

NISO Standards Development Process Review & Recommendations

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Introduction

I was charged in August 2005 by the NISO Board to study the NISO Standards Development Process (SDP) and make recommendations to the Board as to how the process could be changed to be more timely and effective (see the full charge in Appendix A). A preliminary draft was presented to the Board at their September 15-16, 2005 meeting. Comments from the Board further shaped the draft, and I was additionally charged with reviewing software options for supporting the SDP.

To prepare this report I performed a literature search and interviewed a number of individuals, both those suggested by the Board and those selected by the author as interested and knowledgeable about standards as well as the NISO standards development processes specifically. I have attempted to distill the key perceptions and ideas of both the interviewees and myself.

The International Organization for Standardization (ISO) defines a standard as a “document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context.” (ISO/IEC Guide 2:2004).

This report would not exist if we did not believe standards to be important, and therefore that crafting a responsive, effective process for developing standards is vital. But despite their clear benefit, standards are not without pitfalls.

In his book *Technical Standards for Librarians*, Walt Crawford warns that “Standards aren’t always helpful. They can hamper innovation when they are established before a field has matured or when they persist although outmoded by evolving technology. They also can lock out the most creative and efficient people in a field...Efforts devoted to developing them can detract from efforts for innovation. Standards can keep old technology dominant beyond its time, costing everybody efficiency and flexibility. They may not be developed with sufficient objectivity and balance, and may favor some suppliers at the expense of others, or at the expense of users. Standards can be used to impose trade barriers or to suppress technologies” (Crawford, 1991, p.8-9).

Our struggle, then, is to craft a standards development process that is both agile and measured, that is both open and yet sensitive to the needs of stakeholders, and that creates consensus while also fostering innovation. These often contrasting goals exert centrifugal forces on a process that attempts to be centripetal. It is not surprising, then, to find we are sometimes working at cross-purposes. Herein lies the rub.

Reaching consensus among parties with different, and sometimes conflicting, goals and purposes is at minimum time consuming and at worst impossible. The process of reaching consensus can, however, be useful in that it demands compromise, flexibility, and understanding from the participants. If time were not an issue, consensus-based decision-making might be the best way to develop standards.

But time is clearly an issue. Libraries and information technology organizations and companies are faced with a rapidly changing world that demands an equally rapid response to remain competitive and effective. There are definitely times when progress can be stymied by a small group of members, or, unfortunately, even one. We are left with a paradox that we may never get completely right, but for which we must strive for a reasonable solution nevertheless.

Therefore, what you will find here is an attempt to mix consensus-building processes as well as processes that foster rapid development and use of draft specifications, best practices and guidelines. It is a process that tries to build a structure that can guide and focus the collective energies of its members while not stifling the leadership that any one member may wish to provide.

It is, in other words, an attempt to define a process that can exert a wide array of centripetal forces on a diverse community to achieve a variety of compatible ends. Some of what this process will produce will be full NISO/ANSI/ISO standards, while others will be draft specifications that never achieve such a status but that may nevertheless underpin useful and effective library services. So be it.

A final caution is in order. Whenever we attempt to maximize competing priorities (e.g., consensus building vs. speed), we open ourselves to doing neither well. Even if we can strike the right balance between these priorities, the end result may be that everyone is equally dismayed. The Board must realize that an efficient, effective, and rapid standards development process is a goal for which we must always strive but likely never fully attain. It is a work in progress, and will require constant vigilance and frequent adjustment to reach the full potential of this organization.

Procedures

This report is the culmination of a variety of activities undertaken to provide sufficient background knowledge, stakeholder opinions, and outside perspectives. Wherever possible I quote directly from the sources themselves, either interviewees or printed sources. Interviewees were provided the option to be quoted without attribution or not at all, in order to encourage honesty and forthrightness. Any quotations that appear here I have received permission to use from the person interviewed.

A literature search was conducted, of both journal and monographic literature, and sources are listed in the "Sources Consulted" section of the report. Inline notes refer to these sources by author, date, and page. Sources that were reviewed and rejected as not being appropriate to the work at hand are not listed. The literature search should not be considered comprehensive; it was meant to be informative and representative, but not exhaustive.

Review of Selected Standards Development Processes

A review of selected standards development processes in the area of information technology was undertaken to compare against NISO procedures.

Internet Engineering Task Force

The Internet Engineering Task Force oversees the specification of the Internet Protocol suite of standards, from TCP/IP itself to application-level protocols such as the protocol that supports email (SMTP) and the File Transfer Protocol (FTP).

The semi-formal process of developing these protocols began in 1969 with the creation of a publication series dubbed Request for Comments (RFC). The process is now documented by RFC 2026, *The Internet Standards Process*. A good sense of what this process was about, particularly in the early days, can be understood from this statement from David Clark of MIT: “We reject presidents, kings, and voting. We believe in rough consensus and working code.”

The goals of the IETF standards process are (RFC 2026, p. 3):

- technical excellence;
- prior implementation and testing;
- clear, concise, and easily understood documentation;
- openness and fairness; and
- timeliness.

RFC 2026 describes various types of RFCs that comprise a range of products, from purely informational documents to standards. RFC types include:

- Standards Track RFCs:
 - Proposed Standard – although this is the first level of any standards-track RFC, it is presumed to have already “believed to be well-understood, has received significant community review, and appears to enjoy enough community interest to be considered valuable” (p.11) and requires a specific action from the Internet Engineering Steering Group (IESG) to achieve this designation. Therefore, it is likely that most documents have already been through the informal “Internet-Drafts” stage prior to becoming a Proposed Standard. There are no requirements for Internet-Drafts, they have no formal status, and they can be removed at any time.
 - Draft Standard – Somewhat of a misnomer, a Draft Standard is “normally considered to be a final specification” (p. 13). In order to achieve this state, there must be at least two independent and interoperable implementations of the specification using two different code bases. These requirements apply to all features of the specification, so if some aspect of the standard has not been so tested it must be removed from the draft standard.
 - Internet Standard – This designation is reserved for standards that have achieved “a high degree of technical maturity and a generally held belief that the specified protocol or service provides significant benefit to the Internet

community”. Examples include the Simple Mail Transfer Protocol (SMTP), Telnet, and the File Transfer Protocol (FTP).

- