralizing the distribution of the dataset allowed for greater consistency – every consumer had access to the same data, and were accountable for using the most recently published data

4. Enhanced Economy: Logging companies could now access data faster and more reliably. This meant better planning, allocation of resources and so better productivity. The significance of this hit home at a conference soon after data was offered online where members of the Natural Resource community actually hugged members of the Ministry of Forestry for making their lives easier.

The Ministry demonstrated that sharing data can bring broader benefits than originally expected and spurs additional value added services that would otherwise not have been feasible.

2.5. Case study: BC Workforce Strategies

Challenge

A significant demographic shift is underway in BC's workforces – many employees of the baby boom era are now becoming eligible for retirement. As these senior and knowledgeable resources leave their organizations there will be significant demand to fill their roles. When combined with increasing budget pressures on government it will be necessary to have a strategy that addresses the skills gap and does so with fewer resources.

What made the difference

By making use of the data available to them with sophisticated analysis tools, the Workforce Strategies group within the Ministry of Citizens' Services was able to predict the incoming demographic shift and proactively plan to address it. This was one of the major motivators for creating the 'Citizens @ the Centre' strategy. This complicated analysis would not have been possible without well-maintained data that make the resulting analysis meaningful and evidence-based.

2.6. Case study: BC Ministry of Housing & Social Development

Challenge

The Ministry of Housing & Social Development became under increasing pressure to demonstrate that past clients of Income Assistance whose support had been discontinued were experiencing a sufficient standard of living.

What made the difference

The Ministry of Housing & Social Development did not have sufficient data alone to be able to demonstrate to the public that past clients were better off having moved on from Income Assistance. The ministry was able to partner with BC Stats to obtain data, such as income levels derived from tax records, to demonstrate an overall positive shift in the lives of those who had discontinued support from Income Assistance. This process was made transparent by the fact that the ministry agreed to make the results of the analysis public, regardless of whether the outcomes favoured them. By combining otherwise disparate datasets, the Government and its citizens were able to reach a new level of understanding about a service the government provides.

2.7. Case study: BC Justice Agencies

Challenge

There are several justice agencies that contribute to the legal process – for example, the Police, Youth Corrections, Adult Corrections, Court Services, Crowns, Offender Management and others. Each of these organizations manages information that is relevant to the other parties. To increase the effectiveness of the legal process, and to share relative insights that could improve decision making, better integration between these organizations was required.

What made the difference

Contrasted against other jurisdictions in Canada, BC has a high level of integration between its justice agencies that makes the Province a leader in sharing information. There are integrated case management systems that challenge historical models, and wherever appropriate, justice partners have role-based access to information to aid decision making. The key success that these agencies experience every day is an already established partnership that makes sharing easy. They do not require an intermediary to enable or coordinate this sharing, and do not have to reach complicated exchange agreements that may discourage the process. Most of this data is a byproduct of operations. The value lies in making this data available such that, when it becomes relevant to another party it is readily available to assist decision making.

2.8. Case study: BC Court Services

Challenge

Under increasing funding pressures, Court Services has had to develop new ways to do their business more efficiently. One process that was identified as a candidate for improving efficiency was the handling of traffic violation ticket disputes. At the time of analysis, each ticket dispute was logged in the individual jurisdiction in which the driver resided. This required a Violation Ticket Centre to exist in each jurisdiction. Court Services determined that approximately $100,000 per year was being spent on the front end of the dispute process.

What made the difference

By collating variables related to staffing, number of ticket disputes, and average time dedicated to the front-end management of these disputes, Court Services determined that it would be more cost effective and efficient to coordinate the initial ticket dispute process out of a central Violation Ticket Centre in Vancouver. This allowed for a resourcing reduction from approximately 30 to 15 full time staff to manage these disputes. Only through the use of data-related analysis was Court Services able to make a fact-based decision to support this change.

2.9. Case study: BC Stats

Challenge

BC Stats currently invests a significant effort into identifying data for its users. This effort is often offset via fees for its datasets. One example of data that BC Stats sells is population multipliers, which in part, are also sold to recoup the cost of maintaining the online store where they are sold.

Population multipliers enable analysis into the impacts of development on communities. For example, what are the future demographics of a community likely to be if a new mining project is approved? Because there is a fee for the multipliers, and for the handbook that guides their appropriate use, many organizations rely on previously purchased multipliers which may be out of date and inaccurate. This, in turn, creates additional work for developers and for the Government as proposals have to be reworked to use the correct multipliers, and use them in the appropriate way.

What will make the difference

BC Stats is considering providing its multipliers and the multiplier handbook for free on its website. This resonates with previous work done by the Ministry of Forestry in providing its Forest Cover dataset for free, and in theory provides similar benefits. By providing the datasets for free, BC Stats would no longer have to recoup the cost of staff that maintains the online store where they are sold. Furthermore, organizations will be inclined to use the most recent multipliers and can be held accountable for using the handbook which describes their

appropriate use. Finally, if BC Stats is able to provide more data for free online, it focus effort less on collecting data for organizations, and more on providing a value added service that helps to interpret that data, and guide its effective use for solving complex problems.

3. The Foundations of DataBC

In order to create a public service and government that can share data and leverage its potential, three key pieces need to fall into place:

First, public servants and the Government of British Columbia need to recognize data as a public asset – one that needs to be managed as much as a bridge, a service program, or even our staff.

Second, the government must convert that asset into a commodity that can be delivered anywhere, to anyone who is authorized to use it and who needs it. In other words, we need to make data a service that is as reliable as other goods and services, like electricity, water or the internet, that are delivered through a well developed and stable infrastructure.

Finally, we need to shift our culture, to encourage and reward sharing and cooperation, to improve data literacy and foster community. The role of DataBC is to serve as a catalyst to help promote and advance each of these three goals.

Key Messages:

- Data should be managed as a public asset
- To manage data as an asset, consider it as a portfolio with three levels: Operational data which is not shared outside of a ministry, Enterprise data which is a subset that is shared within Government and partners; and Open data which is shared broadly with the public
- To enable use within and outside of government data should be thought of as a service, reliable, available and easy to use.
- A significant cultural change will be required to achieve the full opportunity that data presents – promoting data literacy will be an important function of DataBC

3.1. Managing Data

The public service of British Columbia excels at managing assets. For example, the Government of British Columbia has, for over a century, managed the province's forests as an asset to produce wealth and opportunity, it has developed and managed its transportations assets to enable British Columbians to access even the most remote parts of the province, and it has cultivated and managed hydro-electric assets to provide economic and ecologically sensitive power to a growing population.

Managing public assets is at the core of what we do.

However, to succeed and compete in the 21st century, with the rise of the digital economy and the digitally enabled citizen, we will need to extend our deep expertise beyond physical assets

and into the realm of virtual assets. And among the most critical of those virtual public assets is data. The data that government collects – about our programs, our geography, our operations and our demography – is a public asset, as much as a bridge, a dam, our water supply, or a forest tenure track. Like these physical assets, the value of data is derived from its use. However, unlike traditional assets, the use of data by one consumer does not preclude another from using it simultaneously – it is a *non-rival* good. For this reason data is a very a different kind of asset than the traditional assets that the Province manages. Where the focus on traditional assets has been around how to allocate them fairly, the focus for data is how to allocate it *as widely as possible* to derive the greatest value.

The goal of DataBC is to make *appropriate* access to data as wide as possible. In this sense, the data sets can be managed as a portfolio. This portfolio contains three main categories:

1. ***operational data*** which is acquired, compiled and created by sectors and ministries and is utilized to fulfill the operational requirements of the custodial agency

2. ***enterprise data,*** a subset of ***operational data*** which has sufficient clearance to be shared with other government departments and, under special circumstances, with industry, and

3. ***open data*** a further subset of ***enterprise data*** which can be shared broadly with the public and does not present legal, security and privacy concerns (for example, because it was been aggregated to a level that protects personal identification, or because sensitive information has been stripped out of the source data).

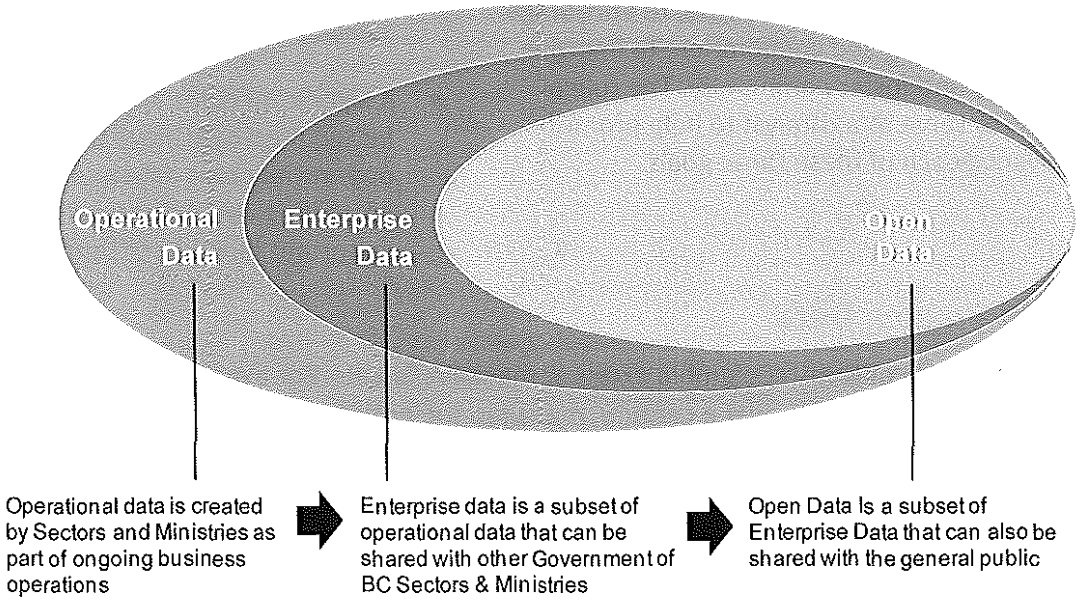


Figure 2: Data as a Public Asset Portfolio

Some government sectors and ministries have, in fact, been thinking about data as an asset for some time. Already there are policies in place to manage the collection, storage and maintenance of data, as with the Natural Resources Sector. With the establishment of DataBC adhering to those policies will become both easier and more important.

To manage data as an asset, DataBC intends to:

- Establish Data Governance as a core discipline across the enterprise including:
    - ensuring there is a "single version of the truth" used in decision making;
    - ensuring that data is fully leveraged during its entire lifecycle and that the accuracy and lineage of both the data and metadata are established upstream at the time of creation of the source data; and
    - encouraging the implementation of data governance policies including data custodianship.
- Provide some basic analytical capabilities that enable a culture of "timely fact-based decision making" across the enterprise and among the public.
- Provide necessary deliverables and capabilities in support of sector Transformation & Technology Plans as they relate to information access and sharing, e.g., open data.

The management and dissemination of data is a critical element to the ability of the Government of British Columbia to achieve its strategic goals as well as sustain itself over the long-term as an organization that can provide data-driven and fact-based advice to decision makers.

Leveraging the Experiences of the Natural Resources Sector

Data management is not a new area for the Government of BC. The Province already has a mature enterprise spatial data infrastructure that supports data discovery, download, visualization, and application framework services. At the heart of this enterprise spatial service delivery is a warehouse of geographic (spatial) data. Geographic data is currently widely available to government and public stakeholders.

The BC Geographic Warehouse and its access services have been positioned to be leveraged more broadly to host data for public consumption from all parts of government. The spatial data management architecture that was transitioned in October 2010 from the Natural Resource Sector provides the foundation for establishing an enterprise data management program that will address the Province's open data initiative and enables the DataBC program. Data transformation capabilities that have been developed through enterprise spatial service delivery can further be leveraged to facilitate the use of government data, along with services that support serving data as a platform for application development.

DataBC will provide a number of services that leverage the assets and experience of the enterprise spatial program including:

- Data hosting services
- Data security services
- Data access services
- Spatial enablement services (i.e. geocoding; spatial application frameworks; spatial warehouse; mash-up frameworks; geocoding web services etc; web map service (WMS) data feeds)
- Metadata services and open data catalogue management
- Data management governance experience
- Data management professional services (e.g. data modelling, data transformation, etc.)

3.2. Providing Data as a Service

In a digital economy and 21st century, the delivery of public service data will be as important as many other ubiquitous public utilities that we all take for granted. For example, electricity is a foundation for our economy. Services have built directly on electricity, as with utilities and manufacturers of generators, and to a greater extent services have been supplemented by electricity, as with businesses that use electricity to power their computers and providing lighting so that employees can work at all hours of the day.

In a digital economy, the ability to draw upon relevant data to understand a crisis, develop policy ideas, assess a program, or even offer new services will be central. To achieve this potential, data will need to be as reliable, as accessible and as easy to use as electricity.

While this sounds futuristic it is already a reality to many Canadians and residents of British Columbia. Take for example, Google Maps. Search to find the fastest way – using transit – between two locations in Vancouver and Google maps will show you the closest bus stop, the fastest route, and the next bus to arrive at that stop.

This is all made possible because Google is a huge consumer of government data. Public transit authorities make their transit data available in a structured format – known as the General Transit Feed Specification (GTFS) and at regular intervals Google receives updated version from each authority that allows it to display accurate transit data in Google Maps. The result: citizens can use Google Maps to find the fastest way – using public transit – between two points in a city like Vancouver. This, of course, has enormous benefits. Google maps is far easier and more intuitive to use than the websites of most transit authorities, it is also a website many citizens are accustomed to using. Better still – citizens who travel from city to city don't have to learn a new website in order to use the transit system. And finally, Google pushes the transit authorities' data to a variety of platforms – including mobile phones – meaning the data is accessible wherever and whenever citizens need it. All of this at no cost to the transit authorities.

So what makes this possible?

As a precondition, the transit authorities must treat data as an asset. They have to manage it, curate it, and have a governance model that ensures its oversight. Like the Government of British Columbia, they need to do these things to enable the use of data internally; however the transit authority must also treat data as a service – like a utility treats electricity or water.

This means that the data must be reliable, accessible, usable and sharable, much like how consumers anywhere in the province know they can plug a device into a socket and the energy will simple flow, with no hassle and no fuss – DataBC must enable us to do the same with our data.

This means, data shared by DataBC must be:

- **Discoverable**: Can public sector staff, citizens, businesses, and public organizations *find* the data they need? If they can't find it, it essentially doesn't exist to them. The goal of DataBC is to ensure that data is easily searchable and indexed. In short, that it is discoverable.

- **Accessible**: Once located, the users need to be able to *access* the data. This means they need to be able to download it in machine readable format or access it utilizing a machine ready method (e.g. an API, subscription feed, or a documented file). Google can't use PDFs of bus schedules to show transit data in Google Maps, Microsoft can't use physical orthophotos to enhance Bing Maps, and the forestry industry can't use a book of tenure maps to develop online maps to guide its workers. Data that can't be used causes public servants and citizens who need it to be disengaged or marginalized from the discussion and it causes businesses and governments to be less efficient and effective.

- **Sharable**: Once located citizens and organizations must be able to share the data or the information they've created from it – internally with employees or externally with stakeholders or even friends. If we are to engage our citizens then we want them to use data to be able to mobilize other citizens, provide new services or just point out an

interesting fact. This means information and data needs to be licensed to allow the freest possible reuse while protecting individual privacy and security.

- **Usable and Reliable**: Finally, the data has to be reliable in its availability and useable in its completeness, currency, quality, accuracy, and fitness for use.

  Public sector employees require consistent and *reliable* availability when using data in the decision making process. The same is true of a business that has built a service using government data, the academic engaged in data analysis, or the citizen with a question. If we expect an ecosystem of users - engaged citizens, academics, companies and other public servants – to emerge, then DataBC must provide the type of uptime reliability we've come to expect from our utilities.

  Furthermore, if we expect decision makers, businesses, non-profits and citizens to use data, they must be confident about how accurate it is. This does not mean the data is perfect, but its currency, completeness, quality, and limitations of its use must be readily available. There should also be quick feedback loops so that when issues arise related to completeness or quality of data, users can easily share those issues with the Data Custodian for comment and possible remediation.

3.3. Changing culture

Getting internal stakeholders comfortable

One significant barrier to sharing data internally and externally is cultural.

Throughout government some operational groups, ministries or sectors may immediately recognize the benefit of open and enterprise data while others may not. For those that do not, continued education is essential. We need to improve data literacy (see below) and cultivate an understanding around how data is critical to measuring progress and developing new and better strategies.

Forward looking public servants will want visibility and accountability. Indeed in many jurisdictions it has been public servants, not political masters that have fostered open data and enterprise data sharing policies – seeing it as simply an extension of their mandate for disclosure and transparency, to improve data accuracy or generate public engagement, or even to achieve policy objectives. This is the case in cities like Washington DC, Nanaimo, San Francisco and Edmonton, where leadership from within the public service has driven the initiative.

So what, as an employee, manager or leader in the public service, can you do to promote culture change? Here are three important starting points:

1. For employees - look for strategic opportunities: In an era where funding is tight and resources are constrained, consider opportunities where sharing data might help

advance policy objectives and/or engage resources outside of government. In BC's apps for climate action competition, merely sharing environmental data such as rainfall information enabled external developers to create applications that helped raise awareness about climate change and even offered real solutions to everyday British Columbians.

2. For managers - celebrate internal successes: Every organization has already used data as an asset to find efficiencies, improve services or even just enable a more effective assessment. The challenge is that those skills cannot simply reside in one function – we need them everywhere. So let's celebrate successes to teach ourselves that managing and using data is an important part of all our work.

3. For leaders – demand the data: One way to shift the culture around data in your organization is to make it a core part of your workflow. As a leader in the public service the organization is designed to meet the demands you place on it – so make a strategic demand: ask for a dashboard that uses data to give you real time information about an issue central to your ministry's duties. An increasing number of governments – especially in the US – are using these dashboards to create real time assessments. Asking for one would induce public servants across your organization to rethink workflows and engage with data as both an asset and a service.

Improving data literacy inside and outside government by cultivating communities

One impact of the launch of DataBC is that, over time, more and more government data is going to be available, both to public servants and to the general public. In this world influence is going to shift from those who *hold* the data to those who can best *analyze* the data. In other words, to be effective and encourage the broadest engagement possible we are going to need a data-literate citizenry and a data-literate public service. A small elite group of engaged developers and policy wonks would miss the enormous opportunity coming our way.

The best way to cultivate that broad-based literacy is not to release in small or measured quantities, but to flood the province with data. People engage in what they are interested in. The more data, the more niches people can find that will engage them and prompt them to learn, play and work with data. That said, there are areas where the province wants public engagement and should specifically release datasets that will enhance participation and to help to solve complex problems. But more than this we also need to think about cultivating communities where citizens can exchange ideas as well as involve educators to help provide support and increase people's ability to move up the learning curve.

Interestingly, this is not new territory. We have a model for how to make this happen – one from which we can draw lessons or foresee problems. Consider the library revolution, a process similar in scale and scope that happened just over a century ago.

In the late 19th and early 20th century, governments and philanthropists across the western world suddenly became obsessed with building libraries – lots of them. This included everything from large ones like the New York Main Library to small ones like the thousands of tiny, one-room county libraries that dot the countryside. Big or small, these institutions quickly became treasured and important parts of any city or town. At the core of this project was that literate citizens would be both more productive and more effective citizens.

But these libraries were more than just buildings. They were community centers. Authors would come by and talk about books, librarians and volunteers taught people to read, to find books, to understand the cataloguing systems. In short, libraries built communities of interest where people learnt, exchanged ideas and helped one another. On a small scale this has already started to happen around open data - in cities like Vancouver and Ottawa, developers come together for open data coding sprints, to share ideas and skills on how to use and engage with open data.

But smart governments should not only rely on small groups of developers to make use of open data. Forward-looking governments – those that want an engaged citizenry, a 21st-century workforce and a creative, knowledge-based economy in their jurisdiction – will reach out to universities, colleges and schools and encourage them to get their students using, visualizing, writing about and generally engaging with open data. Not only to help others understand its significance, but to foster a sense of empowerment and sense of opportunity among a generation that could create the public policy innovations that will save lives, make public resources more efficient and effective and make communities more liveable and fun. A recent paper published by the University of British Columbia students who used open data to analyze graffiti trends in Vancouver is a perfect early example of this phenomenon.

So what can you do, as an employee, manager or leader?

- As an employee – consider stakeholders across government or in the non-profit and businesses sectors that have an interest in your data. Consider dedicating a small amount of time to engaging them, teaching them about the data and helping them think about how it might advance their own goals, as well as public sector goals.

- As a manager – what skills and knowledge around data literacy does your team need? Providing some basic data literacy training, provided by a member of your ministry's analytics group could help raise awareness and seed ideas.

- Leaders – don't let data policy get lost in IT. Data is a much broader issue that involves both internal and external stakeholders.

Note: The following sections on the DataBC Technology Environment, Operations and Governance provide a more tactical look at how DataBC will work in its ideal, mature state. These conceptual models provide a reference point for DataBC to move toward as the program develops, and can be used to guide practical strategies that will help DataBC to transforms these concepts into reality.

4. DataBC Technology Environment

Before understanding how DataBC will operate, it is important to understand the environment in which it will operate. DataBC will leverage a number of technologies to facilitate effective collection, management and sharing of Government of BC datasets. Each of these tools is described in detail below, followed by a conceptual architecture which shows, at a high level, the relationships between these tools and the stakeholders who use them.

Key Messages:

- The data catalogue will point to all available datasets regardless of where they are stored – this catalogue can be updated automatically for Sectors and Ministries that choose to maintain their own data
- DataBC will offer infrastructure to maintain data in a warehouse environment and provide some value add services
- The DataBC website acts as the primary channel for sharing datasets. It provides a search feature to enable discovery of datasets, and can connect consumers to the appropriate source to view, connect to, or download their data

4.1. DataBC Warehouse

A data warehouse is a central repository where datasets hosted by DataBC reside. The DataBC warehouse will be available to all sectors and ministries, however some ministries may prefer to host their datasets on their own sources for consumers to download directly, and register their availability through the *DataBC catalogue*. The BC Geographic Warehouse can be leveraged in this capacity.

4.2. DataBC Catalogue

Just as a retail catalogue describes all sales items that are available from a retailer, DataBC's data catalogue describes all datasets that are available from DataBC. Each dataset has one catalogue entry with a number of descriptors referred to as "metadata" (data about data). Metadata may include the dataset name, publisher, applicable geographic regions, as well as information about where the datasets is stored and how it can be accessed. Another important subset of metadata will describe the accuracy and currency of the dataset, such that users are aware of the limitations on its use.

In addition to its raw data catalogue, as with the US Data.Gov program, DataBC will also develop and maintain a tool catalogue which includes applications, tools and widgets for using the data, and a geodata catalogue with geospatial data and geospatial search functionality (*see Geographic Integration* in the *Operations* section of this document).

4.3. Web Syndication Tools

Web syndication tools, such as Really Simple Syndication (RSS) or Atom Syndication, are used to publish frequently updated works in a standard format to interested subscribers. For example, readers of a newspaper can subscribe to an RSS that provides a regular feed of the latest newspaper headlines along with links to the full stories. DataBC will use these tools to communicate new service offerings and data updates and possibly even to publish the catalogue.

4.4. Data Integration (ETL) Tools

Data integration tools are used to **extract** data from sector or ministry source systems, **transform** that data into a format which conforms to the DataBC standard (a model which can be easily shared and used by end users), and **load** that data into the DataBC warehouse – for this reason they area also called ETL (extract, transform and load) tools. At the time of integration, DataBC may also offer Geographic Integration (*see Operations section*), to help associate datasets with geographic information where applicable.

4.5. Data Visualization Frameworks and Analysis Tools

Data visualization frameworks are a set of technical building blocks that are used to construct a foundation for DataBC access services. The resulting services allow clients to explore, experience and analyze DataBC warehouse content without the need download the data directly, or connect using client side applications. Examples include the DataBC Mash-up Framework, Geographic Integration services and Business Intelligence. DataBC will promote and use these frameworks to provide services directly to clients through the DataBC Website and associated Geographic Integration services.

4.6. Search Tool

Due to the large number of datasets that will be hosted by DataBC, a search tool will be required to enable efficient and effective discovery of datasets that are of interest to the end user. A search engine requires a *search index* – a table of relevant metadata that users can search on to locate the dataset that best fits their needs (e.g. by sector, by published data, by user rating, etc.). As a future goal, the search tool should also search the indexes of relevant external catalogues for datasets that may be of interest to the end user, and provide a geospatial search for locating datasets based on geospatial criteria.

4.7. DataBC Website

The DataBC website is the main channel for delivering DataBC services to its users – suppliers and consumers of datasets. The website is the go-to place for citizens and public servants to learn about DataBC, access and download relevant datasets, and find relevant tools and applications to work with data. To facilitate the supply and consumption of datasets the DataBC website will include a data supplier interface, a search service, and an access service, as described below.

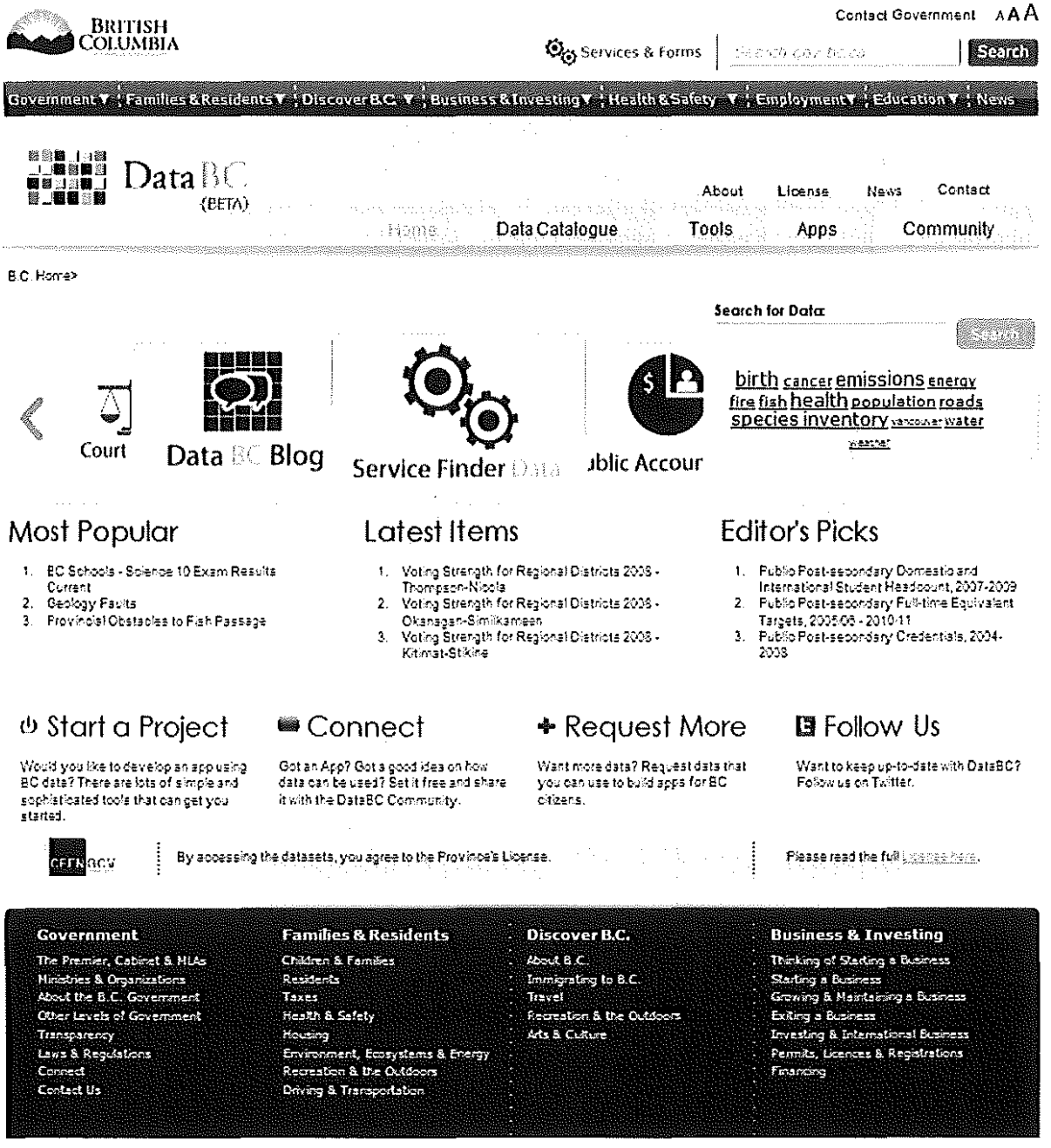


Figure 3: DataBC Website

Data Supplier Interface

The data supplier interface is a secure web application that sectors and ministries can use to submit their datasets and corresponding metadata about their datasets. The supplier interface will also include performance dashboards to provide feedback to Data Custodians about the overall quality, usefulness and popularity of their datasets.

Search Service

The search service enables the user to make use of the DataBC search tool to browse and search the data catalogue to discover relevant datasets. Where possible, in the future, this search service can also direct the user toward relevant datasets in external catalogues.

Access Service

After a user has located a dataset of interest, the access service connects the user to the appropriate repository to either download a machine-readable version of that dataset, or connect to data of interest at source, or view the data utilizing DataBC data visualization tools. The website may also provide business intelligence tools that allow end users to interact with the data in the dataset.

4.8. Conceptual Architecture

The conceptual architecture for DataBC summarizes, at a high level, how all of the above technology components work together to facilitate collecting, managing and sharing government datasets.

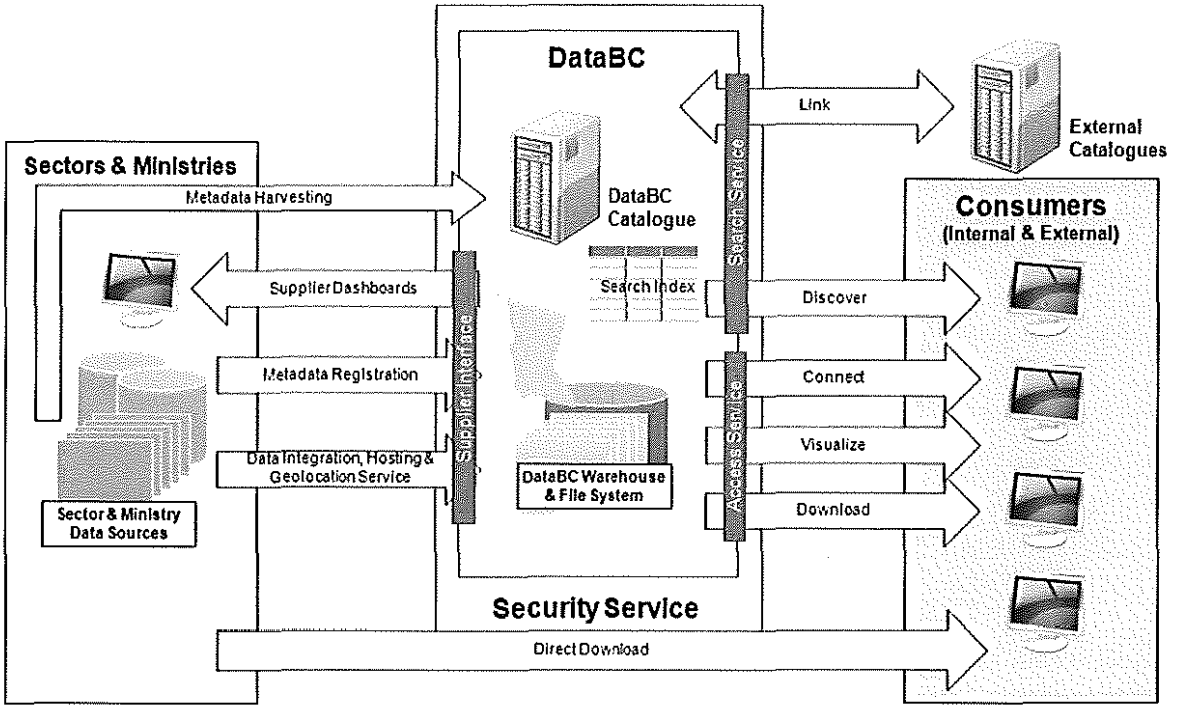


Figure 4: Conceptual DataBC Architecture

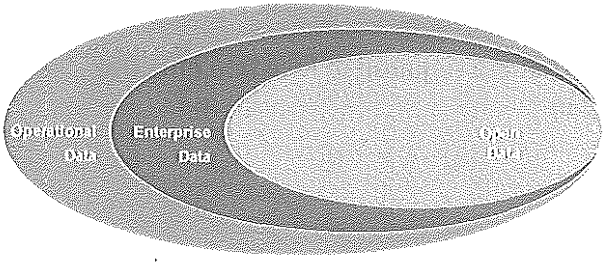
It is clear that this environment will be dependent on government sectors and ministries, as well as participating consumers to thrive. The following sections on DataBC operations and governance describe *how* these groups will work together using this technology to achieve the objectives of DataBC.

5. DataBC Operations

5.1. Overview

The DataBC program will help the Province to manage data as an asset and enable both public servants and citizens to effectively share and use its data. DataBC will do this through the delivery of services to internal data suppliers and both internal and external data consumers. The DataBC operational model describes these services and how they fit together.

The processes and practices that are used to manage data are consistent across all levels of the DataBC portfolio: operational, enterprise and open data. This is because the fundamental difference in these types of data is the licensing that is applied to enable sharing it – the data itself does not change.

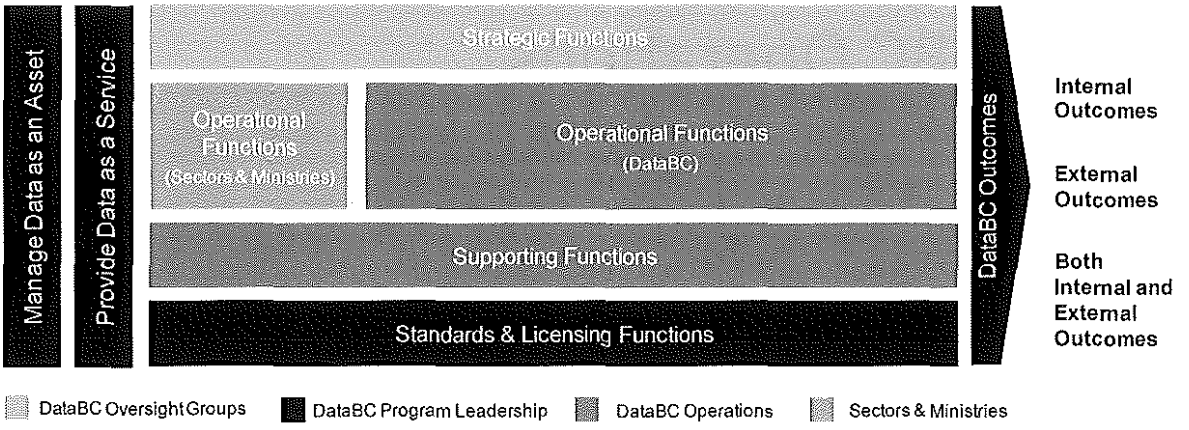


Key Messages:

- DataBC provides data cataloguing, access and hosting services to help Sectors and Ministries share their data more broadly. This is accomplished by leveraging a common infrastructure provided by DataBC
- The operations of DataBC are enabled by several supporting functions as well as strategic functions that provide guidance and alignment
- The DataBC program will result a number of positive outcomes for both internal and external stakeholders, such as improved efficiency, better analysis and decision making, and opportunities for new businesses and services

The functions described in this section apply consistently to the three types of data depicted above. For simplicity, the term "data" will be used in a general sense.

The DataBC operational model consists of a core process for cataloguing, managing and sharing government datasets, and the leadership functions and supporting functions that enable it such as licensing, data literacy, geographic integration and technology infrastructure. The leadership, process and supporting functions work together to deliver a set of specific outcomes internally to public servants and externally to BC citizens. At a high level, these DataBC functions and outcomes are shown below, organized by the stakeholders that are responsible (see *Governance*).

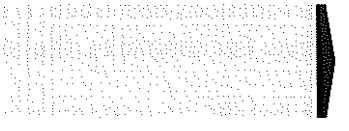


Using this model as reference, the following elements of the DataBC operational model are described in this section:

- DataBC Outcomes: The expected beneficial outcomes that will result from the DataBC program
- Operational Functions: The day-to-day activities that form the main operational focus of DataBC for creating, submitting, integrating, hosting and sharing data.
- Strategic Functions: The strategic activities performed by senior leadership to guide DataBC and align the program to government priorities
- Standards & Licensing Functions: Activities that provide structure to DataBC operations, to ensure data can be managed and used as an asset
- Supporting Functions: Ongoing activities that are required to facilitate effective operations, and ensure stakeholder buy-in

5.2. Data BC Outcomes

Outcomes of DataBC are categorized as internal, external, and *both* external *and* internal. The following outcomes are expected to be achieved through the DataBC program:



Internal Outcomes

- Improved efficiency: *DataBC will provide data management processes and tools that reduce the manual effort that is currently required to locate and prepare data for analysis*
- Improved planning: *by providing access to high-quality data, DataBC will help improve the annual and strategic government planning processes by allowing them to be fact-based and data-driven*

- Information sharing and collaboration: *DataBC will provide a mechanism to more easily share data between ministries, and create further opportunities to collaborate where one ministry's information is a useful input to another's operations*

- Improved discovery: *by maintaining a central dataset catalogue, DataBC will facilitate improved search and discovery of information – this is further enabled by appropriate use of metadata which describes the datasets*

- Improved tools: *by maintaining common frameworks for application development, DataBC will provide a foundation for ministries who want to develop specific data driven government services for citizens*

External Outcomes

- Public awareness: *by sharing data with the public, the public can openly consume that data and develop a better understanding of context in which the BC Government operates and makes decisions*

- Transparency: *by sharing data, citizens can 'know what the government knows', and more clearly see the impact that policies are having on the province*

- Public trust: *sharing data with the public demonstrates that the Government of BC is open and transparent and that citizens can trust it is making data informed decisions*

- Public dialogue: *by understanding the data that government is using to make decisions, citizens can contribute new ideas and perspectives to the policy making process*

- Community building: *sharing data can surface challenges that government is facing, and create opportunity for citizens and communities to work together to find innovative solutions to public issues.*

Both Internal AND External Outcomes

- Improved Accessibility: *Making data open and more accessible can reduce barriers and costs that both citizens and other ministries have historically encountered in obtaining data, such as FOIPPA fees and processes*

  (It is important to note that DataBC processes will be compliant with FOIPPA legislation to protect **personal and private** information)

- Informed Policy: *having more data available allows government to provide additional inputs to policy analysis – better analysis results in better understanding of key issues and more informed policy decisions*

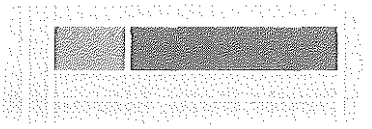
- Self-service: *services are built on data, whether that is a case file for a client, or geographical knowledge of a forested area – by freely providing information, citizens and public servants can create their own services to meet their specific needs*

- Economic development – *providing citizens and organizations with access to government data will provide a platform on which new services, businesses and value can be created for British Columbians*

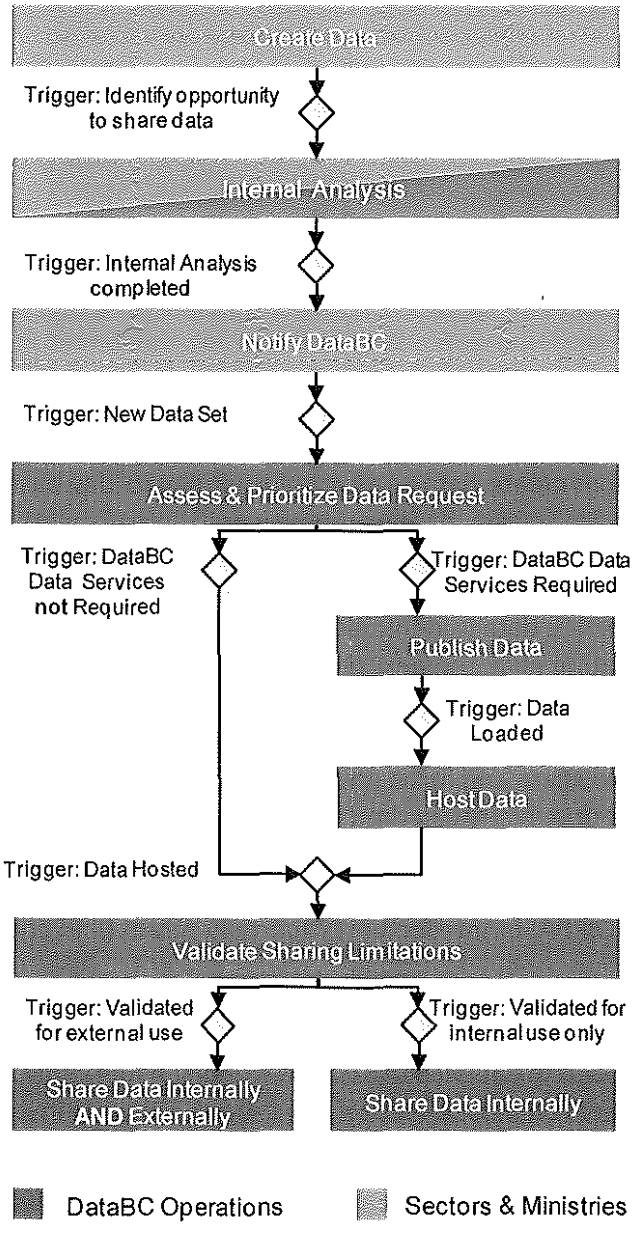
The DataBC operating model is designed to deliver these outcomes.

5.3. Operational Functions

The main day-to-day operations of DataBC are focused on identifying valuable datasets created by the Government of BC, transforming those datasets into a form, when necessary, that can be easily shared, maintaining a catalogue of these datasets, and sharing them through centralized channels (e.g. the DataBC website).



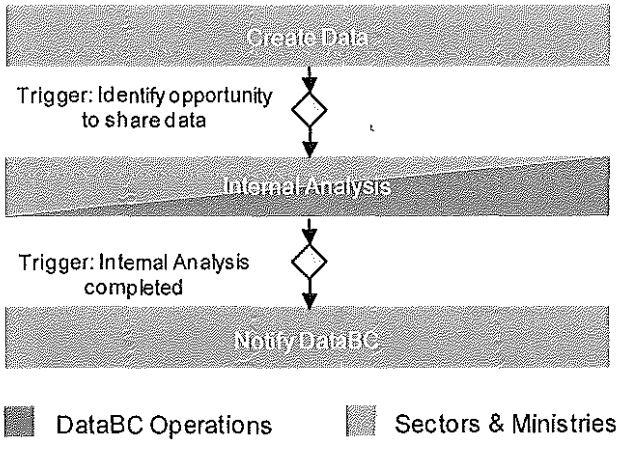
The operational process describes the necessary steps that must happen from the time that government data is created through the time that it is shared. This process is depicted below, and is described in more detail throughout this section.



Note that the DataBC operational process relies on participation from both DataBC and from government sectors and ministries.

Create Data, Internal Analysis, Notify DataBC

The main operational process of DataBC starts with the creation of data by sectors and ministries, and notifying DataBC (either manually or through an automated mechanism such as an RSS feed) that data is available. This part of the operational model is initiated and delivered by sector & ministry data suppliers – those resources who submit datasets on behalf of a Government of BC sector or ministry – as shown below:



Ministry or sector resources **create data** as a part of their day-to-day business operations. This data may reside in a case file system, data warehouse or in spreadsheets depending on the maturity of the data management capabilities of the ministry or sector supplying the data.

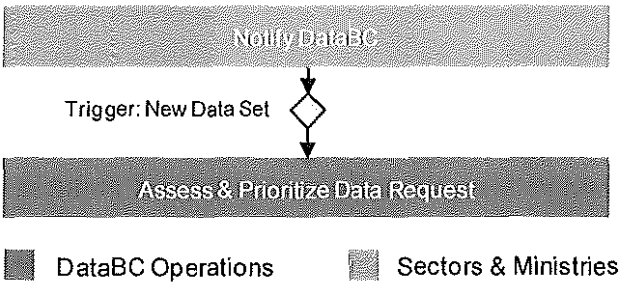
When an opportunity to share data is identified, for example through the execution of a Sector Technology & Transformation plan, the next phase of the process begins – an **internal analysis** to determine what data can be shared and how it can be shared. The supplying sector or ministry can engage DataBC at this point to provide a preliminary assessment of what data would be most valuable to share and focus efforts on those datasets. After deciding which data will be shared, the sector or ministry can then follow-up to determine if there are any restrictions that restrict the dataset from being shared as open data (i.e. enterprise data that is limited to internal sharing). Such restrictions may include legislative, Freedom of Information & Privacy Protection Act (FOIPPA) or Intellectual Property Program (IPP) components.

After data has been appropriately assessed for sharing limitations, the sector or ministry will **notify DataBC** that the new dataset is available. Notifying DataBC may involve contacting DataBC directly (e.g. through the Service Desk), and working with DataBC resources to determine how the dataset can most effectively be shared. This may involve leveraging DataBC infrastructure as described in more detail below under *Publish Data* and *Host Data.*

Assess & Prioritize Data Request

Once an opportunity has been identified by a data supplier, and a preliminary analysis (performed in consultation with DataBC) has been performed to validate the sharing opportunity, DataBC can be engaged to help the supplier host and publish their dataset. As, previously mentioned, the data supplier may also choose to leverage their own hosting and publishing capabilities, in which case minimal involvement from DataBC is required, and the data catalogue can be updated.

Once DataBC has been engaged with a request to a help a sector or ministry, it will then assess the opportunity in more detail and prioritize the request. This will provide a direct input into the planning process for DataBC so that resources can be allocated in the most effective fashion to assist participating sectors and ministries.

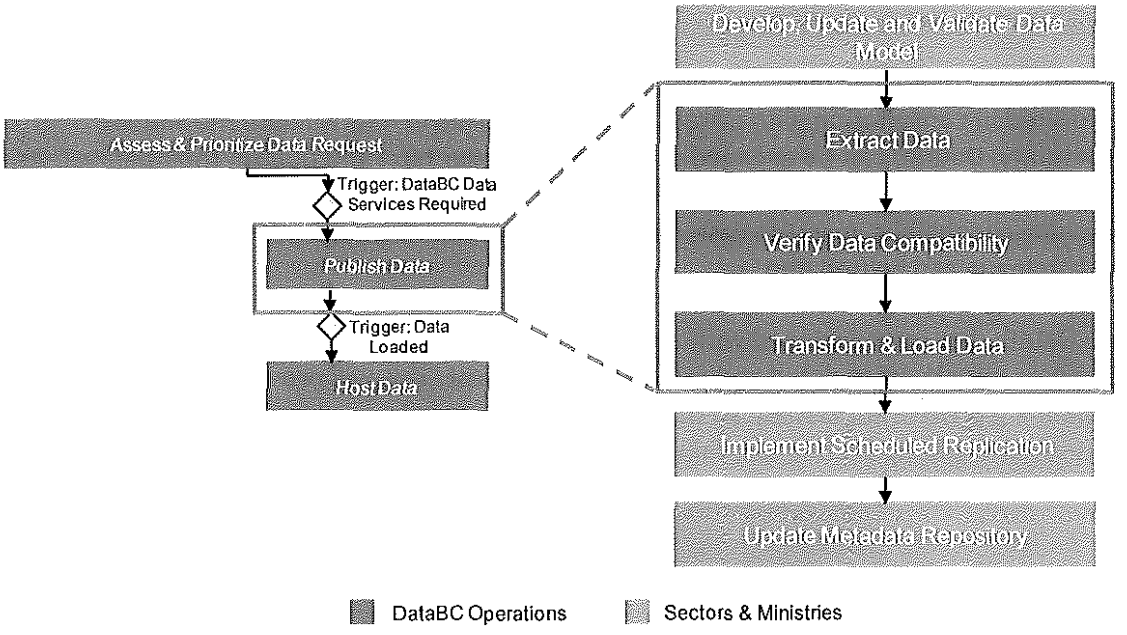


DataBC will prioritize requests according to government priorities, and alignment to the objectives of the DataBC program, and will also consider the relative urgency of requests. By prioritizing requests, DataBC can ensure that its effort is both strategically allocated, but also fairly allocated to participating sectors & ministries.

Publish Data

For sectors or ministries that want to take advantage of the DataBC integrated warehouse environment DataBC provides publication ETL (extract, transform and load) services which take data from operational to access ready. This process involves extracting data from sector or ministry source systems, transforming that data for access, and then loading the data to the warehouse using a scheduled replication process. Data publication is a major focus of DataBC operations – this is where DataBC adds significant value to sectors or ministries that are eager to share their data and contribute to the province's data catalogue. The design of scheduled replication processes are also necessary to ensure that the data is refreshed.

Data publication has several sub-steps, some of which must be performed by the sector or ministry and others which are performed by DataBC. These steps are shown below:



- **Develop, Update and Validate the Data Model:** Before DataBC can begin its data publication activities, the sector or ministry must develop, update and validate their access data model. This is to ensure that the source data can easily integrate with the DataBC warehouse. A data model specifies how data is stored and accessed for a given dataset, specifies which data elements are included, and specifies the relationships between data elements. Development or modification of the data model is done in consultation with DataBC to ensure the data is of sufficient form and quality to be compliant with DataBC standards.

- **Extract Data**: Next, data is extracted from the source system (e.g. case file system, excel, etc.) – ideally, this step will be automated through the use of a scheduled data publication tool that regularly receives updated information.

- **Verify Data Compatibility:** DataBC will provide supplying sectors & ministries with the structure of data and metadata that is required to be compatible with its systems and data catalogue. For metadata, this will include the dataset descriptors that must be completed to enable effective discovery within the data catalogue. Where data is found to be incompatible, DataBC will request that the supplier resubmit metadata data according to required standards. Note that, while DataBC considers data quality to be of significant importance for ensuring the usability and effectiveness of data, it will not provide data remediation services. This will ensure that the supplier's *source* data acts as a single version of the truth, and will allow Data Custodians to provide overall accountability for their sector or ministry's data.

- **Transform & Load Data:** After the data has been reviewed for privacy and security concerns it can be transformed into a warehouse model that may be hosted in the DataBC warehouse for access. If the data is destined for a file system (either hosted by DataBC or by the source business area) then the data will be transformed into a compliant machine readable format that can be easily shared and used by data

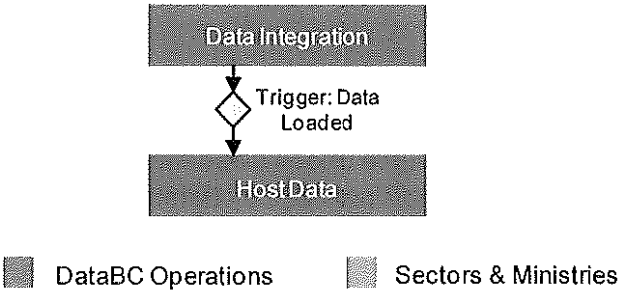
consumers. Once the data has been transformed it can be loaded into the DataBC warehouse.

- **Implement Scheduled Replication:** After data has been successfully loaded for the first time, the supplying sector or ministry sets the replication schedule and ensures any changes to the original 'master' dataset are propagated through to the DataBC warehouse.

- **Update Metadata Repository:** After the data has been loaded, the supplying sector or ministry can update their metadata repository records, which will indicate, for example, which data will be available through the DataBC warehouse.

Host Data

DataBC will provide data hosting services on DataBC infrastructure, where data can be registered with the DataBC data catalogue (note – the catalogue does not contain the data itself, rather it is an aggregation of *the descriptions* of all available datasets). The data is then available for access through the rich DataBC access application environment as well as being available to other applications and people who require it. For data that is hosted by DataBC , whether in the form of flat files or database records, the data catalogue will point to DataBC's integrated warehouse environment.

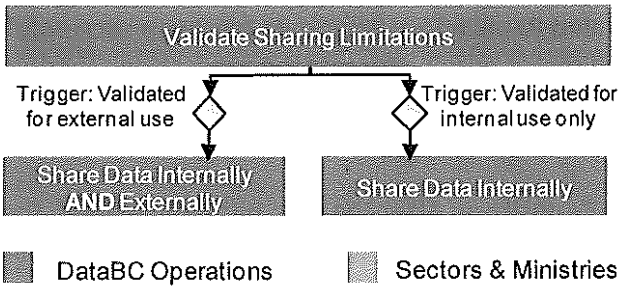


For data that is hosted by a participating ministry or sector and does not require publication to the DataBC integrated warehouse environment, the data may still be registered with the DataBC data catalogue. In these instances, the data catalogue can point to the ministry or sector's locally maintained data store. However, the benefit of using the DataBC hosting service is that data can easily be leveraged as a platform for sophisticated web service or application development.

Validate Sharing Limitations

Regardless of *where* the data is hosted, the next step of DataBC's main operational process is to confirm any sharing limitations on the new or updated dataset, per the internal analysis performed earlier by the sector or ministry. This 'safety check' will help DataBC to validate any

limitations on sharing data internally and externally, to ensure compliance to legislative requirements.



Share Data

DataBC will provide mechanisms to share data through multiple channels that are described and accessed through the DataBC website. The website will cater to both internal and external audiences, which will require DataBC to maintain a security service that prevents external users from discovering and accessing datasets that have been approved for internal sharing only.

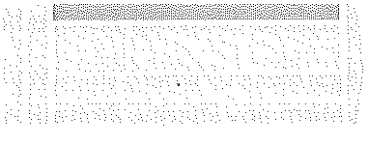
There will be two primary *types* of users of DataBC: *general consumers* (e.g. internal staff and external users visiting DataBC out of interest) and *developers* (e.g. internal staff and business groups who build services on government data). The DataBC website will cater to each of these groups.

- For general consumers: the DataBC website will provide an interface to browse or search the DataBC catalogue. If a user is interested in a particular dataset, he or she can be directed to the appropriate source to download the data, or can interact with that data directly with visualization tools provided by DataBC, by the supplying ministry or sector, or by third-party websites or applications designed by developers.

- For developers: the DataBC website will provide frameworks and tools to expedite the development process.

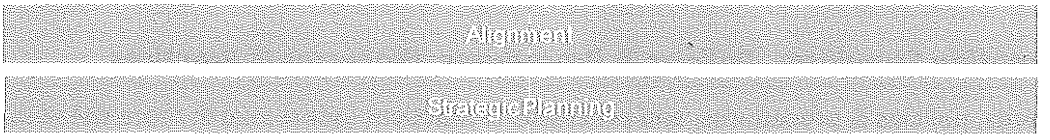
DataBC may also use other mechanisms to share information about datasets, including Real Simple Syndication (RSS) feeds that notify interested consumers and developers when a specific dataset has been updated.

5.4. Strategic Functions



There are two important strategic functions that will be required to position DataBC for success – alignment and strategic planning. These functions are performed by key Government of BC leaders, and include the Deputy Ministers' Committee on Technology & Transformation (DMCTT), the Assistant Deputy Minister of

Strategic Initiatives Division for the Ministry of Labour, Citizens' Services and Open Government (ADM SID), the Office of the CIO (OCIO) and the Cabinet Committee on Open Government & Engagement (CCOGE).



Alignment

DataBC oversight stakeholders will ensure that the program is aligned to government priorities and objectives. When priorities are defined by, for example, the DMCTT or CCOGE, these groups will communicate their priorities to DataBC so that program initiatives can be strategically aligned. Stakeholders will meet regular to ensure current priorities are understood.

Strategic Planning

Strategic planning for DataBC will be overseen by the ADM of Strategic Initiatives Division (ADM SID). The ADM SID will regularly meet with DataBC to review plans and initiatives, and work to ensure DataBC is appropriately funded to achieve its objectives – the funding process will be performed in close collaboration with the OCIO and DMCTT.

5.5. Standards & Licensing Functions

Standards and licensing functions provide a foundational level of governance for the management of use of government data. These functions are performed by the *DataBC Program Leadership* and are depicted below:

Licensing

DataBC will develop and maintain licensing agreements to enable both internal and external use of the datasets in its catalogue, thereby reducing what has historically been a barrier preventing wide adoption and distribution of data. Licenses will be designed to enable the freest possible use of government data. DataBC will also look into cases of misuse of its license,

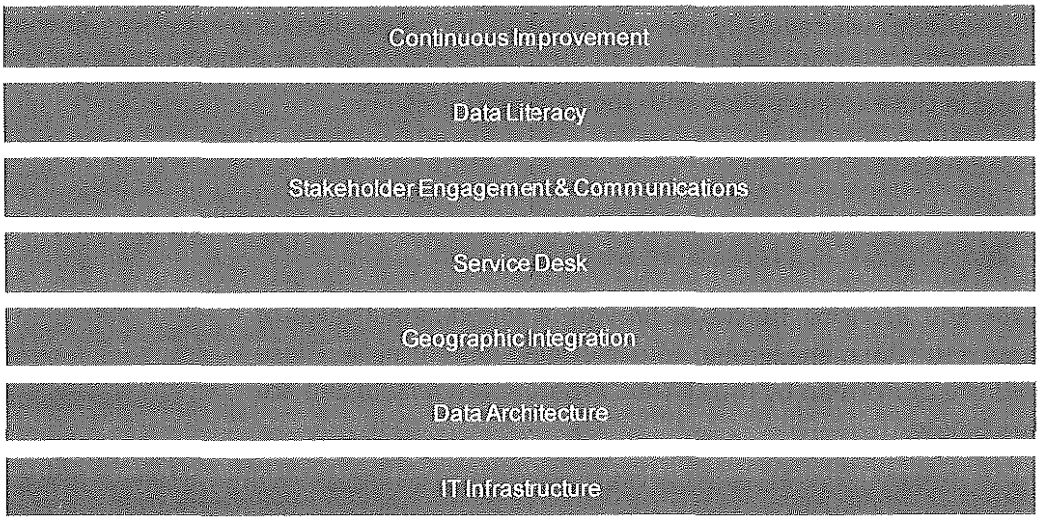
and engage parties who may be acting against the terms in the license, under the consultation of the Attorney General.

Information Standards, Policies & Procedures, Processes & Practices

Standards, policies & procedures, and processes & practices (addressed in more detail in the *Governance* section) are developed by DataBC to provide guidance to data suppliers for managing data as an asset and facilitate effective data management. Standards, policies & procedures define expected data requirements or "norms", while processes & practices will provide tactical guidance for data users to implement against these requirements. For example, a DataBC standard may specify required metadata descriptors for datasets (e.g. title, date, descriptors of accuracy, etc.) while a process or practice describes how to apply those descriptors and how to submit datasets to the DataBC catalogue.

5.6. Supporting Functions

Supporting functions are carried out as part ongoing operations of DataBC, and include the functions depicted below:



Continuous Improvement

DataBC will measure performance across all of its operational functions to continuously improve the services that DataBC provides. This will require the definition and tracking of performance metrics – a task which, for some metrics, can be automated through the use of monitoring tools. Web analytics, for example, will be run on the DataBC website where the data distribution service is accessed to determine quantity and frequency of dataset downloads. Online surveys may be used to gauge satisfaction of end users.

Data Literacy

DataBC will seek to improve the overall level of "data literacy" both within the Government of BC and outside government, helping to inform both citizens and public servants about the value of data and how it can be used to improve their daily activities. This may include, for example, communications to promote awareness, workshops to teach essential skills, web-based training for data users or internal consultation to ministries and sectors to help them use data more effectively and integrate data into their business processes.

Stakeholder Engagement & Communications

DataBC will promote use of its website and data catalogue, and foster a community of contributors and consumers. This will include outreach activities, such as competitions to create applications on DataBC's data (e.g. the Apps 4 Climate Action competition), recognizing users who have created value from the data and maintaining a blog and on-going dialogue about the value of government data. DataBC will also solicit feedback from data users as an input to the continuous improvement function, and communicate anticipated changes to its data catalogue so that end users can proactively address any impacts to services they have built on the data.

Service Desk

DataBC will operate a service desk to ensure stakeholder issues or inquiries are addressed in a timely fashion, and to help triage DataBC activities. When a stakeholder has an issue that requires follow-up, he or she can visit the DataBC website and easily locate service desk information. Ideally, the stakeholder can choose to submit his or her issue online at this time (or simply find the answer to his or her question on the website), or can call the service desk directly.

The first point of contact within the service desk is referred to as "Tier 1 Support." This group can resolve simple requests and, for more complicated requests, can direct and connect the user to the appropriate "Tier 2 Support" party, such as a Data Standards Manager (*see Governance section*) for follow-up. The first function of the Tier 1 Support group is to triage the DataBC request. The *Information Technology Infrastructure Library (ITIL)* provides an appropriate framework for prioritizing requests:

- ***Impact***: *what is the effect of the stakeholder's issue on a business process? (e.g. are there business groups that have been impacted by unexpected changes to a data set)*
- ***Urgency:*** *how long will it be until the stakeholder's issue has a significant impact on the business? (e.g. a high impact issue may have low urgency if it will not impact the stakeholder until the following year, as with proposed changes to a dataset)*
- ***Priority***: *what is the relative importance of the stakeholder's issue based on impact and urgency?*

DataBC will define Service Levels that dictate the appropriate response based on the above criteria. For example, an SLA may define four request priority levels, each having its own appropriate resolution timeframe.

The DataBC Service Desk is expected to address the three major types of requests, all of which have a corresponding Tier 2 contact for complex issues. Per the proposed governance model (*see following section*), these Tier 2 contacts belong to the DataBC *Stakeholder Engagement Services, Data Services, and Website Services* groups respectively:

- ***General Stakeholder Requests:*** *general inquiries related to the plans and operations of DataBC (e.g. How can I get involved? When will you address my group?)*
- ***Data Requests:*** *requests related to the supply or consumption of datasets (e.g. How do I submit a dataset? What data is relevant to DataBC? The data that I need is not included in your datasets – can you start collecting it? I've noticed data quality issues – can you remediate them? Changes to your datasets are impacting my business – can the changes be reverted or modified?)*
- ***Website Requests:*** *issues related to the use of the website (e.g. How do I use the website? How do I access the data catalogue? Can you feature my application on the DataBC website?)*

Geographic Integration

Perhaps one of the most important functions for making data useful for both internal and external consumers is the geographic integration service that DataBC will provide. Geography provides an important dimension and context to data and decision making.

As previously mentioned, the Province already has a mature spatial data infrastructure with data discovery, download, visualization, and application framework services. DataBC will further the use of geographic data and services as a service transformation enabler. Services that were developed in the Natural Resource Sector will be leveraged for broader use across the enterprise. The infrastructure (e.g. the BC Geographic Warehouse) and the capabilities (e.g. management of an open geodata catalogue) that have been developed through the operation of an enterprise spatial service will continue to be leveraged through the delivery of a geographic integration service.

