Updates on HL7 Infrastructure and Standards Development

The Latest

Updates about standards development, tooling, infrastructure, and process improvement at HL7.

Findings from the 2023 Co-chair Perspective Survey
Daniel Vreeman posted on Jun 26, 2023

Background

HL7's 3 Year Plan recognizes that the individuals of HL7's global community fuel our collective progress. We must inspire, expand, and engage with an ever-broader set of stakeholders to support development and implementation of HL7 standards.

Strategy 07 of the 3 Yr Plan is to Develop and execute a contributor engagement program. We want to cultivate a diverse, equitable, and inclusive community where everyone can experience the deep satisfaction of contributing their unique perspective towards the common goal of interoperability. Participants in HL7’s community do so of their own volition, so we must inspire, expand, and engage with an ever-broader set of people.

Since launching the 3 Yr Plan, we have continued a series of conversations about how we're doing as a community and what we could be doing better. In particular, we've had robust discussion on how we might better optimize for contributor happiness (and reduce burden). To better understand where we stand and help plot the course towards what we want to become, we conducted a survey of Work Group Co-chairs and Management Group members to better understand their perspectives.

This post summarizes the key findings from that survey and some of the next steps we're taking based on this feedback.

Approach

We conducted an online survey from April 15 to May 19 2023. Participants were recruited by the co-chair mailing list and in person at the May 2023 WGM+ meeting. Either anonymous or identified responses were allowed, though we encouraged respondents to identify themselves. Two lucky (randomly selected) respondents received a $50 credit for HL7 swag as a token of our appreciation for their feedback.

Here is what the survey looked like:
Summary Results

The table below summarizes the main respondent characteristics. Overall our response rate was 19% out of the 124 co-chairs and 12 management group members who aren't co-chairs, all of which were technically eligible to respond. We received responses from (at least) 3 first time co-chairs.

Table 1. Respondent characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible people (N)</td>
<td>136</td>
</tr>
<tr>
<td>Respondents (N)</td>
<td>26</td>
</tr>
<tr>
<td>• Co-Chairs</td>
<td>20</td>
</tr>
<tr>
<td>• Management Group</td>
<td>2</td>
</tr>
<tr>
<td>• Anonymous</td>
<td>4</td>
</tr>
<tr>
<td>Mean years as leader (Years)</td>
<td>7</td>
</tr>
<tr>
<td>Mean score of role understanding (0 to 5)</td>
<td>3</td>
</tr>
</tbody>
</table>

Based on human review by the CSDO and TSC leadership, assisted in summarization by ChatGPT-4, here are the main themes in response to each survey question.

Challenges with fulfilling duties

- Understanding process steps, especially when it changes
- Uneven influence and consistency of governance among WGs, management groups, and TSC
- Tracking and tracing project progress
- Time commitment, unequal “sharing the load”
- Complexity of the ballot process
If you could snap your fingers to change 1 thing…

- Improved automation and usability of tooling (esp. Jira and ConcCall scheduler)
- Have available human “concierge” support for process and technical questions
- Have a broader pool of engaged participants to share the work
- Financial support for attending WGM

What would you eliminate, automate, or delegate

- Automated end-to-end project management (and reporting)
- Delegation of admin tasks (minutes, scheduling, etc)
- Continue simplifying the standards development process
- Unified WG management console (unified dashboard)

What tools would help?

- Automated end-to-end project management (and reporting)
- Unified WG management console (unified dashboard)
- Better calendar and call scheduling
- Support staff
- Collaboration and learning resources (on-demand FAQ, mini tutorials, quick start guides for common tasks)

What is the most personally rewarding aspect of serving?

- Engagement in a true community
- Working with passionate and knowledgeable colleagues
- Making a difference in health around the world
- Personal and professional growth

Closing comments

- Appreciation for the HL7 staff and the HL7 community
- Concern for the financial commitment it takes to be a Co-chair
- Concern for our gender dynamics and respectful communication
- HL7 is complicated; it can be difficult to find what you need when you need it
- Concern for focus on FHIR (to the exclusion of large V2/CDA implementation base)

Discussion and next steps

We presented the findings of this survey at the joint session of the Technical Steering Committee (TSC) and the HL7 Board of Directors during the Board strategy session this summer. Coming out of that discussion, we identified some key themes and specific next steps (in the form of Board motions). Here I’ve organized these themes into 3 categories for focus: process, infrastructure, and people.

Process

The survey findings underscored that we must keep a continuous improvement mindset about our processes. To resist overgrowth and unnecessary bureaucracy, gatekeepers, or busywork, we want to identify low hanging fruit for aspects to eliminate, automate, or allocate. Ideas for these top-priority tune-ups are always welcome.

Survey respondents also challenged us to scale capacity and availability for key staff and our contributor leaders. When our work and community of contributors grow together, we’re scalable.

The survey responses also prompt us to think about whether we’re appropriately matching the rigor of the process with the readiness of the project. What might we be suffocating by applying too heavy a process? Within the TSC we are beginning to explore potential new designations for certain kinds of standards to help better match the process and the project.

Lastly, the survey findings challenge us to enhance our communication and education to all participants. There were several suggestions to try to deliver those resources “just in time” or at the right place where you need it. Our documentation is pretty vast, so just pointing people to this Encyclopedia of Confluence site is not going to be very efficient. We may also experiment with the concept of office hours for key staff or seasoned, efficient leaders who are willing to share what has been working well for them.
Board Motion
The TSC shall assess the policies and processes that the TSC uses with a view to simplification whilst maintaining the required quality of output and will provide feedback to the Board on the progress of the optimization, including an emphasis on communication, usability, and regular education within regular cochair training.

Infrastructure

The survey findings re-enforced the importance of pushing forward on our vision of having a smooth, efficient, end-to-end specification lifecycle tooling platform.

We also should explore the concept of a unified dashboard for co-chairs/workgroups. We can start be sharing best practices for the component queries and visualizations that our “positive deviants” are already using to help manage their workflows.

Board Motion
HL7 Board supports continuing to advance our Jira and Confluence automation, including an emphasis on communication, usability, and regular education within regular cochair training.

People

The survey findings also illustrated that for many people, the most rewarding aspect of serving in a co-chair or management group role is the community and the professional growth that comes from interacting with brilliant colleagues from around the world. Combined with the personal meaning derived from pursuing work that is transforming health and health care, these are powerful motivations for why people choose to contribute their time and talent to HL7.

Survey respondents also highlighted the financial commitment required to serve as co-chair, which suggests we should reassess that impact. We didn’t develop a specific action plan for this, but did launch some background financial analysis on different approaches.

Last, a few responses noted that we are not always living up to our ideal of fostering an open and welcoming environment. We must do better.

Like the Apache Foundation’s maxim “community over code”, the essence of HL7 is not the specifications we produce, but rather having a diverse, respectful, well orchestrated community. Our success in addressing healthcare interoperability challenges depends on it.

To that end, HL7 is committed to ensuring an environment of respectful behavior and communication for all. We recognize that to continuously improve, we’ll need to be proactive in emphasizing and educating about our community expectations, including how to report unacceptable behavior or misconduct if you witness it in any of our community gathering places (whether in person or only). In addition to the board motion noted below, we are also reviewing how best to incorporate Human Resources expertise into our handling of reports.

We hope that the processes, governance, education, and any corrective actions necessary will help us become the kind of community we aspire to be.

Board Motion
HL7 Board supports enhancing HL7 contributor, leader, and staff education to include promoting respect and anti-harassment components, including how to report misconduct. Such training will become mandatory for leaders on an annual basis.

Thank you for your contributions to HL7’s collective work.

As always, we welcome your participation and feedback in how we keep refining our community habits, processes, tools, and roles to provide self-sustaining (not burn-out inducing) effectiveness and growth.
Updates on Standards Development

As we are gathering together for our first ever WGM, it’s exciting to see and feel how our integrated approach to standards development and implementation is becoming part of the fabric of HL7. The interplay of health data policy and interoperability standards are continuing to drive advancements in clinical care, administration, research, and public health around the globe.

Your participation in our shared work here at HL7 ensures that your perspective on the world, your expertise, and your lived experiences are reflected in the interoperability advances that are transforming the health of people everywhere.

Year to date: Standards publications

In total, we have published (or reaffirmed) 22 specifications so far in 2023. These specifications represent the culmination of consensus building among stakeholders about how they want to address a particular interoperability problem.

2023 YTD: 23 Specifications published by HL7 International

Jan
STU Update: FHIR IG: Subscription R5 Backport, Release 1, STU 11

Feb
STU Update: minimal Common Oncology Data Elements (ncODE) IG 2.0 - STU 23
STU Update: FHIR IG: Clinical Data Exchange (CODEx), Release 1 STU 2 - US Realm
STU Update: FHIR Profile: Occupational Data for Health (ODH), Release 1.3
STU Update: FHIR IG: Vital Records Death Reporting (VRDR), Release 1 STU2.1 - US Realm
STU FHIR IG: At-Home In-Vitro Test Report, Release 1 - US Realm
STU FHIR IG: International Patient Access (IPA), Release 1
STU FHIR IG: Longitudinal Maternal & Infant Health Information for Research, Release 1 - US Realm
STU FHIR IG: Patient Cost Transparency, Release 1 - US Realm
STU FHIR IG: Release 5 (RS)

Mar
STU: FHIR Profile: Quality, Release 1 - US Realm (ccCore) STU Release 5
Normative: CDA R2 IG: Emergency Medical Services; Patient Care Report Release 3 - US Realm
STU: Consumer Mobile Health Application Functional Framework (CMHAF), Release 1
STU: FHIR IG: Data Segmentation for Privacy (DS4P), Release 1
STU: FHIR IG: SMART Application Launch Framework, Release 2.1
STU Version 2 IG: Diagnostic Audiology Reporting, Release 1 - US Realm
STU FHIR IG: Clinical Study Schedule of Activities, Edition 1
STU Update: FHIR IG: NHSN healthcare Associated Infection (HAI) Reports for Long Term Care Facilities, Release 1 STU 11 - US Realm
STU: CDA R2 IG: Personal Advance Care Plan (PACP) Document, Edition 1, STU3 - US Realm
STU: CDA R2 IG: Pharmacy Templates, Edition 1 STU Release 2

Apr
STU CDA R2 IG: C-CDA Templates for Clinical Notes STU Companion Guide Release 4 - US Realm
STU FHIR IG: US Core IG STU6 Release 6.0.0 - US Realm
STU: HL7/NCDS FHIR IG: Specialty Medication Enrollment, Release 1 STU 2 - US Realm

May

June

Looking closely at this publication summary, a few notable things stand out...

FHIR R5!

As a community, we celebrate the significant milestone of FHIR Release 5, published. FHIR R5 reflects our collective progress and implementation experience, and represents the monumental effort of the FHIR community.

FHIR R5 contains thousands of incremental updates, corrections, and enhancements that improve the overall quality and capability of the standard.
Although it's impossible to cover all of the enhancements, some of the key ones include:

- Capabilities for topic-based subscriptions are now part of the core specification, enabling proactive event notifications based on data changes in the source system.
- Significant revisions to the Medication Definition resources to better support the needs of manufacturers and regulators and use in drug catalogs and pharmacopoeias.
- More than a dozen new resources defining structures for different types of health-related information. FHIR now defines 157 different resource types.
- New operations are defined for efficiently managing large resources such as Groups and Lists
- Several changes to the specification's infrastructure further enable management of coded terminologies as well as extensions to be managed more appropriately alongside the core FHIR specification

Also, because R5 is now the base standard published at hl7.org/fhir, be sure to point out to your friends that there is an easy way to see the R4 (or other prior) version of any page in the spec. Just look for the handy yellow info bar near the top of the page:

This page is part of the FHIR Specification (v5.0.0: R5 - STU). This is the current published version. For a full list of available versions, see the Directory of published versions at: Page versions: R5 R4 R3 R2

A Global FHIR publishing ecosystem

The other notable trend in this year’s publication history was the slight pause from mid-January to February. No, it wasn’t a winter sabbatical. We have continued to evolve and improve our publishing infrastructure in support of the global FHIR community.

Behind the scenes we were working to make some significant improvements in the FHIR IG Publisher’s file transfer performance, as well as providing additional logging capabilities for debugging purposes. Although this created a bit of temporary queue in our IG publications, we’ve developed a more reliable approach that improve future performance.

In addition, the FHIR pipeline and infrastructure development team have made a continual set of performance and feature improvements to the IG Publisher, FHIR Validator, and validator.fhir.org.

Publishing Software Infrastructure

<table>
<thead>
<tr>
<th>Releases (2023)</th>
<th>Commits (2022-2023)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG Publisher: 35</td>
<td><img src="image" alt="Graph of commits" /></td>
</tr>
<tr>
<td>FHIR Validator: 32</td>
<td><img src="image" alt="Graph of commits" /></td>
</tr>
<tr>
<td>FHIR Validator GUI: 1</td>
<td><img src="image" alt="Graph of commits" /></td>
</tr>
</tbody>
</table>

Our auto-build pipeline is used round-the-clock to publish continuous integration builds of specifications under development by HL7 International, HL7 Affiliates (11 or so of them), and many others. There are now more than 280 implementation guides connected to the auto-build pipeline!
Enabling interoperable exchange of US Core Data for Interoperability (USCDI) content

With continued financial support from the ONC (#75P00120C00078), we are pleased to share the recent publications of FHIR® US Core IG Release 6.0.0 and the CDA® R2 IG: C-CDA Templates for Clinical Notes STU Companion Guide Release 4. These new releases add support for exchange of USCDI v3 content, and reflect ongoing feedback from the implementation community.

2023 Consensus-making

Bringing a specification from idea through to publication is a significant accomplishment. And it takes many people playing different roles to make our communal process succeed. The process of seeking, receiving, and incorporating community (and expert, test, and real-world experience based) feedback is the circulatory system of our collective progress.

It takes sustained, ongoing commitment from each of you in the HL7 community to keep this forward momentum.

Here’s what 2023 has looked like in terms of the number of resolved issues each day across all of our specifications.
Welcoming New Participants to HL7

Since 2021, we’ve had 621 people submit comments on HL7 specifications. How wonderful. I’m particularly pleased to share that for 2023, of the 217 issue submitters so far, about a quarter of those were new.

Community Participation

48 of 217

People who submitted comments on HL7 specifications were NEW!

2023

Fresh new updates to registry.fhir.org

In collaboration with our friends at Firely, we’re pleased to announce a whole set of new updates to the FHIR Package Registry (launching today). Starting off, you’ll be treated to a fresh new look and feel that both matches HL7’s branding and is mobile responsive!
We've also updated the search capabilities so that you can search both for packages with instances of FHIR resources as well as profiles of particular FHIR resources. For example:

- Find ValueSet instances related to COVID
- Has anyone profiled the Evidence resource already?
- Or, find an example Condition instance about "food insecurity" (shown below)

Then, if you click-through from a resource on this search page, you'll be brought right to that resource in the package.
And, from here if you want to see all the resources in the package (in this case the SDOHCC IG has 110 resources), just click the clear filters link.

We’re excited about these new features and always welcome your feedback on how we can make the FHIR Package Registry better!

Infrastructure Improvements

Earlier this year we welcomed a new web developer, Chad Neale, to the HL7 team. Some of the projects the IT team worked on have come online, including: a re-working of the Ballot Desktop (for some things that glitched with the transition to the Fonteva association management system) and updating the Conference Call Center software to remove outdated ASP.NET code. We also migrated the mailing list server from an on-prem machine to the cloud, which should enable a more reliable infrastructure for this core HL7 service.

More good things coming in 2023

As we look ahead to projects in store for 2023, we’re also continuing to press ahead on our Specification Lifecycle Management project, which is optimizing and redesigning our existing paper and Confluence-based forms into a semi-automated Jira (issue tracking) workflow. The Product Family Management Council is reviewing the design and requirements analysis to help plot the course ahead.

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Update on Standards Development

Daniel Vreeman posted on Jan 17, 2023

As we turn the page into a new year, it’s a delight to look back what our community has accomplished in 2022. From my perspective, three big things stand out:

1. We created an integrated approach to standards development and implementation that has now become part of the routine decision-making and long term strategy for the organization
2. We transformed the re-envisioning recommendations into HL7’s 3 Year Plan for strategic action
3. We continued to cultivate a global community that delivered world-class standards to the industry

2022 Standards Development

In total, we published (or reaffirmed) 64 new specification versions!
Bringing a specification from idea through to publication is a significant accomplishment. And it takes many people playing different roles to make our communal process succeed. The process of seeking, receiving, and incorporating community (and expert, test, and real-world experience based) feedback is the circulatory system of our collective progress. It takes sustained, ongoing commitment from each of you in the HL7 community to keep this forward momentum.

