

New

Ministry

Advanced Education

Describe: Basic Job Details

Position

Position ID

Position Name (30 characters)

Data Infrastructure Lead

Requested Class

Systems Analyst Level 3

Job Focus

Corporate Services

Supervisory Level

00 - No Supervision

Agency (ministry) code

Cost Centre

Program Code: (enter if required)

Employee

Employee Name (or Vacant)

Vacant

Organizational Structure

Division, Branch/Unit

SBS, DABS/Data Management & Governance

Current organizational chart attached?

Supervisor's Position ID

Supervisor's Position Name (30 characters)

Manager, Data Operations

Supervisor's Current Class

Manager (Zone 2)

Design: Identify Job Duties and Value

Job Purpose and Organizational Context

Why the job exists:

Data Management and Governance (DMG) unit was created to improve the organization's data maturity, as follows:

1. Develop, implement, and evolve enterprise-wide data management and governance.
2. Develop, implement, and evolve stewardship of the Department's major administrative datasets.
3. Collect and provide oversight of key administrative data from the advanced learning system

The Data Infrastructure Lead contributes to multiple functions of the unit, as follows.

Reporting to the Manager - Data Management, the Data Infrastructure Lead builds enterprise-wide data infrastructure to enable Department digital services and business intelligence. This includes developing and optimizing pipelines, data warehouse and orchestration platforms, and cloud storage to reliably move data from multiple source systems, assessing existing infrastructure, and developing a roadmap for infrastructure improvement.

The Data Infrastructure Lead also works with colleagues and management to improve Advanced Education's data management capacity and maturity by teaching skills, establishing processes and standards, and advising on best practices.

To do this work, the Data Infrastructure Lead engages data stewards, business owners, system custodians, service designers, and application developers to discover and improve how data is used for business purposes.

The Data Infrastructure Lead approaches the work with a systems perspective, develops collaborative environments, and develops others to build a more mature data management culture in the department and the post-secondary system.

The Lead possesses a combination of skills, from technical acumen to well-developed leadership and communication skills. This skill combination is essential for an emerging area of maturity in Advanced Education. The Data Infrastructure Lead retains an open-minded, collaborative, and listening attitude to help lead this area of change.

Responsibilities

Job outcomes (4-6 core results), and for each outcome, 4-6 corresponding activities:

A. Data infrastructure is developed to meet AE's operational and analytic needs.

1. Identify and document requirements for new data infrastructure, working with data scientists, data modellers, subject-matter experts, and business users to ensure outcomes are clear and shared.
2. Build data pipelines from one or more sources to cloud storage and data warehouse in a customized way, including orchestration, masking, testing, reviewing, troubleshooting, scheduling, and documenting.
3. Leverage replication tools (Nexla, Airbyte) to copy data from disparate sources into the centralized data storage location (Azure Blob Storage).
4. Organize structured (e.g. postgres tables) and unstructured data (e.g. json) into analyst-friendly tables in the centralized data cloud (Snowflake).
5. Develop messaging and alerting systems so that failure and error reporting happen in an automated, trusted way.
6. Maintain the tooling libraries that enable automation and quality of the data warehouse: custom operators and scripts for orchestration (based on Astronomer/Airflow), continuous integration and deployment (CircleCI), code deployment process, and linting.
7. Enable analysts and modellers to work effectively by supporting the tools they use, including Data Build Tool (DBT) for data transformations inside the centralized data cloud.

B. Best practices guide infrastructure development and planning.

1. Own and drive AE's data infrastructure building standards, developing documentation and processes to support junior and future data infrastructure staff in the unit.
2. Identify and prioritize building and maintenance work, taking in to account department business priorities, technical dependencies, and unit coordination and capacity.
3. Develop and maintain a roadmap for development and improvement of infrastructure and standards.
4. Build a library of data infrastructure documentation and resources for unit and Department staff.

C. Data modelling and data reporting functions are backed up.

1. Cross train with data modelling and reporting colleagues to ensure business continuity.
2. Draft, test, and review data model scripts.
3. Develop and maintain data model documentation including standards.
4. Draft and review reports, visualizations, and dashboards.
5. Develop and maintain reporting and visualization documentation including standards.

D. AE improves data operations capacity and data management maturity.

1. Support unit staff to develop data infrastructure building skills including teaching the basics, guiding junior staff through complex cases, and validating that pipelines work as intended.
2. Support unit and department colleagues to read and understand data infrastructure documentation.
3. Support the Manager and Director to develop and hire to additional data infrastructure positions as needed.
4. Help to develop and socialize with colleagues and stakeholders an evolving data management framework and ongoing data operations functions, roles, and systems.
5. Support the Manager and Director to prepare briefings and presentations about data management and governance.

Problem Solving

Typical problems solved:

The Data Infrastructure Lead must meet a wide range of challenges, from granular, technical problems to chronic, systemic culture issues. Examples include the following:

- *change*: Advanced Education is maturing as an information organization. The Data Infrastructure Lead will face resistance from inside and outside the organization, and must find ways to ease concerns and rally colleagues and stakeholders to the cause.
- *opposing needs*: The Data Infrastructure Lead works with many individuals and groups across the organization, serving as a critical diplomat in brokering agreement among colleagues with conflicting needs and priorities. An enterprise view is essential in solving such problems.
- *complex problems*: When things go wrong in data management, the causes are often complex. The Data Infrastructure Lead will have the tenacity to tackle these issues and see them through to their conclusion, marshalling resources as needed.
- *working in an emergent space*: The organization knows it needs to improve data management, but not always what that means. The Data Infrastructure Lead is always looking for ways to improve policies and procedures, and to provide better service. When clear direction is not forthcoming, the Lead imagines new ways to add value.

Types of guidance available for problem solving:

The Data Infrastructure Lead works within the policies and guidelines set by Cabinet, Treasury Board, the Minister, the Deputy Minister, and legislation including the *Post-secondary Learning Act* and the *Freedom of Information and Protection of Privacy Act*.

However, data management is a new function in Advanced Education, and to a large degree in the Government of Alberta. The Data Infrastructure Lead discovers and develops best practices that are effective for the Department, and seeks to positively influence development of data management policy.

The Manager provides guidance to the Data Infrastructure Lead in setting priorities and determining outcomes. Within these parameters, the Lead has extremely high autonomy and authority to determine work priorities and approaches.

Direct or indirect impacts of decisions:

Working with the Manager, the Data Infrastructure Lead ensures excellent data infrastructure, standards, documentation, facilitation, and teaching, and is accountable for resolving issues that arise in pursuit of that goal. The position has the freedom to develop and implement solutions aligned with the Department's data management and strategic objectives. The position is expected to act independently to ensure a coordinated approach at the department level.

The role has a significant impact on the Department's core business functions which all depend on the quality, availability, and usability of data. For example, these data feed metrics in post-secondary institution funding agreements (Investment Management Agreements) and in the Department business plan. Additionally, these data form the content of the Department's digital services for students, learning providers, and employers (services currently being created under the Department's Digital Strategy - a priority initiative).

In this way, the position has significant direct influence on business areas and stakeholders that generate and use Department data.

Key Relationships

Major stakeholders and purpose of interactions:

Data modellers: those who structure data in the data warehouse

Daily to Weekly

Engagement and problem solving to develop and maintain data infrastructure

Business areas: for each dataset and digital service, expert staff who understand and depend on the data and its systems

Daily to Weekly

Engagement and problem-solving to develop and maintain data models

Digital Services staff: product owners, IT contractors, data architects, data consultants

Daily to Weekly

Engagement and problem-solving to provide data as digital services are developed

IT colleagues: staff who understand and maintain data systems, including DevOps managers, enterprise architects, data architects, application owners groups

Daily to Weekly

Problem-solving, coordination, and strategy to deploy, maintain, and fix problems with data flows and models

Users/Consumers: Department, GoA, stakeholders, public

Daily to Monthly

Service delivery, use cases

Governance bodies: GoA- and department-level data management bodies

Monthly to Quarterly

Guidance, coordination, strategy, decision-making

Executive: Executive Director Council, Executive Team

Ad hoc

Approvals

External: national bodies (e.g., Statistics Canada, Council of Ministers of Education Canada), external contractors

Ad hoc

Coordination, learning

Required Education, Experience and Technical Competencies

Education Level

Bachelor's Degree (4 year)

Focus/Major

Other

2nd Major/Minor if applicable

Designation

If other, specify:

Other related: Computer Science, Data Science, Statistics, Informatics, Information Systems or another qu

Job-specific experience, technical competencies, certification and/or training:

*Four years of experience performing similar integrations will be considered equivalent to a four-year degree.

