

## Job Description



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| <b>Job Title:</b>      | Business Intelligence Architect and Developer     |
| <b>Department:</b>     | Institutional Analysis and Planning               |
| <b>Reports To:</b>     | Senior Manager, Data Analytics and Reporting, IAP |
| <b>Jobs Reporting:</b> | None  |
| <b>Salary Grade:</b>   | USG 12  |
| <b>Effective Date:</b> | January 2026                                      |

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### **Primary Purpose**

Under the direction and guidance of IAP leadership and in alignment with standards and best practices the Business Intelligence Architect and Developer is responsible for the design, development and maintenance of data warehouses, data marts, databases, data dictionaries, data transformations, user interfaces, systems interfaces, analytical models, and related processes used for data-driven decision-making by IAP, its partners and clients. The Business Intelligence Architect and Developer will proactively contribute to IAP's mandate of providing data, advice, analytical and planning support to the Senior Leadership of the university to inform policy development, strategic planning, decision-making and priority-setting.

### **Key Accountabilities**

#### **Institutional data**

- Abstracts and organizes institutional data from Waterloo's enterprise resource planning (ERP) and departmental systems to create and maintain business objects for institutional reporting and analysis.
- Abstracts and organizes semi-structured institutional data from employee and student surveys to create and maintain business objects for institutional reporting and analysis.
- Leads the creation and maintenance of institutional data stores as "single sources of truth" for varied reporting and analytics functions, including government reporting, Key Performance Indicators (KPIs), research projects, forecasting, scenario modelling, statistical analyses, machine learning and AI projects.
- Synthesizes data from multiple sources for reporting and analysis. Supports the Data as a Strategic Resource (DSR) program by technology adoption, business process reengineering, and personnel development.
- Collaborates with Information Systems and Technology to inform technology choices and best practices for data architecture, including software procurement, information management, risk management, retention schedules, cloud and on-premises infrastructure.
- Consults with Legal and Immigration Services to inform best practices for data handling, information management, and information risk and privacy.
- Engages with departmental subject matter experts to build knowledge of the core data elements in those systems and the business processes that generated those data elements.

#### **Information Technology Architecture**

- Designs, implements and maintains data warehouses for storage of "snapshot" data from ERPs, IST Data Lake and other data sources, internal and external to the institution.
- Designs and implements dimensional models including star schemas, snowflake schemas, and conformed dimensions across multiple subject areas, for analytics solutioning.
- Defines appropriate grain for fact tables and designs multi-fact schema architectures.

- Creates and maintains logical and physical data models that balance query performance with storage efficiency.
- Designs, develops, and implements data systems/solutions that meet defined business requirements for data pipelines (e.g., Electronic File Transfers, APIs, data flows, datasets, xml, text files).
- Makes use of multiple operating systems (e.g., Linux, Unix, Windows), cloud and on-premises infrastructure and services (e.g., SaaS, IaaS, PaaS) and scripting/coding languages managed by IST to deliver data systems/solutions.
- Designs, develops, and implements data systems/solutions that improve user interfaces, usability and enable user adoption.
- Ensures data and information is placed into the proper context by combining university data with both qualitative and quantitative environmental/external data and appropriate narrative.
- Serves on University, and as appropriate, non-University committees and groups, offering data and analytical expertise and fostering data information sharing and collaborative approaches on a variety of projects.
- Collaborates with data analysts across campus to help create a data culture in support of institutional goals.
- Liaises with other departments campus-wide in providing technical support and guidance (e.g., IST). Facilitates training/education where required.

### **Data Processing and Engineering**

- Designs, develops, and implements data systems/solutions to reduce data redundancy and improve data integrity, for ETL-R/ELT-R purposes. (e.g., data warehouses, data marts, and databases).
- Applies Extract-Transform-Load steps consistently, using approved tools and best practices, to minimize data errors and omissions, maximize maintainability and performance.
- Makes use of validated and verified data sources, and accompanying data catalogs, to meet stated business requirements.
- Incorporates SOPs, logging, error-trapping and audit steps to improve maintenance and support.
- Maintains Dev-Prod environments, code libraries and version control, in support of data quality.
- Incorporates external data from a variety of sources including Statistics Canada, surveys and data sharing consortiums in combination with institutional data to prepare analysis and reports that address research questions.
- Supports indicator development and ongoing reporting for Waterloo operational and strategic measures.
- Works with large data sets to support data mining and statistical analyses.
- Leverages machine learning, artificial intelligence, and other productivity tools.

### **Data Analytics and Reporting**

- Designs, develops, and implements data systems/solutions that support defined business requirements for descriptive, diagnostic, predictive, and prescriptive analytics.
- Designs, develops, and implements data systems/solutions that support user interfaces that allow stakeholders to self-serve and explore planning parameters.
- Supports indicator development and ongoing reporting for Waterloo operational and strategic measures.
- Helps lead the adoption and standardization of new data analysis tools and techniques, in partnership with stakeholders across campus.

### **Data Governance and Management**

- Designs, develops, and implements data systems/solutions that meet non-functional requirements related to security, privacy, anonymity, performance, disaster recovery, accessibility, business continuity, archival, and storage.

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- Identifies and addresses security & privacy risks to data processing, including the potential for unauthorized access and data breaches.
- Works with other Information Stewards and Information Custodians to ensure that institutional data is accurate, consistent, properly maintained and shared in compliance with relevant privacy protection, confidentiality and other ethical principles.
- Identifies and addresses data integrity/reliability issues and uses data cleaning processes to reduce duplication and errors and to ensure consistency in data and proposes data cleansing processes to achieve required data quality standards.
- Develops data catalogs to improve understanding of institutional data (e.g., data definitions, data dictionaries, and business glossaries).
- Designs, develops and implements standard operating procedures (SOPs), process controls, audit reports, and error-checking procedures to maximize data quality, consistency, and availability.
- Manages equity data in accordance with the Notices of Collection and Indigenous data sovereignty principles.

### **Communication**

- Ensures timely communication to University leadership, managers, campus support units, faculties, departments, research groups, appropriate staff through appropriate media, of developments and projects; also communicates on any related events that have the potential to directly or indirectly impact normal services.
- Communicates with technical and non-technical users to gather data and technical requirements and assists with project planning.

### **Supervision**

- Assists with coaching, training of other data professionals and co-op students to contribute to their growth and development
- Provides input into regular performance reviews, and supports achievement of performance goals
- Assists with making decisions on the hiring of data professionals within the unit, in consultation with the Management team within Institutional Analysis and Planning.

## **Required Qualifications**

### **Education**

- Bachelor's degree in Software Engineering, Data Science, Computer Science, Management Sciences, or a combination of equivalent experience and education.

### **Experience**

- 5+ years of experience in analysing and configuring complex enterprise applications and services.
- 4+ years of project management experience.

### **Knowledge/Skills/Abilities**

- Superior data management, manipulation, interpretation and analysis skills.
- Excellent written and verbal skills for procedural documentation and demonstrated experience with report writing.
- Ability to work independently and as part of a team.
- Ability to manage large workloads and prioritize competing deadlines.
- Taking initiative and being proactive.
- Working knowledge of a variety of reporting and data visualization tools, such as SSRS, Power BI, or Tableau.
- Working knowledge of a variety of ETL tools, such as SSIS, Python, R, Tableau Prep, or SAS.
- Knowledge of Sharepoint, Drupal and other web development and web content applications.
- Demonstrated ability to use MS Visual studio tools (SQL Server, SSIS, SSRS and SSAS)

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- Knowledge of SPSS, SAS, Python, R or other statistical analysis or data transformation tools
- Aptitude for applying and incorporating AI into data processes and solutions.
- Ability to apply, identify and use a combination of quantitative and qualitative research methods.
- Develops complex T-SQL using window functions and recursive queries for data transformations.
- Implements dynamic SQL for metadata-driven ETL frameworks.
- Creates stored procedures, table-valued functions, and uses MERGE statements for efficient “upsert” operations.
- Designs and creates stores of Institutional Data to answer research, administrative and teaching questions.
- Designs and creates data warehouses, data marts and databases for descriptive, diagnostic, predictive and prescriptive Data Analytics questions.
- Designs and creates user interfaces that enable users to self-serve their data needs.
- Designs and creates data pipelines from ERP and other administrative systems.
- Elicits business requirements from clients and develops process models using appropriate notation.
- Creates technical diagrams in support of business requirements and non-functional requirements, including Context, Data Flow, Flowcharts, and Entity Relationship Diagrams.
- Creates and executes Test Plans to validate outputs. Produces Test Reports.
- Creates metadata to help users make correct and efficient use of data.
- Creates and maintains separate Dev and Prod environments to manage risk and improve quality.
- Manages system configurations and code versions/packages to manage risk and improve quality.

### Nature and Scope

- **Contacts:** Internally, communicates with all employees in all groups and departments and at all levels to deal with, influence and motivate others, and to address potentially sensitive matters. Key business contacts include the Registrar’s Office, Graduate Studies and Post-doctoral Affairs, Human Resources, Finance, and Co-operative and Experiential Education- stewards of the university’s Enterprise Planning Systems (ERPs). Key technical contacts include IST’s Data Integration and Analytics (DIA) team, IST’s Information Systems Security (ISS) team, Legal and Immigration Services (LIA), ERP systems’ IT support, and communities of practice at Waterloo for Data Analytics and Data Science.
- **Level of Responsibility:** The position is responsible and accountable for the overall results of the service area. IAP’s Data Architecture is recommended by IST and includes four levels of data management: data pipelines (e.g., APIs, dataflows, csv files, database tables and views), data warehouses and data marts (e.g., SQL Server), datasets (e.g., Power BI semantic models) and visualizations/reports (e.g., Power BI reports). The Business Intelligence Architect and Developer is responsible for data pipelines, data warehouses/datamarts, dataflows and datasets. The data stores represent “single sources of truth” for IAP reporting and analytics, and data management practices must support accurate, consistent reporting of Institutional data to internal and external clients.
- **Decision-Making Authority:** Responsible and accountable for the design and population of IAP data warehouses and data marts, in support of IAP priority projects. IAP’s data architecture is based on SQL warehouses, Python, SQL scripts, Power BI dataflows and Power BI reports. Wherever possible, business logic is placed upstream of reports, to minimize duplication and increase accuracy. The Business Intelligence Architect and Developer will be responsible for implementing business logic and data solutions into ETL processes to support best practices for Data Analytics and Data Governance.
- **Physical and Sensory Demands:** Minimal exposure to disagreeable conditions typical of an office position exposed to stress and pressure associated with those responsibilities.
- **Working Environment:** Minimal exposure to disagreeable conditions typical of an office position exposed to stress and pressure associated with those responsibilities.

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*\*All employees of the University are expected to follow University and departmental health and safety policy, procedures and work practices at all times. Employees are also responsible for the completion of all health and safety training, as assigned. Employees with staff supervision and/or management responsibilities will ensure that assigned staff abide by the above, and actively identify, assess and correct health and safety hazards, as required.*