ITI Views on Open Standards and Open Source Software

Technology development increasingly is based on information exchange and the output of collaborative activities among many people. Projects are organized to allow participants to agree on pivotal design elements on top of which they can innovate, with some mechanism for the new innovations to become stable and, in turn, form the basis of new work.

Two of the predominant approaches that are used to facilitate this type of collaboration are:

- The development of published, stable <u>open standards</u> that may be implemented by anyone, and

- <u>Open source [software development]</u> that is a method of producing software based on the use and improvement of shared technology to create new solutions.

Open standards organizations and open source software projects can each facilitate collaboration and innovation. Both have created supporting organizational patterns and intellectual property approaches of extraordinary variety to support the quality, stability and accessibility of the standardized specifications and the software they create.

The goals, processes and usage patterns in connection with the development and implementation of standards and open source software, however, differ. Standards organizations seek to create stable specifications that, when implemented, foster interoperability and equal market opportunity on any technology platform for participants and implementers alike. Open source development projects are predicated on dynamic contribution, implementation and reuse of a commonly available software technology. (Open source software has no inherent interoperability with other implementations or software technologies. That requires design and testing as it does for any software project.) Furthermore, open source development projects may incorporate an implementation of one or more standards, and a standards-setting organization may include source code in connection with a standard specification, but generally the process for developing and maintaining an industry standard is very different from the process for developing and maintaining open source software code.

Despite these different approaches and focuses, there is potential synergy between standards and open source software where they can complement and leverage each other's strengths. Each approach has an important role in the industry, and many information and communication technology projects combine the two approaches in some measure.

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In order to better understand this synergy and opportunity for effective interaction between these two models, it is important to understand their inherent attributes as a collaboration method.

Open Standards

- o Technology Neutral. Open standards are technology neutral. They can be implemented on any technology, allowing innovation by connecting interoperable components and systems and avoiding lock-in to any one technology ecosystem.

- o Interoperability. Standards specify how a component of a system should communicate and respond so other components can rely on it, without having to know how the component is implemented. This supports interoperability in a cross-platform context.

- o Quality. Open standards must be high quality to be successful in the marketplace. This generally is achieved through oversight by standards-setting organizations that provide transparency, committee structure, voting rules and other due process-based checks and balances to ensure that the standards they produce benefit a wide implementing community.

- o Stability. Open standards must remain useful for an appropriate number of implementation cycles. Systems made up of multiple interoperable components require that the specifications that define each component change often enough to keep up with technology, but quality is reduced and cost increased if some component specifications change too often.

- o Availability. Open standards must be available for implementation by a wide range of implementers under reasonable terms and conditions.

Open Source

- o Flexibility. The collaboration methodology that underpins open source software enables developers to mix and match components from a commonly available software technology set and rapidly iterate software projects. Projects are managed by community leads which both keeps engineering processes in place while enabling broad contribution from many participants. In addition, the choice of source code license may

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also dictate community behaviors. The result is a dynamic collaboration environment that fosters frequent incremental innovation, sometimes resulting in divergent software code.

o   Interoperability. Open standards may be implemented in an open source project as one means of achieving interoperability. Many leading open source projects have significant numbers of standards implemented in them (such as Linux's support of core networking protocols to enable Internet connectivity).

o   Quality. Open source projects must be of high quality to be successful in the market place. Unlike standards organizations which are rules-based with a general approach to achieve consensus from participants, open source projects function on social dynamics based on strong community leaders who closely manage the primary project.

o   Stability. The largest open source projects provide stability through version-controlled releases much like traditional commercial software. Smaller projects may be less rigorous in the management of versions. There are many firms who offer integration and testing to package open source solutions of all types into more stable releases. The stability is a function of the need for predictable behaviors for interoperability and/or for commercial support contracts.

o   Availability. The software developed in open source projects is usually available to anyone for use, pursuant to the terms of its specific open source code license, and solutions based on that software may be made available as part of commercial offerings. Use of the software relies on implementation of an underlying software technology, which must also be widely available and usable.

Interaction between Open Standards and Open Source

Standards specifications for software-based technologies increasingly face difficulties in expressing complex concepts in written English rather than in source code, difficulties which slow development of the standard. Engineers who are participating in the development of the standards as well as those seeking to implement the standards find the expression of key concepts in source code to be more efficient. Open standards organizations are adjusting policies and processes to include source code as examples when it is helpful and in interoperability testing scenarios. The choice to license the source code under an open source license is one option (of many) that the standards bodies may allow.

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However, using source code as a full substitute for a standard means abandoning technology neutrality. For standards development organizations, using open source to replace their current standards processes runs the risk of embedding unintentional elements or legal constraints that may disrupt the chartered intent of a standards organization. In addition, the very nature of the flexibility of open source code referenced above may contribute to a lack of sufficient stability because it does not "stand still" in the same way an open standard does.

Yet open standards can and do support open source software in that they can facilitate interoperability by enabling software from an open source project to work with software or hardware created in other contexts. Open source projects can decide to enforce the use of relevant standards so that key interfaces are maintained even as the open source software is further developed by different participants.

In conclusion, open standards and open source have similarities and differences. The two are clearly independent of each other and will continue to evolve. Both remain vital tools for the information and communications technology industry.

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