Here's what 2022 looked like in terms of the number of resolved issues each day across all of our specifications.
Over time, this adds up to steady cumulative progress. In total, we resolved more than 6,100 issues across all of our specifications.

Welcoming New Participants to HL7

Since 2021, we've had 568 people submit comments on HL7 specifications. How wonderful. I'm particularly pleased to share that for 2022 almost half of the issue submitters were new since 2021.
A Global FHIR Publishing Ecosystem

We have continued to evolve and improve our publishing infrastructure in support of the global FHIR community. With major contributions from Graeme Grieve, Lloyd McKenzie, David Otasek, Josh Mandel and many others, we continue advancing this pipeline to support the community's continuous development of FHIR-based specifications.

Here's an summary of the commit history for 2022 of our core publishing software components:

<table>
<thead>
<tr>
<th>Software</th>
<th>History of Code Commits in 2022</th>
</tr>
</thead>
<tbody>
<tr>
<td>IG Publisher</td>
<td>![Graph of commit history]</td>
</tr>
<tr>
<td>FHIR Validator</td>
<td>![Graph of commit history]</td>
</tr>
<tr>
<td>FHIR Validator GUI</td>
<td>![Graph of commit history]</td>
</tr>
</tbody>
</table>

We've also launched an initial version of a Swagger UI for validator.fhir.org.

Our auto-build pipeline is used round-the-clock to publish continuous integration builds of specifications under development by HL7 International, HL7 Affiliates (10 or so of them), and many others. There are now more than 280 implementation guides connected to the auto-build pipeline.
CDA and C-CDA Web Publishing

Over the last year, a team led by Gay Dolin Jean Duteau and Brett Marquard have been working hard to build the infrastructure, techniques, and content representation for a publishing C-CDA using FHIR's StructureDefinition and tooling suite to produce a C-CDA replica of the June 2019 errata package. This publication is now out for community review prior to the next ballot of C-CDA (January 2024) which is intended to be produced using the FHIR StructureDefinition (SD) tooling:

http://hl7.org/cda/stds/ccda/draft1/

In addition, there is a first draft of the CDA Version 2.0.1 using the FHIR Type Definition Framework available here:

http://hl7.org/cda/stds/core/draft1/

Linking the Global Ecosystem of FHIR Specifications

fhir.org/guides/stats/

As the ecosystem of published FHIR specifications grows, we want to continue to make it easy to re-use and build on each other’s work. We have some great tools like registry.fhir.org to find existing work, but it can be hard to see similarities and differences at the profile level. Grahame Grieve has built some draft tools to help navigate the global ecosystem of FHIR specifications.

This site (fhir.org/guides/stats) organizes (by realm) FHIR specifications, their profiles, dependencies, and similarities/differences. If you drill down, for example, to look at its page for the IPS profile on Observation for laboratory results, you can see which profiles have it as a target, and which other profiles are based on it.
You can also look at all the profiles, say, on the AllergyIntolerance resource. The table rendering on that page shows which of the 14 profiles have added constraints on which data elements. Pretty cool!