As part of its geographic integration service, DataBC will provide:

- Geocoding of data
- Spatial application frameworks
- A spatial warehouse (i.e. the BC Geographic Warehouse)
- Mash-up frameworks

- Geocoding web services
- Web map service (WMS) data feeds

Web mapping framework services will be an important component for creating geographic "mash-ups" – interactive map displays of data that will enable government clients to use geography as an enabler to decision making.

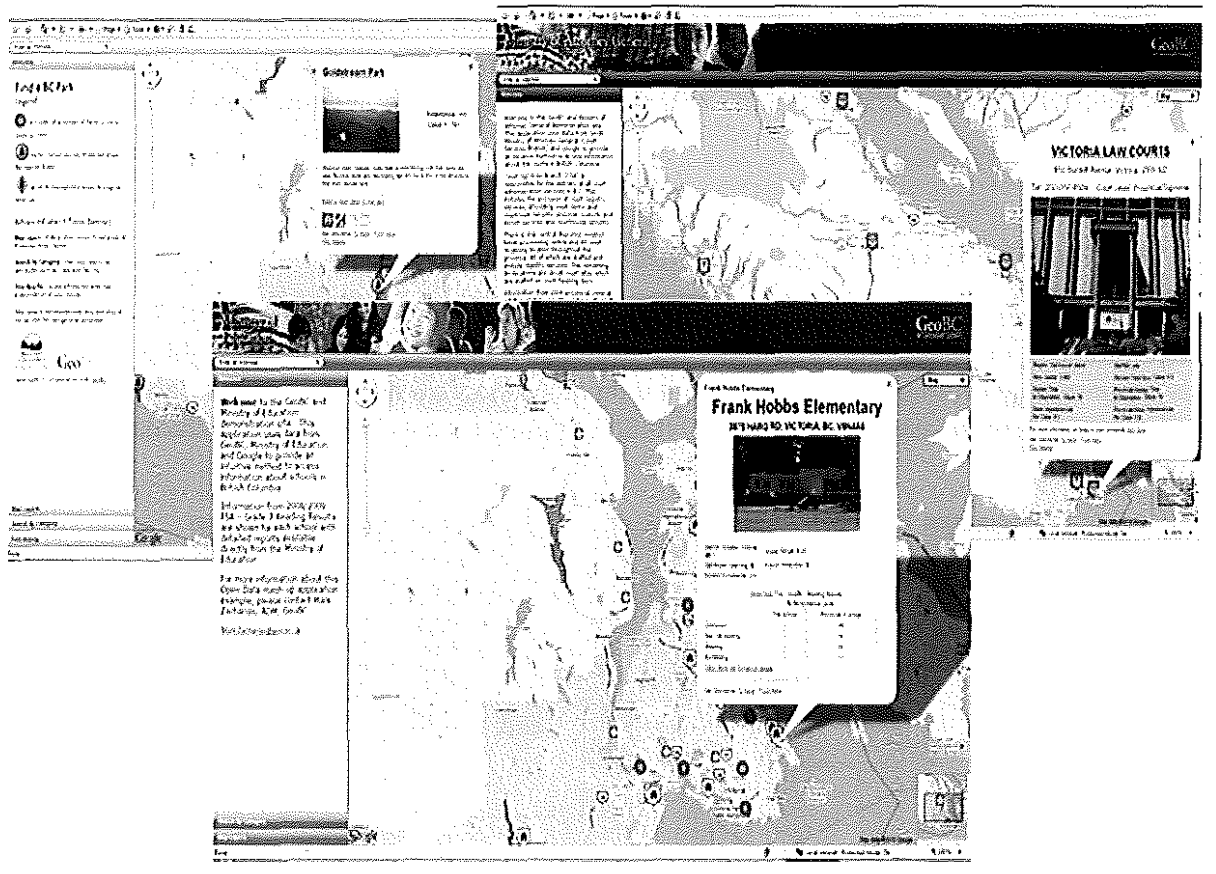


Figure 5: The DataBC Mash-up Framework: A tool for turning raw "Open data" into consumable "Open Information"

Data Architecture

DataBC requires data architecture for constructing its Data Warehouse. This architecture will be built on the standards, policies and procedures that have been defined by DataBC, and will also include the warehouse data model, a metadata dictionary, and privacy and security requirements that will ensure sensitive data is sufficiently protected.

IT Infrastructure

Technology is a fundamental enabler of DataBC. The IT function will provide the necessary tools to facilitate data management and maintain data as a strategic asset, and to make data accessible to consumers.

The portfolio of technology that DataBC will maintain includes, for example, Extract, Transform & Load (ETL) tools used during data publication, the data warehouse needed to store and maintain data, and a search engine for discovery of data sets. Also included within the portfolio of technology that DataBC will provide is the website where the data catalogue will be shared and users will interact directly or indirectly with the tools that DataBC provides. \

5.7. Putting it together: The DataBC Value Chain

The following functional model represents the end-to-end value chain for DataBC. The main operational process is performed under the strategic direction of DataBC oversight groups, and is supported by a number of functions that ultimately allow DataBC to provide a service that manages data as an asset. The value of DataBC is represented as internal and external outcomes.

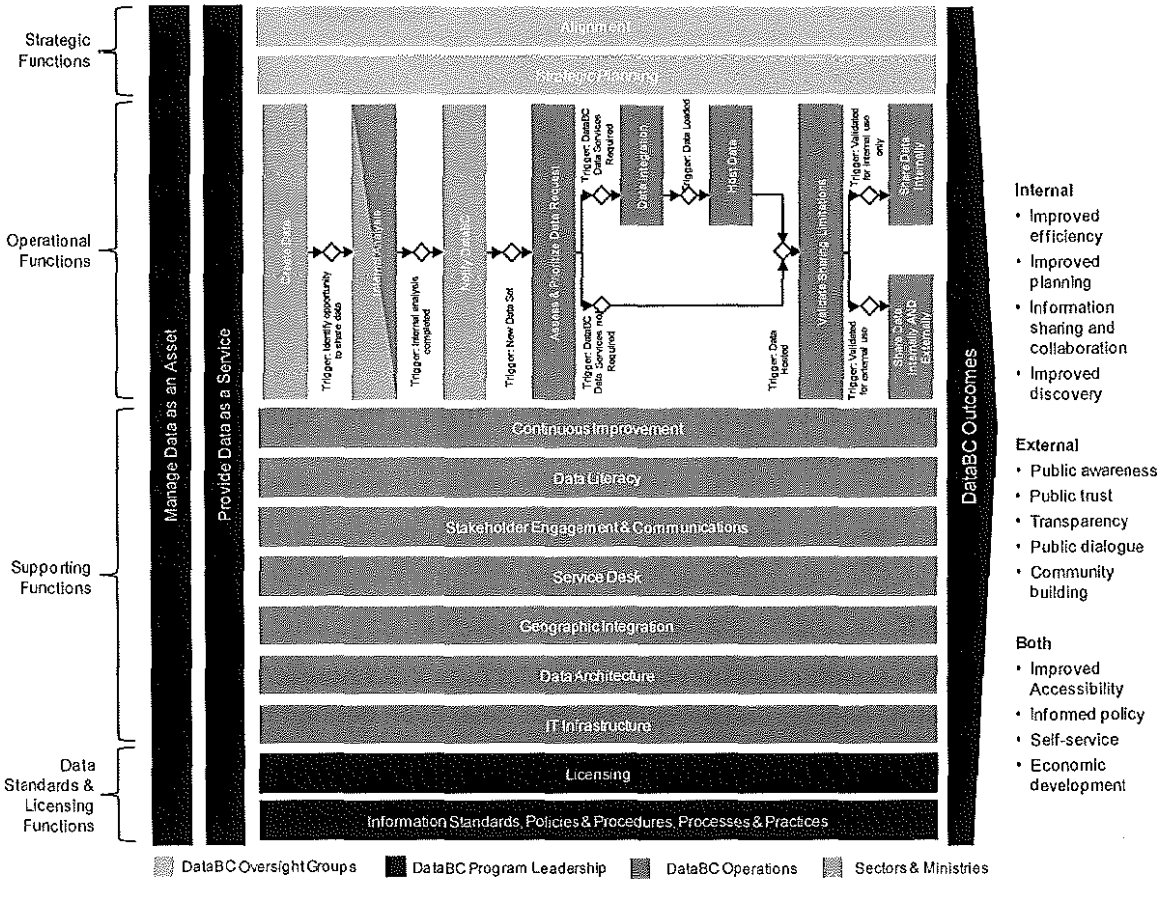


Figure 6: DataBC Functional Model and Value Chain

To fully understand this model it is helpful to consider how the functions work together to achieve specific outcomes. A selection of DataBC outcomes have been revisited below to examine the role of the major functions in delivering them:

- **Improved Accessibility**: DataBC provides *licensing* that allows for the freest possible use of data, such that it can be accessed and *shared* via the DataBC website with minimal restrictions. *Geographic integration* further improves the ability to consume data by providing intuitive visual interfaces, such as an interactive map, that allow users to examine data by region.

- **Improved efficiency**: *IT infrastructure* provides tools that help to automate data management activities, such as *data integration*. Tools are configured to the DataBC *data architecture*.

- **Improved planning**: through *data literacy*, DataBC's stakeholders can better understand the data available to them and perform planning and decision making based on that data. *Continuous improvement* ensures that, over time, planning becomes more accurate as data quality improves.

- **Transparency**: under the *strategic direction* of DataBC oversight groups, DataBC works with sectors and ministries to *share data* that will improve transparency for the public. Prior to sharing, DataBC *validates sharing limitations* to ensure that shared data is compliant to FOIPPE, IPP and other regulations.

- **Community building**: through *stakeholder engagement* DataBC fosters a community of data users, and allows citizens to work with government to identify further opportunities for ministries and sectors to *submit data* to DataBC and *share data* via the DataBC website.

- **Improved discovery**: *IT infrastructure* provides a centralized repository to *host data* and a search tool to easily discover datasets that have been *shared* internally or externally.

Clearly each function will play its own critical role in attaining broad success both internally and externally.

The following section on *Governance* defines the roles and accountabilities that are necessary to deliver the DataBC service, and the stakeholder groups that will assume those roles and accountabilities. Some of these roles have already been identified at a high level, such as the roles of DataBC Program Leadership, DataBC Operations, DataBC Oversight and sectors & ministries. Where applicable, stakeholders in the *Governance* section have been linked back to their respective functions for reference.

6. DataBC Governance

6.1. Overview

DataBC is about managing data as a strategic asset, and providing a data service to both the citizens and the Government of BC that will enable effective use of its data. As with other assets, managing data will require its own set of governing rules and organizing principles to maximize value and protect its integrity. This system of rules is referred to as Governance.

A mature organization uses six primary mechanisms to enable effective governance:

1. ***Organization***: Identifies the primary stakeholders and their respective roles, responsibilities and accountabilities
2. ***Standards, Policies & Procedures***: Guidelines and principles that define the "norms" or requirements for effective data management
3. ***Governance Metrics:*** Measures for monitoring the performance of data management and integrity of data across the enterprise, and actions to promote continuous improvement
4. ***Processes & Practices:*** Tactical "instructions" for how to define or implement standards, policies and procedures to achieve effective, consistent data management
5. ***Tools & Technology:*** Facilitates data management and provides automation and controls enable compliance to standards, policies & procedures. Technology also facilitates presentation and consumption of data.
6. ***Data Architecture:*** Includes enterprise data standards, and the information model, metadata dictionary and security and privacy requirements that support them.

Key Messages:

- Strong governance is a fundamental enabler of DataBC – the first step towards establishing this governance is to setup the organization that supports and delivers DataBC services
- To be successful, DataBC requires the participation of several stakeholder groups including DataBC program resources, Sector & Ministry data resources, and oversight groups such as the DMCTT and CCOGE
- A balance of both technical and business interests will ensure data is sufficiently maintained as an asset, and addresses government priorities

While all six mechanisms are of strategic importance for managing data as an asset, it is the organization that must first be addressed. The organization, once established, drives out the remaining mechanisms as it matures to effectively manage data.

This document focuses on the governance organization that is needed to support DataBC. DataBC's organizational model will identify key stakeholders and their relative roles and accountabilities for making DataBC a success.

The following framework provides a model for successful governance in a mature organization. The framework can be used a 'sanity check' to ensure DataBC governance is addressing all factors required to make the program successful. The organization is of primary concern and subsequently develops the remaining areas.

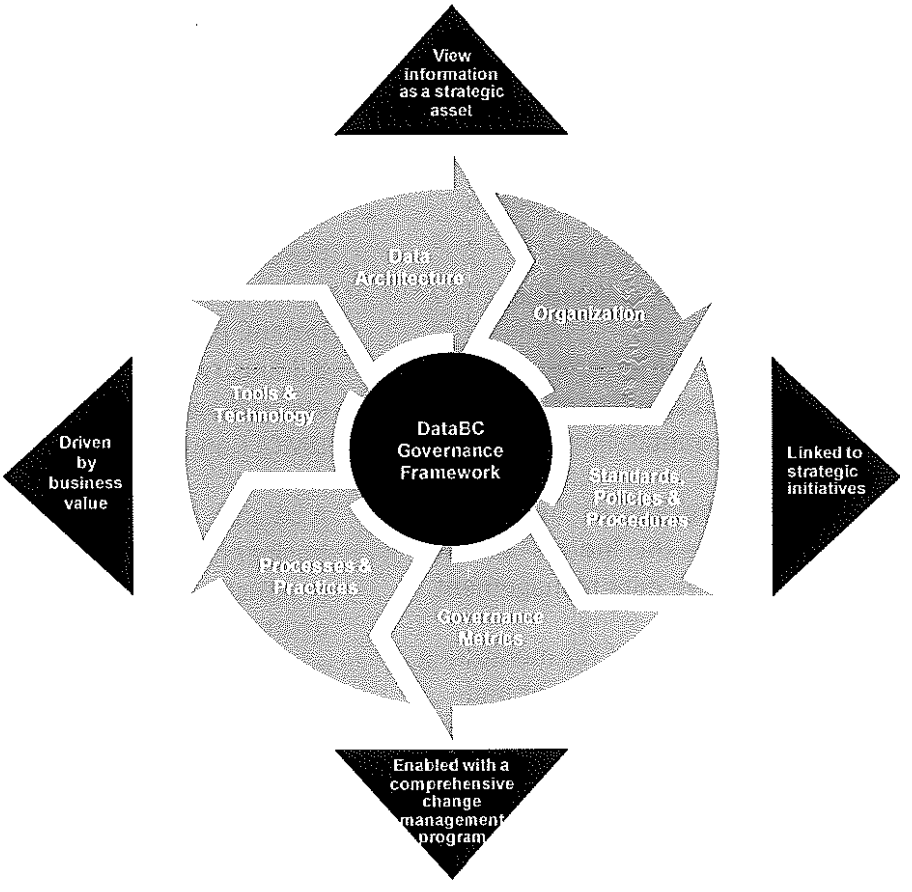


Figure 6: DataBC Governance Framework

This proposed organization to support the DataBC program will consist of operational groups that perform day-to-day processes, practices and implementation activities, and oversight and consultation groups that ensure DataBC operations are strategically aligned to government priorities.

6.2. Governance Organization Design Principles

The proposed model for DataBC governance is designed based on a set of principles that will ensure data can be used strategically as an asset across the government, while still fulfilling needs of individual sectors and ministries.

