

The Named Data Networking (NDN) Team's Perspective on IPR and Licensing of NDN and Related ICN Technologies

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The Named Data Networking (NDN) project team is excited by the growing interest of researchers, corporations, government agencies, academic institutions, and others in NDN and Information-Centric Networking (ICN) technologies. We support the long-term objective of moving the Internet toward an ICN architecture, and are committed to promoting its research, development, and adoption as broadly as possible. In addition to continuing technical work on NDN, we hope to participate in emerging steps toward standardization being explored in the IETF ICNIRG.

We believe that an open dialogue about intellectual property is important to such efforts at this important time of community growth. Over the last five years, in particular since PARC's CCNx project and NDN diverged both technically and in terms of licensing strategy, we have fielded many questions about the relationship between the two projects, and heard many deep concerns about patent assertion on the core protocols. ICNIRG's new "harmonization effort" to develop a common base ICN protocol has brought these questions and their practical impact to the surface. Here, as input into that process, we summarize our perspective on the history of the CCN / NDN IPR approaches.

The NDN team's approach to intellectual property, in particular our commitment to the open and free use of core protocols that was a critical part of the Internet's success, is given in Appendix 1, which contains the IPR statement submitted to the National Science Foundation (NSF) as part of the "NDN Next Phase" funding proposal in 2013. To many in the community, our approach is well known.

Much less known is the intellectual property statement from the *first* NDN proposal submitted to the NSF Future Internet Architecture program by UCLA and PARC along with the eight other collaborating universities, which follows in Appendix 2. That 2010 statement includes a shared and explicit commitment by PARC and the academic team to a "core set of protocols that are open and cost-free" and to the non-assertion of a related patent by PARC. For us, this was a fundamental basis of the original collaboration that expressed shared aspirations for the future Internet. PARC's CCNx licensing FAQ website publicly acknowledged this commitment until the Fall of 2012, when PARC removed the specific patent statement. The original online statement is given in Appendix 3, along with documentation of the current intention of FRAND licensing for CCNx IPR.

We believe that FRAND (and other) licensing of ICN-related "*applications and optimized implementations*," as described in our joint 2010 IP statement, is acceptable and an opportunity that will drive investment and innovation in ICN. However, we remain convinced that the community must learn from the success of the current Internet and *keep the core protocols freely usable*. We have sought but not received this commitment. We will continue to seek it in the ICNIRG context. Without it, we are extremely concerned with the chilling effect that the continued deferral of this commitment is having on investment in ICN. The NDN project team is engaging in the technical harmonization effort, but we urge ICNIRG and the ICN community to openly discuss this and other IPR challenges. We hope that all involved will join us in a public commitment to free and open core protocols for an information-centric Internet.

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Appendix 1

2014 Public Statement on NDN's Intellectual Property Approach

As submitted to the National Science Foundation by the NDN NP academic team

NSF required that each proposal to the "Future Internet Architecture: Next Phase" program included a statement on intellectual property. The following statement was included in the proposal to NSF for funding in 2014-2016 by UCLA, UCSD, the University of Arizona, the University of Memphis, Colorado State University, the University of Illinois Urbana-Champaign, University of Michigan, and Washington University in St. Louis. It is available on the project's website.

Intellectual Property Approach: Copyright and Patents

Our team believes that NDN is a viable architecture for the future of the Internet. As such, protecting its availability to all who would use it as the basis for innovation is extremely important. We agree with the principles expressed by the Mozilla Foundation in [their statement of values](#), in particular the following:

- The Internet is a global public resource that must remain open and accessible.
- The effectiveness of the Internet as a public resource depends upon interoperability (protocols, data formats, content), innovation and decentralized participation worldwide.
- Free and open source software promotes the development of the Internet as a public resource.
- Transparent community-based processes promote participation, accountability, and trust.
- Commercial involvement in the development of the Internet brings many benefits; a balance between commercial goals and public benefit is critical.

We believe that NDN, as a proposed Future Internet Architecture, must adhere to the same philosophy of openness that has made the existing Internet architecture both wildly successful and a fundamental advance of our lifetimes.

By openness, we mean that the standard protocols and algorithms that are the common language or "thin waist" of the future internet must be unencumbered by intellectual property claims, as has been the case for the TCP/IP protocols, HTTP, HTML, and other key components on the current Internet.

Our approach emphasizes an open source ethos for the architecture and key mechanisms, as well as the research process, but does not intend to restrict the commercialization of innovation by the project team or others. Our collaboration and management plan describes possible approaches to future governance over NDN as an open source project. Here we describe our intent for intellectual property generated in the course of this research effort.