<table>
<thead>
<tr>
<th>AllergyIntolerance (14)</th>
<th>Source</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td># Name</td>
<td>Source</td>
<td>Ver Description</td>
</tr>
<tr>
<td>1 1 AllergyIntolerance-14/15</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile represents the constraints applied to the AllergyIntolerance resource by the International Patient Summary (IPS) HL7 implementation guide. It describes the relevant allergies or intolerance conditions for a patient, describing the kind of reaction (e.g. rash, palpitations, ...), profile the agents that cause it, and outline the criteria and the severity of the allergy.</td>
</tr>
<tr>
<td>2 AllergyIntolerance Profile</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile defines an allergy model that includes core models, conditions, and forms, ideal for use in an Australian context.</td>
</tr>
<tr>
<td>3 Abstract</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile uses minimum requirements for an AllergyIntolerance resource to record, search, and fetch allergy/intolerance reactions associated with a patient. It is based on the ICD-10 code (AllergyIntolerance), <a href="https://hl7.org/fhir/AllergyIntolerance">https://hl7.org/fhir/AllergyIntolerance</a>, and identifies the appropriate core elements, extensions, vocabularies and value sets that &quot;<em>S1</em>**&quot; represent in the AllergyIntolerance resource when conforming to this profile. It provides the &quot;Sniffer&quot; standards development for specific areas of use in an Australian context.</td>
</tr>
<tr>
<td>4 AllergyType</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile represents the constraints applied to the AllergyIntolerance resource in the Swiss context - in adoption of the definition by the International Patient Summary (IPS) HL7 implementation guide. It describes the relevant allergies or intolerance conditions for a patient, describing the kind of reaction (e.g. rash, palpitations, ...), profile the agents that cause it, and outline the criteria and the severity of the allergy.</td>
</tr>
<tr>
<td>5 ICN</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile defines the AllergyIntolerance profile for vaccination record documents.</td>
</tr>
<tr>
<td>6 DP-AllergyIntolerance</td>
<td>Projectlifedashboard.hl7.org</td>
<td>Define minimum requirements for an AllergyIntolerance resource when assessed via a National Patient Access API.</td>
</tr>
<tr>
<td>7 AllergyIntolerance</td>
<td>Projectlifedashboard.hl7.org</td>
<td>This profile defines allergy intolerance, to be used in form. The profile is adopted to support the narrative standard for clinical information (I3 standard).</td>
</tr>
<tr>
<td>8 AllergyIntolerance</td>
<td>Projectlifedashboard.hl7.org</td>
<td>Profiles of AllergyIntolerance for decision support and quality metrics. Defines the core set of elements and extensions for quality risk and measure authors.</td>
</tr>
<tr>
<td>9 AllergyIntolerance</td>
<td>Projectlifedashboard.hl7.org</td>
<td>Defines the core set of elements and extensions for allergy information.</td>
</tr>
<tr>
<td>10 AllergyIntolerance</td>
<td>Projectlifedashboard.hl7.org</td>
<td>To provide interoperability and adherence through common implementation, this profile sets minimum requirements for the allergyIntolerance resource to record, search, and fetch allergy/intolerance reactions associated with a patient and it identifies the mandatory core elements, extensions, vocabularies and value sets that &quot;<em>S1</em>**&quot; represent in the AllergyIntolerance resource when using the profile. It provides the &quot;Sniffer&quot; standards development for specific use cases.</td>
</tr>
</tbody>
</table>

projectlifedashboard.hl7.org

This project is creating a dashboard for tracking specifications through their lifecycle. With support from the ONC (contract #75PD00120C00078), we have developed a prototype dashboard that’s now live. It contains an easy to navigate overview of key HL7 specifications that updates as they progress from early drafts to mature standards.

The super exciting part is that underneath the clean design is a modern open source content management system (Wordpress) with API functionality that will serve as the basis for a major hl7.org platform revamp we’re planning for the future.
More good things coming in 2023

As we look ahead to projects in store for 2023, there’s a lot cooking!

In the near future we’ll be migrating the mailing list server from an on-prem machine to the cloud. This transition should be seamless for you, but in the background we’ll have a much more reliable infrastructure for this core HL7 service.

Early in 2023 we’ll begin work first to patch the Ballot Desktop (for some things that glitched with the transition to the Fonteva association management system) and then to plot its complete redesign. This is being coordinated with our bigger efforts to modernize our main web platform, which is a strategy in HL7’s 3 Year Plan.

We’ll also pick up again on our Specification Lifecycle Management project, which is optimizing and redesigning our existing paper and Confluence-based forms into a semi-automated Jira (issue tracking) workflow.

Oh, and of course we are eager to work through the community feedback received on the FHIR R5 ballot and bring that to publication.

Thanks for your personal efforts in HL7. Together, we keep striving to cultivate a diverse, equitable, and inclusive community where everyone can experience the deep satisfaction of contributing their unique perspective towards the common goal of interoperability.

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