Sponsorship: *DataBC needs to receive overall guidance and sponsorship from a senior group that is ultimately accountable for the success of the program.*

Leadership: *DataBC should receive more direct leadership from a DataBC council which has responsibility for driving effective use of data across the enterprise*

Cross-functional representation: *DataBC will engage with stakeholders across ministries and services, including members of the Office of the CIO.*

Shared responsibility: *Many parties share responsibility for the success of DataBC to ensure effective communication, engagement and buy-in.*

Clear, defined roles: *Stakeholders should have clear, defined roles with distinct responsibilities and objectives.*

Balanced business and technical interests: *Business and technical resources should work closely together to manage data. Business stakeholders maintain perspective of the needs of individual Sectors & Ministries while technical resources will provide an Enterprise perspective to facilitate compliance with standards, policies & procedures. This balance will ensure that data serves a business purpose while being useful to other stakeholders outside of individual Sectors and Ministries.*

Enabled by supporting functions: *DataBC needs to be supported by several enabling functions such as IT, Communications, and Licensing – these enabling functions need to be clearly understand and recognized.*

Includes the governed: *Data suppliers and consumers should be included in DataBC's governance model since they are the ultimate users of the data.*

In alignment with these principles, the following stakeholders have been identified as necessary for the successful operation of DataBC:

- Deputy Minister, Ministry of Labour, Citizens' Services and Open Government
- ADM, Strategic Initiatives Division, Ministry of Labour, Citizens' Services and Open Government
- Data Custodians, Data Standards Managers, and Data Suppliers
- DataBC: Program Leadership and operational groups
- Office of the CIO (OCIO), including representatives from:

  - Architecture & Standards Branch (ASB)
  - Knowledge & Information Management
  - Intellectual Property Program (IPP)
- Deputy Ministers' Committee on Technology Transformation (DMCTT)
- Cabinet Committee on Open Government and Engagement (CCOGE)
- External Consumers (e.g. Citizens, Business Groups, Academic Institutions, etc.)

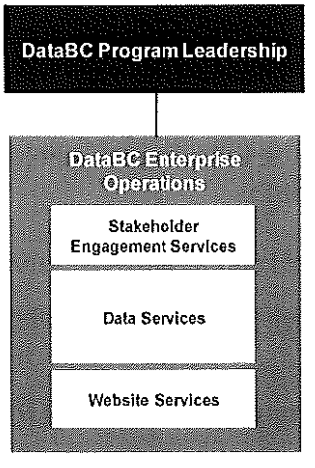
Using the above stakeholders and designing principles, the governance model in the following section has been proposed for DataBC. This model identifies the primary roles and accountabilities of each stakeholder group, and identifies their relationships relative to each other. The model is introduced by major stakeholder groups and subsequently shown in full.

6.3. DataBC Program

The core objective of the DataBC Program is to provide a service that allows the Government of BC to use data as a strategic asset. To accomplish this objective, DataBC will operate a portfolio of data-related services to facilitate the data management process, and facilitate the creation and sharing of an overall Government of BC data catalogue which aggregates datasets of participating sectors & ministries. DataBC services, which have been defined in more detail in the *Operations* section of this document, are delivered by three major service groups:

- Stakeholder Engagement Services
- Data Management Services
- Website Services

These service groups will be part of overall operationally focused team called "DataBC Enterprise Operations." As illustrated below, this group receives direction and leadership from DataBC Program Leadership.



The ***DataBC Program Leadership*** is accountable for the overall operations of DataBC and manages the *Enterprise Operations team*. The *DataBC Program Leadership* also plays a lead role forming and coordinating ad hoc working groups to tackle specific sector & ministry data initiatives.

Functions: Licensing, Information Standards, Policies & Procedures, Processes & Practices

Stakeholder engagement services are primarily responsible for engaging both internal and external data users to promote effective use of DataBC services. This includes coordinating outreach activities such as apps contests to attract new users, and for promoting greater data literacy through education, training and internal consultation to groups wishing to share data or make more strategic use of their data.

Functions: Continuous Improvement, Data Literacy, Stakeholder Engagement & Communications, Service Desk

Data services are the operational focus of DataBC. *Data services* works with sectors or ministries with emerging data management experience and capabilities, and helps them to contribute their datasets to the DataBC catalogue. This includes extracting data from source systems, transforming data into a format that is compatible with DataBC standards, and to loading and hosting data using DataBC systems. *Data services* will also provide ongoing support and consultation to sectors and ministries to help them use their data more effectively. This includes helping others to understand data standards and to develop effective data architectures, and providing a geospatial service which includes the provision of reference frameworks for data access APIs (programmable interfaces that enable developers to leverage foundational development that has already been done by DataBC), geospatial web mapping and mash-up services.

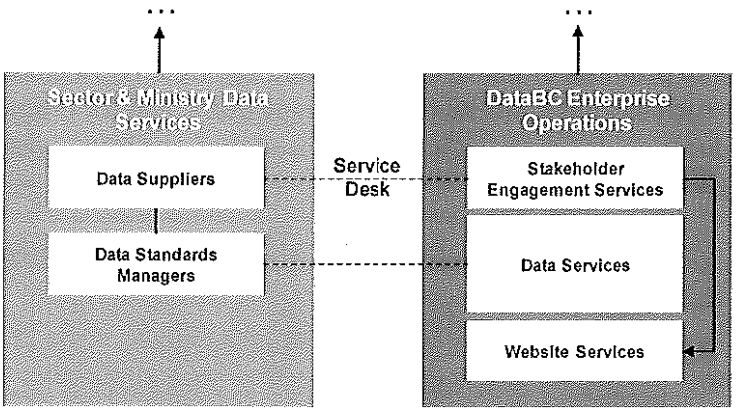
Functions: Assess & Prioritize Data Request, Publish Data, Host Data, Validate Sharing Limitations, Geographic Integration, Data Architecture, IT Infrastructure, Provide access services

Website services develop and maintain the DataBC website (in alignment with Government of BC standards). *Website services* ultimately maintain the linkage between the DataBC website and DataBC data catalogue. Other website responsibilities include posting and maintaining web content such as DataBC communications, and working closely with *stakeholder engagement services* to develop specific tools for promoting engagement (e.g. visualization tools and collaborative features).

Functions: Share Data

6.4. Core DataBC Operations

At on operational level, DataBC is closely engaged with sector & ministry data services that contribute data to the DataBC catalogue, and consume other services provided by DataBC such as consultation and mentorship. Their relationship is illustrated below:



Data suppliers provide datasets on behalf of sectors & ministries where they have identified an opportunity to do so. This group works closely with their ***Data Standards Managers*** to ensure an appropriate level of data quality. Ultimately accountability for an individual Sector or Ministry resides with that Sector or Ministry's ***Data Custodian***.

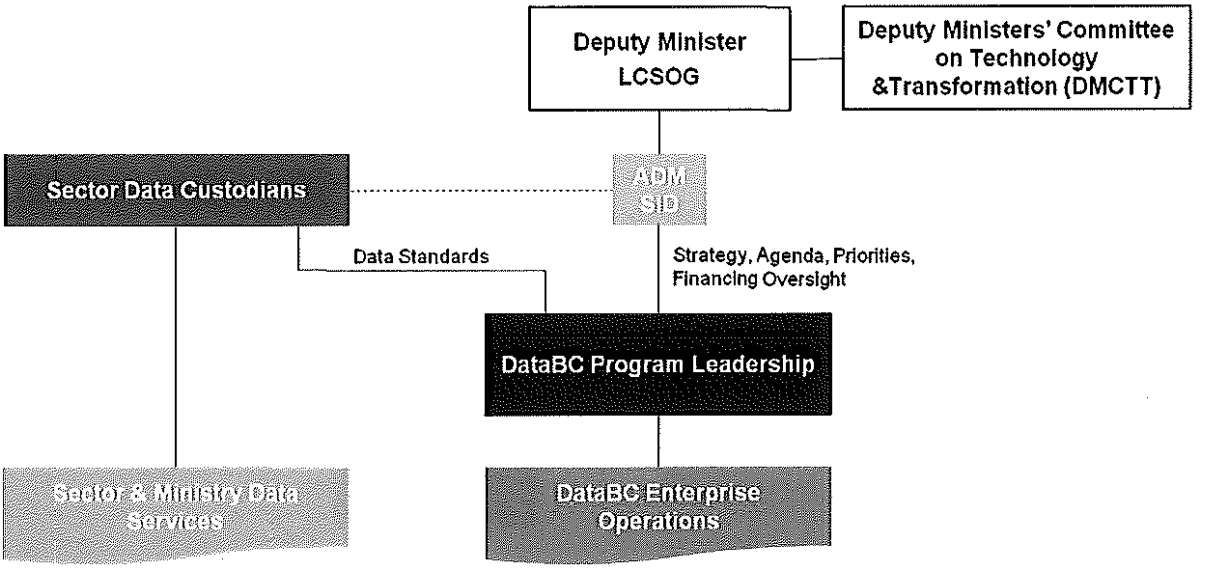
Functions: Create Data, Internal Analysis, Submit Data

With respect to sector & ministry data services, *Stakeholder engagement services* will act as the primary point of engagement. The stakeholder engagement groups will interpret the concerns of the *data* supplier and connect them to the appropriate party for follow-up. Where data management assistance is needed, the *data services* group will provide that service as previously described. *Data services* will also work with the *data suppliers* to understand sharing restrictions on their information and validate whether their data can be shared externally. Where a sector or ministry has a request related to the DataBC they will be directed to the *website services* group for follow-up.

6.5. DataBC Oversight

Direct oversight for DataBC is provided by the *DataBC Program Leadership*, which in turn is directly overseen by the *Assistant Deputy Minister of Strategic Initiatives Division (ADM SID) of the Ministry of Citizens' Services,* and by *Sector Data Custodians*. Ultimate accountability for DataBC resides with the *Minister of Labour, Citizens' Services and Open Government (LCSOG)* through the *Deputy Minister (DM LCSOG)* working with the *Cabinet Committee on Open Government Engagement (CCOGE)*.

Functions: Provide Strategic Direction



The ***Deputy Ministers Committee on Transformation and Technology (DMCTT)*** provides strategic direction to DataBC via the ***DM LCSOG***. DMCTT is accountable for the strategic alignment of Ministries related to goals of Open government and Open data.

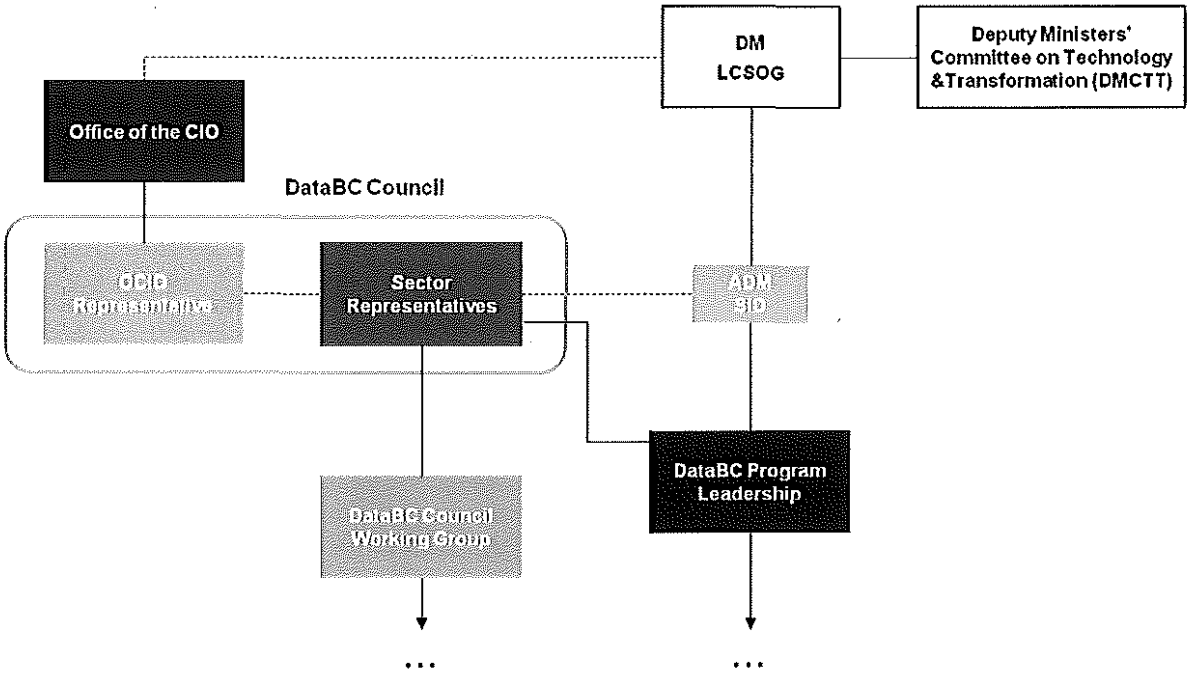
The ***ADM SID*** works closely with the *DataBC Program Leadership* to inform strategic objectives and priorities of DataBC. The *ADM SID* will review and approve plans, priorities, funding models, and licensing agreements draft by the *DataBC Program Leadership.* The *ADM SID* also acts as the central coordination point for liaising with other stakeholders (described in more detail later).

Sector Data Custodians provide technical oversight for DataBC. This group reviews and approves DataBC standards, policies & procedures, and processes & practices, and disseminates information to their respective sectors & ministries. *Sector Data Custodians* are part of a larger DataBC Council, whose role is described later in more detail.

6.6. DataBC Council, Working Group & OCIO Alignment

The ***DataBC Council*** provides strategic advisory to DataBC and convenes regularly (frequency to be determined) to discuss priority issues and provide decision making for the program. The Council acts on behalf of the DataBC program to engage government stakeholders where there is a more appropriate, direct relationship (e.g. the OCIO).

The DataBC Council consists of *Sector Representatives, e.g., Sector Data Custodians, Sector CIOs,* and also consists of representative(s) from the *Office of the CIO (OCIO)* as required.



The ***DataBC Council Chair*** acts as the primary coordination point for the DataBC council on behalf of the DataBC program.

Sector Representatives provide strategic, tactical, technology consultation and perspective on behalf of their respective Government of BC Sector. *Sector Representatives* may include the previously described Sector Data Custodians.

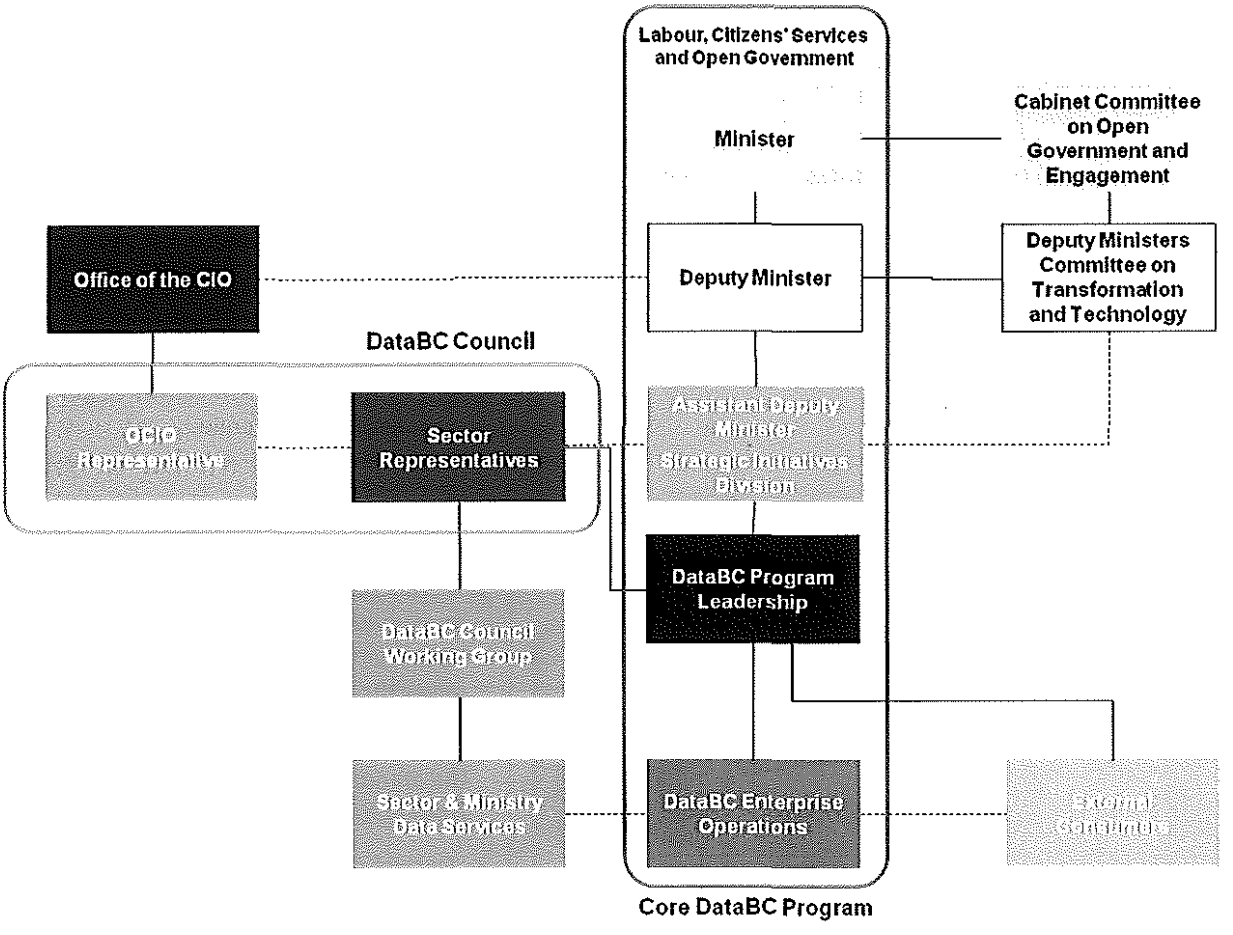
The ***Office of the CIO (OCIO)*** ensures alignment to strategic IM/IT initiatives such as "Citizens @ the Centre." The OCIO also have overall accountability for specific groups that provide consultation to DataBC, and participate on the DataBC council as required.

