



The international reach of Crossref

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Introduction

‘Smart alone, brilliant together—collaboration is at the core of everything we do’ [1].

Publishers join Crossref for a variety of reasons but the primary one is the ability to register the content they produce to let the world know that it exists. They send information about that content—called metadata—to Crossref.

The metadata includes basic fields like titles and dates, but also unique labels that identify the content’s authors, affiliations, funders, and its location on the web. We call those labels persistent identifiers. Crossref metadata is used by numerous systems and organizations, like libraries, funders and others, that together help credit and cite the work, report impact of funding, and track outcomes and activity. Although there exists a number of organizations through which publishers can register digital object identifiers (DOIs) for their content, Crossref is widely recognized as the primary DOI registration agency for international scholarly content.

In addition to registering content and metadata with Crossref, there are other services members can participate in to enable research outputs to be easier to find, cite, link, and assess. Examples include Reference Linking, Cited-by, Similarity Check, Crossmark and the upcoming Event Data service.

On average, around 180 new members join Crossref each month, with members currently across 114 countries. In more recent years there has been a rapid growth in membership from outside of Crossref’s traditional West European and North American markets, with a large percentage of new members coming from Asia, Eastern Europe, and South America (Fig. 1).

Crossref is also involved in other industry initiatives like Metadata2020 (<http://www.metadata2020.org>), the OrgID Project (<https://www.crossref.org/blog/the-organization-identifier-project-a-way-forward>), PIDapalooza (<https://pidapalooza.org>), and Scholix (<http://www.scholix.org>). These underscore Crossref’s commitment to providing shared services, listening to the wider community and playing an active role within the industry.

Crossref LIVE Local Events

Each year Crossref holds a two-day annual event, traditionally in either Boston, USA or in London, UK. In 2017, the annual event was held in Singapore taking into account the large and increasing number of members in the region. However, in recognition of the need to interact with a greater number and range of members face-to-face, in their own countries and

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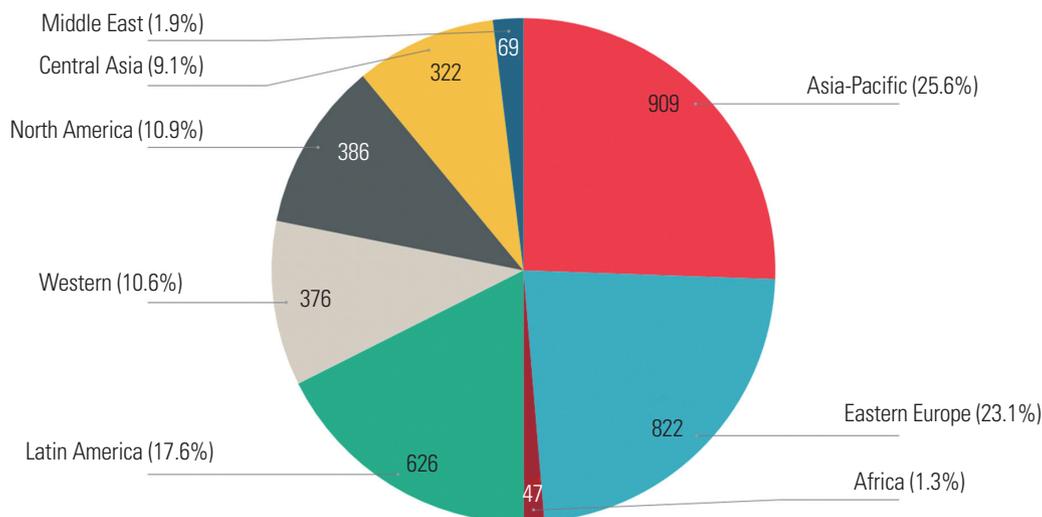


Fig. 1. New members, segmented by region, who have joined Crossref within the last two years (January 1, 2016 to December 31, 2017).

Table 1. Local LIVE events held in 2017 [2]

Event name	Date	Location
Crossref LIVE London	Sep 26, 2017	London, UK
Joint Global Infrastructure Conference (ORCID/Crossref/DataCite)	Jun 15, 2017	Seoul, South Korea
Crossref LIVE Seoul	Jun 12, 2017	Seoul, South Korea
Crossref LIVE Boston	May 30, 2017	Boston, MA, USA
Crossref/THOR Outreach Meeting	Apr 24, 2017	Warsaw, Poland
Crossref LIVE Beijing	Mar 30, 2017	Beijing, China [3]

languages, Crossref additionally launched a series of smaller one-day events held in a variety of locations around the globe. In 2017 this included Seoul, Beijing, and Boston (Table 1) [2,3], with future events in 2018 planned to take place in Japan, South Africa, and India to name but a few.