Copyright and Licensing Approach

Copyright will be held by the author(s) and/or their institutions, per institutional policy.

- Software developed with funding from this program will be made available under one of the open source licenses listed by the Open Source Initiative. In particular, the "reference implementations" will use LGPL, Apache, BSD, or similar, to enable incorporation in both open and closed source projects.
- Documentation and technical reports will be made available under a similar open source or Creative Commons license.
- Papers and other publications will be made available on the NDN site when allowed by the publisher.

Patent Approach

As in our previous FIA project, each institution may file patent applications on new inventions arising from the research, according to usual practice. New and existing IP may require licensing for commercial use. We do not expect IP issues to negatively impact the research conducted by the collaborating institutions in this project. Project team members may collaborate with industry and others to develop protectable IP that can spark new markets and increased interest in NDN.

However, the full potential of named data networking can only be realized through a core set of protocols that are open and cost-free. Thus we will continue to publish as much as possible in [peer-reviewed papers](#), [technical reports](#) and [protocol specifications](#) on our web site, and open source reference [software implementations](#). For guidance, the team will rely on current practices in the free and open source software (FOSS) community, including possibly formalizing a patent policy similar to that of W3C2.

- Submitted with the proposal for NSF Award CNS-1345318 and related collaborative proposals.

Appendix 2

2010 Public Statement on NDN's Intellectual Property Approach *As submitted to the National Science Foundation by the NDN project team*

NSF required that each proposal to the "Future Internet Architecture" program included a statement on intellectual property. The following statement was included in the proposal to NSF for funding in 2010-2013 by UCLA, PARC, UCSD, UCI, the University of Arizona, the University of Memphis, Colorado State University, the University of Illinois Urbana-Champaign, Washington University in St. Louis, and Yale University.

FIA: COLLABORATIVE RESEARCH: NAMED DATA NETWORKING (NDN) *INTELLECTUAL PROPERTY STATEMENT*

The plan for NDN is that each institution will file patent applications on new inventions arising from the research, according to usual practice. New and existing IP may require licensing for some commercial applications and specialized implementations. We do not expect IP issues to negatively impinge on the research conducted by the collaborating institutions in this project.

PARC believes that the full potential of content networking can only be realized through a core set of protocols that are open and cost-free, and to that end has published CCNx protocol specifications and an open source reference implementation in software. To assure that these protocols may be freely implemented, PARC has filed for a patent (application published as US 2009/0287835) that will be made available to all at no cost, by means of a published commitment not to assert.

In addition to developing the open source CCNx, PARC does work for clients that contributes to adoption by applying the technology to commercial or government problems. As part of its business, PARC files and holds patents related to applications and optimized implementations of CCNx technology, as well as to many other technologies that might possibly be used in conjunction with CCNx in the future. No licenses to these patents are implied by the commitments to the open source CCNx.

PARC has filed approximately 10+ U.S. patent applications related directly to CCN, in addition to that referenced above. These filings deal with application of the basic technology in a number of contexts such as mobility, overlay, and carrying conventional services such as conversational media communication or web services traffic. Some filings deal with optimized forwarding in hardware and forwarding control.

- Submitted with the proposal for NSF Award CNS-1039615 and related collaborative proposals.

Appendix 3

CCN Public Patent Statements *Via the Internet Archive (archive.org)*

The CCNx Licensing FAQ contained the following statement since its inception during the early years of the NDN project (emphasis ours):

Q.What about patents?

PARC makes a business from the generation of knowledge and the creation and distribution of intellectual property in a variety of forms. In the case of Project CCNx, we seek to enable the widest possible adoption of the protocols, and **will file certain patents for defensive publication purposes. PARC plans to publish commitments not to assert these patents.** The timing of this is constrained by the schedule of the patent office(s).

This statement was removed sometime between May and November, 2012. To our knowledge, the commitments were never published.

References:

Sep 7, 2011 - <http://web.archive.org/web/20110907012705/http://www.ccnx.org/faq/licensing-faq/>

May 7, 2012 - <http://web.archive.org/web/20120507064821/http://www.ccnx.org/faq/licensing-faq/>

Nov 10, 2012 - <http://web.archive.org/web/20121110154541/http://www.ccnx.org/faq/licensing-faq/>

The most current statement on patents that we are aware of by PARC is in the LICENSE file for the CCNx_Distillery repo on Github:

This software distribution does not grant any rights to patents owned by Palo Alto Research Center, Inc (PARC). Rights to these patents are available via various mechanisms. As of January 2016 PARC has committed to FRAND licensing any intellectual property used by its contributions to this software. You may contact PARC at cipo@parc.com for more information or visit <http://www.ccnx.org>