Part of the responsibilities of the DataBC Council will include addressing government wide issues such as development of enterprise data strategies (including geo-spatial, data cataloguing), resolution of data governance conflicts, development and administration of data governance training and outreach, and other enterprise data management related tasks of significance to the province. The resolution of these activities will require the establishment of a ***DataBC Council Working Group*** made up of sector Data Standards Managers, the OCIO and DataBC Enterprise Operations staff.

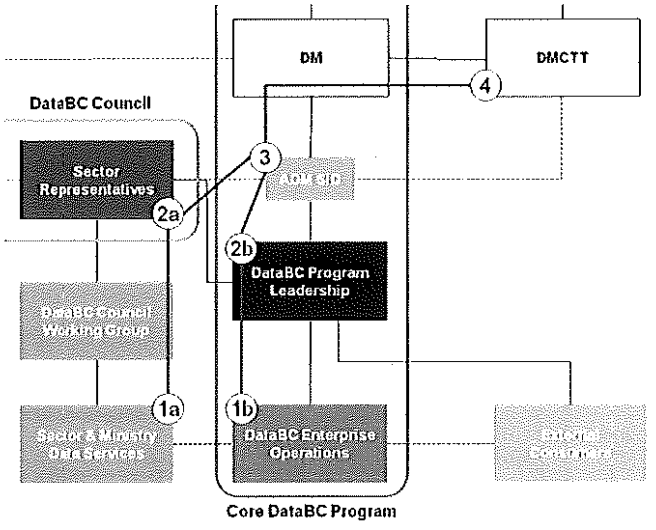
The DataBC Council Working Group will report to and be directed by the DataBC Council and will be responsible for striking special interest sub-groups and task teams to address issues as they arise.

6.7. Putting it together: Overall DataBC Governance & Accountability Model

The following diagram shows the overall governance and accountability model for DataBC. To fully understand how the model fits together, it is helpful to consider practical scenarios which involve the major stakeholders identified. Three such scenarios are provided below.

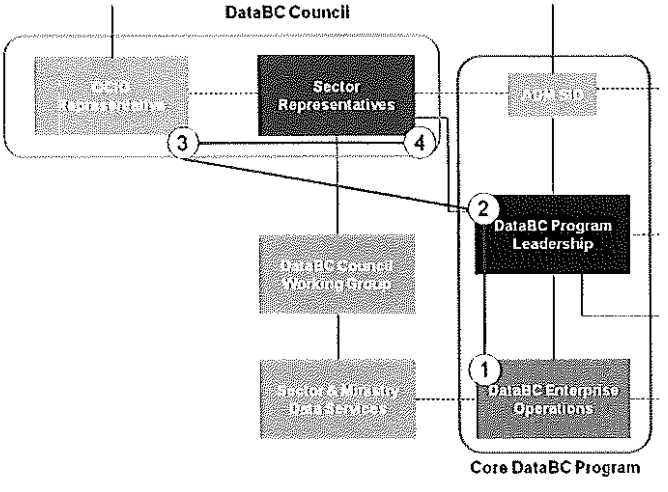


Scenario 1: Overcoming an Information Sharing Barrier within a TnT Plan



1. In this scenario, *data suppliers* within a particular ministry are carrying out work against a Technology & Transformation (TnT) plan. The plan involves working with DataBC to contribute a valuable dataset for internal sharing. The group encounters a barrier that is preventing information from being shared at a level that is useful to other Sectors & Ministries.
2. The issue is raise to *DataBC Program Leadership* via the *Enterprise Operations* team, and is concurrently raised to *Sector Data Custodians* via the *data suppliers.*
3. The issue is discussed at the DataBC Council. The *ADM SID* then engages the *DMCTT* through the DM LCSOG to get the issue on their agenda.

Scenario 2: Creation of a New DataBC Standard



1. In this scenario DataBC *data services* identifies recurring quality issues with incoming datasets and raises the need for a data standard
2. *DataBC Program Leadership* drafts the standard in consultation input from *data services*.
3. *DataBC Program Leadership* consults with the *ASB* to ensure the standard aligns to government guidelines.
4. *Sector Data Custodians* engage the *ASB* representative to provide further feedback and consultation as required

6.8. Alignment to Design Principles

The proposed DataBC governance organization has been contrasted against the design principles outlined earlier in this document to ensure stakeholders are strategically aligned to the ultimate objective of managing information as an asset:

Principle	DataBC Alignment
Sponsorship	• DM LCSOG provides overall sponsorship for DataBC
Leadership	• ADM SID provides direct leadership for DataBC • DataBC Council provides general oversight on a broad range of issues
Cross functional representation	• Representatives from each participating sector reside on the DataBC council, this includes Data Custodians and potential CIO participation • External groups such as CCOGE and OCIO are represented
Clear, defined roles	• Stakeholders are defined into distinct groupings (e.g. oversight, operations, etc.) with specific objectives and roles
Shared responsibility	• Sector & ministry data services work closely with DataBC Enterprise Operations to contribute to and maintain the data catalogue
Balanced business and technical interests	• Decision making groups include cross representations from sectors (i.e. the 'business') and enterprise-focused groups such as the OCIO • Sectors and ministries have both Data Custodians to represent their business, and Data Standards Managers to ensure compliance to cross-government information standards
Enabled by supporting functions	• DataBC offers a portfolio of three services to ensure the program is properly supported with IT, Stakeholder Engagement, Communications, etc. (defined in more detail in the Operations section)
Includes the governed	• External consumers are represented • All internal stakeholders can be considered internal consumers

7. What DataBC Means for Me

It is worth considering the impact that DataBC will have on you – the end users. This section profiles a subset of future users of DataBC's services, identifies the role of data in their day-to-day life and provides some example metrics that can measure the success of DataBC. A detailed list of potential metrics to gauge success of DataBC is provided in Appendix C.

Key Messages:

- Data will become as ubiquitous as computers and email – it will be essential to the future operation of government
- The importance of data will not be limited to those who manage it – data will also play an important role for internal consumers such as policy analysis and deputy ministers, and external consumers such as business groups, NGOs and citizens at large
- For resources that do manage data, this task will become easier with DataBC, and allow for more value-added activities that focus on expanding the role the data plays in improving government

7.1. The Policy Analyst

Policy analysts can be considered internal consumers of data. They use data to examine impacts of policy changes and advocate for further sharing of data from other sectors & ministries.

DataBC will be a success when... *data becomes an integral part of my job. Life without DataBC would be akin to life before computers and email. I use data to inform policy decisions, and to model the impacts of proposed policy decisions.*

A day in the life... *I am asked to assess potential impacts of a policy change. I use my analytical tools on a variety of relevant datasets from DataBC to model the impacts of the proposed changes. I summarize my analysis into an easily consumable, visual format and distribute results to interested stakeholders.*

Example metrics: *Sector or ministry DataBC participation rates (Internally shared datasets / Total datasets); Total internal downloads*

7.2. The Program Manager

Program managers can be considered internal consumers of data. They use data to find opportunities for efficiency, and develop plans to realize those efficiencies. They also use data to better anticipate demand, such as legislative impacts on resourcing. Program Managers can

also be considered suppliers of data when they identify opportunities to share their programs data (more on *data suppliers* below)

DataBC will be a success when... *I can easily interpret and visualize data that conveys the performance of my program (e.g. based on standard performance metrics that are tracked), and can base future planning decisions on real, data-based evidence. Having the right data and sufficient tools allows me to simulate outcomes of my decisions.*

A day in the life... *I am planning for the next phase of my project. Using the data available I can assess progress and performance of my program and strategically address areas requiring greater focus. I can forecast staffing demand to ensure I am proactively lining up the right resources at the right times.*

Example metrics: *DataBC usability score; Accuracy of plans (forecast vs. actual)*

7.3. The Deputy Minister

Deputy Ministers are considered internal consumers of data. They use data as an input to strategic decision making (e.g. for capital planning or policy changes).

DataBC will be a success when... *decision making is always informed by data and is facilitated by tools that make information easy to consume (e.g. BI, visualizations, and analytics). The need for meetings is significantly reduced since the data I need is readily available and shared. Policies that come to me are more evidence based which help me brief the minister.*

A day in the life... *I login to my computer and am immediately presented with a dashboard summarizing the information that is most valuable to me, such as key metrics that indicate performance of programs I oversee. This dashboard is made possible by the fact that DataBC provides a centralized catalogue from which to pull the data that is most relevant to me. I can easily request further information that is available in the data catalogue for additional analysis.*

Example metrics: *DataBC usability score; Timeliness of information*

7.4. The Citizen

Citizens are considered external consumers of data. They can use data to better understand government issues and decision making to inform their own opinions, or simply browse data out of personal interest. Citizens can also develop services on the data to create businesses – see *business users* below.

DataBC will be a success when... *I can freely explore the same data that government uses in its decision making on public issues.*

A day in the life... *I read about a controversial government decision in the news. I navigate to DataBC and locate related information to gain a better understanding and hold government accountable. Built-in visualization tools help to further my understanding and clearly communicate historical patterns.*

Example metrics: *Sector or ministry DataBC transparency rates (Externally shared datasets / Total datasets); Total external downloads*

7.5. Business users

Business users are considered external consumers of data. Businesses can create services on the data provided by DataBC, and rely on DataBC to keep that information accurate and up to date.

DataBC will be a success when... *I view data as a utility comparable to water and electricity. I can build services around data with comfort that the data will be maintained at an expected level of quality and currency.*

A day in the life... *My day job is to maintain a service that has been supplemented by or created on government data. My business can deliver a quality service to my clients because DataBC is a dependable source for the information I need.*

Example metrics: *Number of businesses built on or supplemented by government data; Number of datasets used to support businesses*

7.6. Non-Government Organization (NGO)

NGOs are considered external consumers of data. Open data is of great benefit to an NGO, which typically operates on a highly controlled budget. By increasing the availability and accessibility of data, NGOs can focus their efforts on value-added activities, and strategically target their programs where they will have the greatest impact.

DataBC will be a success when... *I can look to government data to demonstrate the effectiveness of my organization to my supporters (e.g. a dataset showing wildlife density over time for a conservation-focused NGO), and to create targeted future initiatives*

A day in the life... *I am presenting the effects that my organization has had on conserving natural resources in my region. I can easily access geographic data from DataBC, and mash-up that data with environmental datasets using the frameworks and tools that have been provided by DataBC to show the impact of my organization's efforts. By leveraging the tools and frameworks provided by DataBC I can reduce overall cost of performing these analyses.*

Example metrics: *Number of NGOs built on or supplemented by government data; Number of datasets used to support NGOs*

7.7. The Data Supplier

Data Suppliers – the sector or ministry resources who contribute new and updated datasets to the DataBC catalogue – are an integral input to DataBC. They advocate for the sharing of information and readily contribute their datasets where there is opportunity to do so.

DataBC will be a success when... *Data management is an integral part of my day-to-day activities and is included as part of my performance plan. Sharing data is easy and encouraged and is a natural part of business operations. I rarely have to think about sharing data because these processes are highly automated.*

A day in the life... *Recent system upgrades have resulted in new information being collected and maintained by my ministry. Seeing a valuable opportunity I file a request to DataBC to share this new data and provide a continual feed to keep the data up to date.*

Example metrics: *Sector or ministry DataBC participation rates; Percentage of participating sectors & ministries; Average dataset ratings; Number of 'favourites' assigned to dataset; Cultural shift from a scarcity economy to a gift economy (measured by survey)*

7.8. The Data Custodian

Data Custodians have significant accountability for the integrity of their sector's or ministry's data. They rely on effective data management to ensure data meets standards.

DataBC will be a success when... *There is a high degree of automation and service that makes data management easy. I confidently take accountability for my Ministry's data. I see that the data I am custodian of is generating jobs, efficiencies, or public dialogue.*

A day in the life... *I receive an automated report on my Ministry's data quality. I can trend historic performance using tools at my disposal, and develop remediation strategies for areas with lower data management performance, and strategically plan for future uses of data*

Example metrics: *Data quality measures (completeness, accuracy, currency); Compliance score (DataBC standards); Staff performance ratings for data management*

Appendix A: Success Metrics

In addition to the potential metrics introduced in Section 7, the following metrics and indicators have been listed for DataBC's reference. A useful success metric will allow DataBC to measure and monitor the value of its data and the quality of the service it provides. This will require more clear definition of what value means to DataBC. While this list is not exhaustive, it nonetheless provides a basis to provoke further discussion, and can be refined to meet the needs of DataBC.

Sector or Ministry Participation Metrics

Metric	Description
1. TOTAL DATASETS WITHIN SECTOR OR MINISTRY	Estimated number of datasets the sector or ministry has, regardless of whether they will be shared publicly
2. TOTAL DATASETS PLANNED TO BE MADE PUBLIC BY SECTOR OR MINISTRY	Estimated number of datasets the agency plans to share publicly
3. TOTAL DATASETS PLANNED TO BE KEPT PRIVATE BY SECTOR OR MINISTRY	Estimated number of datasets the Sector or Ministry tracks internally, but are private by design (e.g. operational data)
4. SECTOR OR MINISTRY TRANSPARENCY RATE	Public datasets / Total datasets
5. TOTAL DATASETS PUBLISHED BY SECTOR OR MINISTRY	The number of sector or ministry datasets currently available on sector's or ministry's website
6. TOTAL DATASETS PUBLISHED VIA DATABC BY AGENCY	The number of this agency's datasets currently available on DataBC website
7. SECTOR OR MINISTRY DATABC PARTICIPATION RATE	Internal datasets / Public datasets
8. TOTAL DATASETS PUBLISHED BY SECTOR OR MINISTRY	How many of the published datasets are available for full download in machine-readable form?
9. TOTAL API ENABLED DATASETS PUBLISHED BY SECTOR OR MINISTRY	How many of the published datasets are accessible via a public API?
10. TOTAL VISUAL DATASETS PUBLISHED BY SECTOR OR MINISTRY	How many of the published datasets are available in an online, interactive or visual form allowing intellectually curious citizens to experiment with the data without requiring bulk download or API access?
11. SECTOR OR MINISTRY GROWTH RATE	Relatively increase in datasets over a defined period of time
12. TOTAL GEOGRAPHICALLY ENABLED DATASETS	How many of the published datasets leverage geospatial data?

Usage Metrics

Usage metrics measure the extent to which the DataBC service is being used. Many of these metrics can be measured and automated using web analytics on the DataBC web site.

