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On behalf of the ORCID Canada Consortium, DataCite Canada Consortium, and the Canadian Persistent Identifier Advisory Committee

Persistent Identifiers (PIDs)

Persistent Identifiers (PIDs) connect information across time, space, research domains, and software systems. They can refer to a variety of entities across the research landscape, including people, places, publications, datasets, equipment, and much more. A key challenge of managing typical IDs is their tendency to contain seemingly static fields that can change quite a bit (e.g., a first or last name). In contrast, a Persistent ID does not change – it always refers to the same person, place, or thing, no matter which other fields or pieces of information may change.

However, persistence is not inherent to a PID without the continued collaborative work of the organizations that maintain them. *PID organizations require the support of the broader research community and infrastructure for PIDs to remain persistent.* Community-driven PIDs managed by global not-for-profit organizations in partnership with local stakeholders ensure thatPIDs and the systems that rely on them remain sustainable and respond to the needs of the research community. National funding for this key infrastructure is required to ensure appropriate stewardship of Canadian scholarship and research outputs.

Canadian PIDs Infrastructure

Two organizations and PIDs with significant community uptake across Canada include ORCID, which provides ORCID iDs for people, and DataCite, which provides digital object identifiers (DOIs) for research outputs. These organizations are built on consortial membership models whereby a local organization acts as the administrative lead for local instances. In Canada, we have the ORCID Canada Consortium (ORCID-CA) and the DataCite Canada Consortium (DCAN). The Canadian Research Knowledge Network (CRKN) is the administrative lead organization for ORCID-CA, and CRKN, in partnership with the Canadian Association of Research Libraries (CARL) Portage, support DCAN. Membership in both national consortia includes Canadian universities, government agencies/departments, research centres/networks, journals, and more.

ORCID is a global non-profit with the aim of creating a “world where all who participate in research, scholarship, and innovation are uniquely identified and connected to their contributions across disciplines, borders, and time”. ORCID supports this vision by providing individuals with a unique ORCID iD connected to an ORCID Record, to which users can add information about their research activities, which is stored in the ORCID Registry. ORCID adheres to FAIR (Findable, Accessible, Interoperable and Reusable) data principles. This means that adopting ORCID also supports principles of the Office of the Chief Science Advisor of Canada’s Roadmap for Open Science and can enhance the global dissemination and discovery of Canadian work as it becomes more visible via ORCID.

Integration of ORCID into local institutional systems can provide direct value to Canadian researchers and institutions by 1) enabling the pre-filling of forms, saving administrative time; 2)

facilitating the flow of information about scholarly activities into and out of Canadian and global databases; and 3) by providing a simple means by which to disambiguate Canadian scholars.

DataCite is also a global non-profit that develops and supports tools and methods that make data and scholarly content more accessible, useful, and citable. DataCite's core activity is providing DOI and metadata registration. DOIs are persistent identifiers for digital objects widely used for identifying published content, datasets, and other scholarly outputs. There are over 550,000 DOIs minted in Canada with DataCite and over 128,000 DOIs in Canada were minted in 2019.

Both ORCID-CA and DCAN have a similar and overlapping collective governance structure. Both consortia have governing committees composed of representatives from member institutions elected by their respective memberships. ORCID-CA and DCAN also benefit from a shared advisory committee called the Canadian Persistent Identifier Advisory Committee (CPIDAC), composed of representatives from non-member stakeholder institutions, with the aim of supporting the implementation of a national PID strategy.

ORCID-CA Membership

To take full advantage of ORCID's functionality, and to enhance its usefulness as a PID, institutions pay for an ORCID membership to gain access to the ORCID Member API. Membership is therefore required to be able to build sophisticated integrations in local systems that can automatically pass information back and forth between ORCID and other stakeholders. Unfortunately, this model can pose two potential barriers: 1) the cost of membership may not be financially viable for many organizations; and 2) the cost and capacity to develop and maintain integrations in local, often custom-built, systems may not exist at all institutions.

Organizations can join ORCID directly (Basic or Premium membership); however, ORCID encourages local non-profit and public organizations to join local and regional ORCID consortia, such as ORCID-CA, at a significantly reduced cost to ensure more direct and contextualized support. In Canada, this dedicated member support means ensuring bilingual support, as well as expertise in the Canadian ecosystem. Membership in ORCID-CA is divided into two separate fee categories: The ORCID License Fee is currently set at $3,500 USD annually per member for a consortium of 35-60 members. The ORCID-CA membership fee, supporting the local work of ORCID-CA, is roughly $120,000 CAD for 2020-2021y and is divided equally among members (~$3,200 CAD annually at present based on a total of 38 members). Consequently, annual ORCID-CA membership fees can range from roughly $8,000-$10,000 CAD per member depending on factors such as the USD to CAD exchange rate, the total ORCID-CA membership, and applicable taxes.

Another cost to consider includes developer time and funds to build and support ORCID integrations. Many large vendor products from major research organizations have integrated ORCID, meaning that members could move forward without development costs; however, those vendor systems and tools may themselves be financially out of reach to many organizations.