The Data Infrastructure Lead must have at least four years of experience performing the following work:

- optimizing data infrastructure/data pipeline architecture and building these structures from the ground up, including optimizing data flow and collection for cross-functional teams.
- collaborating with teams of data analysts, data scientists, and software developers on data initiatives.

Building Data Infrastructure

These skills and experience are essential:

- A deep knowledge of data scripting languages Python, Data Build Tool (DBT), and Linux.
- Significant experience using version control systems (Github): branching, writing and saving code, creating pull requests, doing pull requests for code reviews, etc.
- Knowledge of orchestration (Airflow and Astronomer), cloud hosting and storage (Azure Blob Storage), and cloud database management (Snowflake), including the ability to connect data sources to an Azure Blob Storage target and Snowflake in a customized way.

- Familiarity with the use of replication tools including Nexla and Airbyte.
- Experience developing and managing process logging, messaging and alert systems.
- Advanced working knowledge of database languages (SQL) and experience working with relational databases, query authoring (SQL) as well as working familiarity with a variety of databases.
- Strong analytic skills related to working with unstructured data (JSON-style data).

These skills and experience are desirable:

- Experience with agile delivery approaches such as DataOps, CI/CD, or DevOps.
- Experience with data science and modelling.
- Practical experience with visualization tools such as Tableau, SiSense or SSRS.

Data management and governance

- Best practices in data management and governance, including the Data Management Body of Knowledge (DAMA-DMBOK) and Government of Alberta standards and policies.
 - Data management organization and roles
 - Data operations
 - Metadata and reference data management
 - Data quality management

Advanced Education and the advanced learning system

- Government and ministry strategic direction for and current issues affecting data management and governance (for example, IT strategic planning, the Department's Digital Strategy)
- Department data systems, IT support structures, and IT projects
- Department structure, operations, and programs; Alberta's advanced learning system (providers, sectors, governance)
- Concepts related to learning delivery, measurement, credentials, etc.: for example, off-campus, full-load equivalent, university transfer
- Relevant legislation and regulations (for example, the *Post-Secondary Learning Act* and the *Freedom of Information Protection and Privacy Act*)

Change management

- Change management principles and their application

Behavioral Competencies

Pick 4-5 representative behavioral competencies and their level.

| Competency | Level | | | | | Level Definition | Examples of how this level best represents the job |
|------------------|-----------------------|----------------------------------|-----------------------|-----------------------|-----------------------|--|--|
| | A | B | C | D | E | | |
| Systems Thinking | <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> | <input type="radio"/> | <p>Considers inter-relationships and emerging trends to attain goals:</p> <ul style="list-style-type: none"> • Seeks insight on implications of different options • Analyzes long-term outcomes, focus on goals and values • Identifies unintended consequences | <p>Understands and acts with an awareness of the many stakeholders involved in data management across the department's business areas and IT supports.</p> <p>Seeks to understand data needs and uses from multiple perspectives: business, technical, enterprise.</p> <p>Thinks though effects of data-related changes.</p> |

| | | | |
|--------------------------|--|---|--|
| Creative Problem Solving | <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> | <p>Focuses on continuous improvement and increasing breadth of insight:</p> <ul style="list-style-type: none"> • Asks questions to understand a problem • Looks for new ways to improve results and activities • Explores different work methods and what made projects successful; shares learning • Collects breadth of data and perspectives to make choices | <p>Asks the right questions to deepen understanding of human, business, and IT issues.</p> <p>Imagines new ways of doing work and adding value, seeking to automate where appropriate.</p> |
| Drive for Results | <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> | <p>Works to exceed goals and partner with others to achieve objectives:</p> <ul style="list-style-type: none"> • Plans based on past experience • Holds self and others responsible for results • Partners with groups to achieve outcomes • Aims to exceed expectations | <p>Focuses on outcomes of data work, planning for deliverables and looking for opportunities to add value.</p> |
| Develop Networks | <input type="radio"/> <input checked="" type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> | <p>Works on maintaining close relations with all stakeholders:</p> <ul style="list-style-type: none"> • Identifies key stakeholder relationships • Has contact with range of interested parties • Actively incorporates needs of a broader group • Influences others through communication techniques | <p>Connects with key business and IT contacts to understand their needs and constraints, and to ensure a focus on meaningful data outcomes for the organization.</p> |

Benchmarks

List 1-2 potential comparable Government of Alberta: [Benchmark](#)

024PS69 Business Analyst, Information Technology System Management