Each of these one-day seminars cover key aspects of Crossref, information on how to be an effective member, how to participate in the different services, upcoming new developments at Crossref, and news of initiatives within the wider scholarly research community. The events also provide an opportunity for Crossref to gain feedback on their activities and to stay well connected with country/region specific developments and trends. Activities and content are tailored to take into account the country context, the attendees' industry background, and any language or terminology difficulties.

Crossref collaborates with local organizations, often Crossref members themselves, to ensure that the events are applicable, appropriate and accessible [4]. Local partners help by advising on venue selection (sometimes providing a space to host the event at their own institution or offices), giving rec-

ommendations for speakers and content topics to be covered, and by helping source translation or interpretation services.

In addition to in-person events, a LIVE local event in Turkey was held online in the form of a 2.5-hour webinar. Webinar software enables organizations like Crossref to reach audiences where it just may not be feasible to hold an in-person event due to time or financial constraints, political upheaval or other instability in the area, or, as it is more convenient for the target audience on this occasion. This is particularly relevant if those wishing to attend are widely dispersed within the country or region, as it provides an alternative to traveling or to holding multiple events in the same locale.

Shorter webinars can be held on specific topic areas, in local languages, using country context examples. This enables members to get a live demonstration and explanation of services, a walk-through to registering content and metadata with Crossref, and gives attendees the opportunity to ask questions in real time. These sessions are recorded and shared, allowing participants and those who were not able to attend to view the recording at their leisure. However, the more that participate on the day, the richer the content can be, as input and questions from attendees is encouraged. Crossref is also then able to glean valuable feedback which it uses to ensure the webinar process, content, delivery and technology stay relevant and accessible to the audience, making continuous improvements.

Crossref Ambassador Program

In order to reach members around the globe on an increased level, a wide team of people knowledgeable in the languages, cultures, and member needs in a variety of locations is re-

quired. The Crossref team is highly skilled, however, with a total of 34 staff [5] (as of December 2017) based primarily in Boston, USA and Oxford, UK, Crossref simply does not have the necessary capacity in-house to provide the breadth and level of support that members require.

The Ambassador Program is a good example of one of the ways Crossref is responding to the needs and wishes of their membership community. Feedback identified a need for local experts to provide support in the local time zone and language, an increased number of training events both online and in person, representatives from Crossref at regional industry events, and to act as a liaison with the Crossref team.

Crossref ambassadors are volunteers who work within the international scholarly research community in a variety of different roles such as librarians, researchers or editors to name but a few. They are individuals who are well connected, value the work that Crossref does and are passionate about improving scholarly research communication. The program is also a way of officially recognizing and empowering a number of people who have already been working with Crossref for some time in a variety of ways and providing more support to those individuals.

The initiative has four primary objectives for Crossref: (1) to gain a deeper understanding of certain audiences or countries, (2) to increase outbound education, with both existing members and new audiences, (3) to improve communication with and between non-English speaking communities, (4) and to empower Crossref members to help and advise one another.

The program officially launches in January 2018 with a select, few individuals with whom Crossref already has a good working relationship, such as Jae Hwa Chang, manuscript editor at infoLumi in Korea, Edilson Demasio librarian at State University of Maringá-UEM in Brazil, and US-based Lauren Lissaris, Digital Content Manager at JSTOR. This will expand to include a larger number of ambassadors over time, providing a good representation of the geographical spread of Crossref membership. However, the intention is to keep the overall group fairly small, in order to maintain a personal connection and provide a high level of support to ambassadors.

A longer-term objective of the program is that it could play an instrumental role in the growth of Crossref, potentially aiding in the setting up Crossref offices and hiring of permanent staff in countries outside of the US and the UK. Some of the activities Crossref ambassadors will undertake are staying up-to-speed with Crossref developments, for example, by attending webinars and maintaining regular check-ins with the Crossref team; engaging in the online community platform by providing feedback, joining in discussions and helping other members to resolve issues posted to the group; writing blog

posts, or contributing to newsletters; participating in beta-testing of new products and services; helping with local LIVE events, for example, providing recommendations on speakers or venues, helping with logistics and presenting at the event; helping with the translation of Crossref material and content into local languages; running webinars on different Crossref services in local languages; running training sessions locally with Crossref members; and representing Crossref at select pre-agreed conferences.

Crossref highly values the individual's contribution and the voluntary nature of the ambassador role means that it comes with a high degree of flexibility. It is important that Ambassadors enjoy the work they are doing with Crossref by contributing in ways in which they feel comfortable, according to their interests, skills and time constrictions. For this reason a good level of diversity among the pool of Ambassadors, not only geographically, but also in terms of industry, experience and role is important.

Crossref ambassadors will become an increasingly key part of the Crossref community—the first port of call for updates or to test out new products or services, and the eyes and ears within the local academic community—working closely with Crossref to make scholarly communications better for all. The benefits are far from one-sided, and the program should provide a mutually beneficial relationship for both the ambassadors and Crossref.

As valued members of the Crossref network, Ambassadors will be provided with comprehensive materials, training, endorsement and further support, to be beneficial not only in fulfilling their roles as ambassadors but more broadly in their careers. This includes an Ambassadors' area on the Crossref website; a dedicated contact for any upcoming news, or to share ideas, queries or concerns; help with content for proposal calls, presentations, training and written articles; Crossref materials and giveaways (plus ambassador-branded materials); personal endorsement via Crossref; training on Crossref services and on wider relevant skills as necessary; first look at new Crossref developments; certification from Crossref on ambassador and training status; personal ambassador logo or badge for use on email, website and profile on the Crossref online community.

After the launch of the program in January 2018, there is a dedicated page on the Crossref website with more information <https://www.crossref.org/community/ambassadors/>, a blog introducing the first few ambassadors, and written features within both the internal and external Crossref newsletters. The program will also be featured in upcoming LIVE local events where people can speak to members of the outreach team, ask any questions, give suggestions or find out more about getting involved. A sign-up form is also available online

for anyone who would like to submit an interest in the program, following which a member of the outreach team will be in contact to provide more information and discuss next steps.

Crossref recognizes that as remotely-working volunteers, processes need to be in place in order to provide the necessary help and support ambassadors need to succeed in their role. Ambassadors will be provided with comprehensive information when first joining the program, regular catch-ups will be scheduled to provide updates, answer any questions and to maintain a personal connection with the team. Ambassadors will also be able to arrange ad-hoc calls with the Crossref team as necessary. There will be an annual review to ensure both Crossref and the ambassador are happy with the level of commitment the role requires and the level of support provided.

Ambassadors will play a key role in Crossref's upcoming community forum, which will provide an online, open platform where members can participate in discussions, pose questions to the group, give feedback and share ideas. As a public forum, the aim is to make it easier and faster for members to get their questions answered by either the Crossref team or a fellow member who may work within a similar context and/or be able to answer in their own language. It will also provide opportunities for members to share tips, news, and updates from their own organizations and sectors. There is a great value in members helping and communicating more with one-another about the ways in which they participate in Crossref and use Crossref metadata, rather than one-way communication from Crossref.

Additionally the platform enables Crossref to have a greater level of communication with members, manage relationships with ambassadors, and conduct activities such as polls and beta-testing. This allows for immediate feedback and input from a large pool of members, helping to streamline the technical and member support process.

However, a community platform should never be approached with a simple 'build it and they will come' mentality. It requires substantial time and effort to become a successful and engaged community. This will include selecting appropriate software, and creating content, codes of conduct, and other support documentation in multiple languages. It will involve moderation by Crossref staff, ambassadors, and engaged members of the community, recognized and empowered to help drive the community forward. It may be an ambitious

project, but if done well, will prove to be of great value to both Crossref and its members.

Conclusion

Crossref's reach and impact is truly international. In addition to being recognized as the leading DOI registration agency for scholarly content, it is in the unique position of providing a range of services and open source tools widely used within global academic research community. The shared infrastructure and open APIs mean that the rich metadata provided by Crossref members is openly available to be used in a variety of tools and projects, enhancing the discoverability of research to the benefit of the international scholarly community as a whole.

As Crossref's membership continues to grow and become increasingly diverse, it is imperative for Crossref to expand its outreach activities to better support its members on a global scale. Initiatives such as the Ambassador Program, Crossref LIVE locals and the 'Community at Crossref' are ways in which the organization is addressing and responding to the needs of its varied and growing membership.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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