DCAN Membership

DataCite recently transitioned to a new fee structure which will be implemented for DCAN in 2021. There is a 2,000€ annual membership fee for the consortium overall. The consortium is also assessed a 500€ organization fee for each member. Finally, there is a tiered DOI fee per member based on the number of DOIs minted by that member in the previous calendar year:

DOIs	Tier	Annual fee
0-1999	Tier 1	0.80 per DOI
2000-10,000	Tier 2	1,600.00€
10,001-100,000	Tier 3	2,500.00€
100,001-250,000	Tier 4	3,500.00€
250,001-1,000,000	Tier 5	8,500.00€

Organization and DOI fees are capped based on the size of the consortium. For DCAN, the cap is 700€ per member at the consortial level. An additional fee of 2,000€ applies to any organizations in tiers 3 or higher, however, only one DCAN member is currently projected to reach this tier for 2021. As a result of DataCite's usage-based model, while a base 500€ fee applies to all members, their final pricing is based on their overall usage of the service. Currently, the overall cost for DCAN in 2021 is subsidized by a contribution of $50,000 a year from NDRIO, through CARL Portage funding. As with ORCID-CA, the final price depends on the currency exchange rate. The DataCite pricing structure presents two challenges for Canadian institutions: a relatively high point of entry for small organizations, and a potential financial disincentive to mint more DOIs, particularly if the DOI output of an organization falls near one of the tier thresholds.

Both CARL Portage and CRKN also make significant in-kind contributions. Staff at CARL Portage provides technical support, as well as community engagement while staff at CRKN provide administrative and governance support. The costs of these staff contributions are absorbed by the respective organizations and not passed onto members.

PIDs in Canada

ORCID-CA and DCAN are two key elements of existing PIDs infrastructure in Canada in need of sustainable, centralized, national support. At the same time, beyond ORCID iDs and DataCite DOIs, other important PIDs and PID organizations exist globally that should also be considered and connected to a national PIDs implementation strategy including, among others: the Research Organization Registry (ROR) which supports open organizational IDs; Crossref which supports DOIs for publications and special DOIs for funding awards called Grant IDs; Research Activity iDs (RAiDs) that aggregate all of the PIDs associated with a specific research activity or projects; and Research Resource IDs (RRIDs) which provide an ID for resources used in research (e.g. cell lines, organisms). A sustainable and funded national PIDs implementation strategy is needed to ensure the innovative integration of this critical infrastructure that makes the Canadian research out most discoverable and interoperable.

Members of ORCID-CA as of December 2020

Bank of Canada	University of Alberta
Brock University	University of British Columbia
Carleton University	University of Calgary
CIFAR	University of Guelph
Concordia University	University Health Network
Dalhousie University	Université Laval
Kwantlen Polytechnic University	University of Manitoba
Lakehead University	University of New Brunswick
MacEwan University	University of Ottawa
McGill University	University of Prince Edward Island
McMaster University	University of Regina
Memorial University of Newfoundland	University of Saskatchewan
Mount Royal University	University of Toronto
National Research Council	University of Victoria
Ottawa Hospital Research Institute	University of Waterloo
Portage Network	University of Windsor
Queen's University	Western University
Ryerson University	Wilfrid Laurier University
Simon Fraser University	York University

Members of DCAN as of December 2020

Agriculture and Agri-Food Canada	National Research Council Canada
ArcticNet	Natural Resources Canada
Bank of Canada	Observatoire global du St-Laurent
BC Electronic Library Network	Ocean Networks Canada Society
Brandon University	Ocean Tracking Network
Canada Human-Computer Communications Society	Ocean Wise Research Institute
Canadian Association of Research Libraries	OCUL Scholars Portal
Canadian Cryospheric Information Network	Polar Data Catalogue
Canadian Energy Regulator	Revue francophone de recherche sur le transfert et l'utilisation des connaissances
Canadian Polar Data Network	Simon Fraser University
Capilano University	Statistics Canada
Carleton University	Université de Montreal
Centre De Recherche Informatique De Montréal	Université de Montréal Biodiversity Centre
Centre d'études nordiques	University of Alberta
Centre for Biodiversity Genomics	University of Alberta Museums
Computational Geometry Lab, Carleton University	University of British Columbia
Concordia University	University of Calgary
CybelePress	University of Manitoba
Dalhousie University	University of New Brunswick
Electronic Textual Cultures Lab	University of Ottawa
Emily Carr University of Art and Design	University of Prince Edward Island
Environment and Climate Change Canada (ECCC)	University of Saskatchewan
Hakai Institute/Tula Foundation	University of Windsor

Institute Centre for the Advancement of Health Regional Innovation and Science	University of Winnipeg
Institute for Research on Public Policy (IRPP)	Vancouver Island University
McConnell Brain Imaging Centre	Walter and Duncan Gordon Foundation
McMaster University	World Ozone and Ultraviolet Radiation Data Centre
Memorial University of Newfoundland	