Metric	Description
PAGE VIEWS	# of times the dataset's host page has been viewed
DATASET VIEWS	# of times the dataset itself has been viewed
DOWNLOADS	# of times the dataset has been downloaded in any structure/format
DOWNLOADS XML	# of times the dataset has been downloaded as XML
DOWNLOADS CSV	# of times the dataset has been downloaded as CSV
DOWNLOADS XLS	# of times the dataset has been downloaded as Excel XLS
DOWNLOADS JSON	# of times the dataset has been downloaded as JSON
DOWNLOADS PDF	# of times the dataset has been downloaded as PDF
DOWNLOADS SHAPEFILE	# of times the dataset has been downloaded as shapefile (ESRI GIS format)
DOWNLOADS KML	# of times the dataset has been downloaded as KML (standard format used by Google Maps)
DOWNLOADS OTHER	# of times the dataset has been downloaded as some other format not otherwise described
RECORDS ACCESSED	# of records accessed by any method
RECORDS ACCESSED ONLINE	# of records accessed interactively online
RECORDS ACCESSED BULK	# of records accessed via bulk download
RECORDS ACCESSED API	# of records accessed via API
RECORDS ACCESSED WIDGET	# of records accessed via widgets
RECORDS ACCESSED EMAIL	# of records accessed by email delivery
RECORDS ACCESSED PRINT	# of records accessed by someone printing the dataset
COMMENTS	# of user entered comments
RATINGS	# (count) of user entered ratings
AVERAGE RATING	The sum of individual ratings divided by the count of the ratings. Provides a community determined rating (i.e. 3.5 stars out of 5)
FAVOURITES	# of users who have marked this dataset as a favorite
EMBEDS	# of foreign hosts containing an embedded version of this dataset
SECONDARY EMBEDS	# of foreign hosts containing an embedded version of this dataset, but where the source of the dataset was itself a foreign host
PROPAGATION FACTOR	A weighted measure of how far a dataset propagates from its source
TWEETS	# of times someone has tweeted "check out this dataset" on any social network including Digg, Delicious, Twitter, Facebook, etc.
ENGAGEMENT INDEX	An algorithmically determined weighted index to compare user interest and engagement of one dataset to another

Usability Metrics

Usability metrics seek to determine how usable the DataBC service is. These metrics are more difficult to quantify and may, for example, require a survey to facilitate their collection:

Completeness of Description (metadata)

- Dataset name is meaningful to average citizens

- Dataset has a secondary description which is meaningful to average citizens
- Column names are meaningful to average citizens
- Column names have secondary descriptions which are meaningful to average citizens
- Dataset has appropriate tags
- % of optional metadata fields that are populated
- Appropriate licensing (public domain; creative commons) has been specified
- Source URL has been attached

Accuracy and Appropriateness of Data

- Users (by vote) indicate that the data seems accurate
- Dataset contains no personally identifiable information (PII)
- Removal of datasets due to PII or other inappropriate information

Searchability of Data

- Dataset can be found easily
- Datasets can be browsed by tag, agency or category
- Similar/related datasets can be found from the host page of another dataset
- Dataset shows up in the first page or two of Search Engine Results Pages (SERP) on Google and other search engines
- Dataset is easily citable and useful

DataBC

DataBC Council

Terms of Reference

Version 1.0
Revised October 15, 2011

Contents

DataBC Council

Purpose

The purpose of the DataBC Council (DBCC) is to provide strategic direction on the government-wide enterprise data and information management services provided by DataBC.

Responsibilities

As an inter-ministry/agency coordinating group operating at the strategic level, DBCC is focused on business needs and requirements for the integration and management of data and information for the British Columbia provincial government. DBCC has specific responsibilities for:

- Establishing vision, strategy, policy and planning priorities for the DataBC program,
- Serving as a BC government collaboration forum - exploring and sponsoring cross-sector collaborative data management planning, data sharing projects, data governance training and outreach, and other enterprise data management related projects,
- Providing oversight, guidance and support to DataBC Program Leadership for provision of services to government,
- Recommending initiatives and providing strategic input and advice to the Deputies Committee on Transformation and Technology (DMCTT) and supporting this committee as required,
- Decision-making and approval of initiatives from the DataBC Tactical Working Group (DBCTWG),
- Serving as a BC government partnership forum – for discussion, issues resolution, and advocacy for data management plans.

Membership

The membership of the DataBC Council consists of executive level representatives from all sectors. Members are expected to represent their sector and the clients they serve.
Each ministry/agency will designate an alternate member to represent them on DBCC when they cannot attend.

Role	Sector	Representative(s)	Alternate
Chair	Service	Enterprise Data Services	
Members	Economy		
	Education		
	Finance		
	Health		
	Justice		
	Natural Resources		
	Service		
	Social Services		
Interested Parties	Office of the CIO		
Secretariat	Service	Citizen Engagement	

Mode of Operation

Meetings will be held every 6 weeks.

DataBC Program Leadership from the Ministry of Citizens' Services and Open Government will provide Secretariat services to support the Chair and the committee.

Members agree:

- to make attendance a priority
- agree to review materials in a timely manner and be prepared for discussion
- to appoint a colleague director as the designated alternate so that their agency is represented at the committee at all times
- alternates are to have authority to make decisions
- to invite key staff to join the committee for presentations
- to submit materials to the secretary to the committee a week in advance of each meeting
- agendas and supporting materials should be posted on the DataBC Governance SharePoint site, one week in advance of meetings, and
- Minutes will record the committee's decisions and action items and be posted within five days of meetings.

DataBC

DataBC Tactical Working Group

Terms of Reference

Version 1.0
Revised November 16, 2011

Contents

DataBC Working Group

Purpose

The purpose of the DataBC Tactical Working Group (WG) is to provide operational support and coordination to government open data and enterprise data management and planning.

Responsibilities

As an inter-ministry/agency coordinating group functioning at the tactical level and supporting issue resolution at the operational level, the DataBC WG is focused on the requirements to support effective and collaborative information management and sharing throughout the government of British Columbia. The DataBC WG has specific responsibilities for:

- Implementing Open Data practices and guidelines.
- Promoting and participating in the development of the DataBC Open Data Catalogue.
- Addressing enterprise and open data sharing, management and services.
- Implementing Data Custodianship practices and guidelines.
- Promote and support government wide Data Integration and Data Access initiatives.
- Supporting IM partnerships.

Accountability and Authority

The DataBC Tactical Working Group draws its authority from and reports to the DataBC Council (DBCC), a coordinating group functioning at the strategic level. The Chair of the DataBC WG is a member of the DataBC Council.

The DataBC WG is responsible for:

- Undertaking working group activities as directed by the DataBC Council.
- Recommending open and enterprise data initiatives that benefit government as a whole to the DataBC Council.

It is expected that the DataBC WG will require direct liaison with the Office of the CIO to address IM/IT-related standards and architecture issues. The DataBC WG is expected to advise the DataBC Council of such interactions in the interest of smooth inter-sector coordination.

Reporting Relationships and Membership

The membership of the DataBC WG consists of data management level representatives from all sectors. Members are expected to represent their sector and the clients they serve. Sectors may choose to designate additional members to participate in the DataBC WG work as appropriate to the nature of items on the agenda and work plan.

Role	Sector	Representative(s)
Chair	Service	Enterprise Data Services
Members	Economy	
	Education	
	Finance	

	Health	
	Justice	
	Natural Resources	
	Service	
	Social Services	
Interested Parties	Office of the CIO	
Secretariat	Service	Citizen Engagement

Mode of Operation

Meeting Frequency and Attendance

- Meetings will generally be held every four to six weeks for the first six months of operation. Frequency of meetings will be reviewed at that time to determine future schedules based on business requirements. Meetings can also be called at the discretion of the Chair.
- Decisions made at the meeting will be documented in the minutes. Members are aware that if they do not attend meetings they may not have the opportunity to provide input into such decisions.

Decision-making Procedures

- While collaboration and consensus will be the dominant approach to decision-making by the DataBC WG, majority rules, unless otherwise agreed and required by the membership (e.g., some decisions may be deemed to require unanimous consent).

Membership Changes

- Membership changes can be undertaken at any time based on a vote and approval of the DataBC WG. The new member must have the appropriate authority to make decisions.

DataBC WG Sub-committees

- The DataBC WG can establish project working groups as required to undertake work on priority areas and projects.

Communications

- Formal communications to and from the DataBC WG is through the Chair.

Role	First Name	Last Name	Agency
Chair	Elaine	Dawson	Government Communication and Public Engagement
Co-Chair	David	Wrate	Government Communication and Public Engagement
Secretariat	Greg	Lawrance	Government Communication and Public Engagement
Member	Jordan	Perrey	Advanced Education
Alternate	Jacqui	Stewart	Advanced Education
Alternate	Andrew	Mitchell	Children and Family Development
Member	Ken	Reimer	Children and Family Development
Alternate	Lori	Collins	Community, Sport and Cultural Development
Member	Bruce	Klette	Community, Sport and Cultural Development
Alternate	Rulen	Tosh	Community, Sport and Cultural Development
Alternate	Glenna	Boughton	Corporate Services for the Natural Resource Sector
Member	Terry	Gunning	Corporate Services for the Natural Resource Sector
Alternate	Doug	Say	Corporate Services for the Natural Resource Sector
Alternate	Charito	Elderfield	Education
Member	Eve	Gaudet	Education
Member	Larry	Jones	Energy and Mines
Alternate	Eric	Lofroth	Energy and Mines
Member	Fern	Schultz	Environment
Alternate	Don	Epp	Finance
Alternate	Carl	Fischer	Finance
Member	Bonnie	Laine Farrell	Finance
Member	Tamara	McLeod	Finance
Alternate	Stuart	Newton	Finance
Member	Steve	Rossander	Finance
Member	Andrew	Calarco	Forests, Lands and Natural Resource Operations
Member	Albert	Nussbaum	Forests, Lands and Natural Resource Operations
Member	David	Hume	Government Communication and Public Engagement
Member	Carlos	Caraveo	Health
Alternate	Gay	Corbett	Health
Member	Wendy	Taylor	Health
Member	Shirley	Wong	Health
Member	Nathan	Nankivell	Labour
Alternate	Allan	Castle	Justice
Member	Dan	Chiddell	Justice
Member	Stephen	Gidden	Justice
Member	Nancy	Pearson	Justice
Member	Martin	Wright	Justice
Member	Linda	Chase Wilde	Jobs, Tourism and Skills Training
Member	Tim	Jah	Public Sector Employers' Council Secretariat
Member	Robert	Bruce	Social Development and Social Innovation
Alternate	Paul	Gosh	Technology, Innovation and Citizens' Services
Member	Martin	Monkman	Technology, Innovation and Citizens' Services
Alternate	Craig	Randle	Technology, Innovation and Citizens' Services
Member	Derek	Rutherford	Technology, Innovation and Citizens' Services
Member	Corinne	Timmermann	Technology, Innovation and Citizens' Services
Member	Kathleen	Ward	Technology, Innovation and Citizens' Services

Member	Peter	Watkins	Technology, Innovation and Citizens' Services
Member	Debbie	Fritz	Transportation and Infrastructure
Alternate	Alex	Ritchie	Transportation and Infrastructure

Role	First Name	Last Name
Chair	Elaine	Dawson
Co-Chair / Secretariat	Greg	Lawrance
Member	Roseanne	Sovka
Member	David	Blades
Member	Rulen	Tosh
Member	Per	Wallenius
Member	Glenna	Boughton
Member	Kelly	McNulty
Member	Erin	Moriarty
Member	Nancy	Needham
Member	Karen	Samuelson
Member	Eric	Lofroth
Member	Peter	Michielin
Member	Jackie	Mignault
Member	Heather	Clark
Member	Maggie	Cross
Member	Tim	Salkeld
Member	Brad	Hlasny
Member	Lorne	Mullane
Member	Tammy	Chatten
Member	David	Tesch
Member	Sean	Hayes
Member	Barry	Peter
Member	Brent	Grover
Member	Doug	Collinge
Member	Nainesh	Agarwal
Member	Alexander	Ritchie

Agency

Government Communication and Public Engagement
Government Communication and Public Engagement
Advanced Education
Children and Family and Development
Community, Sport and Cultural Development
Community, Sport and Cultural Development
Corporate Services for the Natural Resource Sector
Corporate Services for the Natural Resource Sector
Education
Education
Energy and Mines
Energy and Mines
Finance
Finance
Finance
Finance
Forests, Lands and Natural Resource Operations
Forests, Lands and Natural Resource Operations
Government Communication and Public Engagement
Justice
Ministry of Environment
Social Development and Social Innovation
Technology, Innovation and Citizens' Services
Technology, Innovation and Citizens' Services
Technology, Innovation and Citizens' Services
Transportation and Infrastructure
Transportation and Infrastructure

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Member	Kathleen	Ward	Technology, Innovation and Citizens' Services

Member	Peter	Watkins	Technology, Innovation and Citizens' Services
Member	Debbie	Fritz	Transportation and Infrastructure
Alternate	Alex	Ritchie	Transportation and Infrastructure

EDS Contracts
In Effect May 15, 2013 - October 17, 2013

Vendor	Contract Number	Start Date	End Date
Hiver Consulting	C13EDS26408	01/05/2012	31/03/2014
Vivid Solutions Inc	C13EDS26712	28/05/2012	31/03/2014
Latitude Geographics	C13EDS26790	14/06/2012	31/03/2014
Little Earth GIS Consulting	C13EDS27184	23/07/2012	31/03/2014
ESRI Canada Ltd	C13EDS27226	20/08/2012	31/03/2014
Bolster Consulting Inc	C13EDS27606	14/09/2012	31/03/2014
Mapgears Inc	C13EDS27621	17/09/2012	31/03/2014
Little Earth GIS Consulting	C13EDS27184	12/12/2012	31/03/2014
iOpen Technologies	C13EDS28451	01/02/2013	31/03/2014
Highway Three Solutions (2013)	C13EDS28637	04/03/2013	04/03/2015
Fujitsu Consulting	C10WTS21972-ITP0011C	01/04/2013	28/05/2013
CGI Information Systems	C10WTS21973-ITP0011I	01/04/2013	31/10/2013
Bartlett Consulting Services	C13EDS28926-1	01/04/2013	31/03/2014
CGI Information Systems	C10WTS21973-ITP0011E	01/04/2013	31/03/2014
Latitude Geographics	C14EDS28925	01/04/2013	31/03/2014
Forte Consulting Ltd.	C14EDS28924	01/04/2013	31/03/2014
Fujitsu Consulting	C10WTS21972-ITP0011D	01/04/2013	31/10/2014
CGI Information Systems	C10WTS21973-ITP0011H	12/04/2013	31/10/2013
Refractions Research	C14EDS29124	29/04/2013	31/03/2014
Revolution Systems Inc	C14EDS29014	29/04/2013	31/03/2014
Sierra Systems Group	C10WTS21971-ITP00011S	06/05/2013	12/07/2013
Sierra Systems Group	C10WTS21971-ITP0011T	06/05/2013	12/07/2013
CGI Information Systems	C10WTS21973-ITP0011K	03/06/2013	19/07/2013
Alex Halkett	C14EDS29514	15/07/2013	18/10/2013
CGI Information Systems	C10WTS21973-ITP0011N	29/07/2013	31/03/2014
Better Outcomes Consulting Inc.	C14EDS29747	06/08/2013	04/09/2013
R. Keith Jones & Associates	C14EDS29771	06/08/2013	30/11/2013
iOpen Technologies	C14EDS29778	12/08/2013	31/03/2014
Revolution Systems Inc	C14EDS29700	19/08/2013	31/03/2014
Sierra Systems Group	C10WTS21971ITP0011AD	05/09/2013	31/03/2014
Sierra Systems Group	C10WTS21971-ITP0011AC	09/09/2013	31/03/2014
Bolster Consulting Inc	C14EDS29881	01/10/2013	31/03/2014
Refractions Research	C14EDS30049	14/10/2013	06/12/2013
Latitude Geographic Group Ltd	C14EDS30081	16/10/2013	31/03/2014

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Chris Spicer
Bruce Tonkin
Peter Wang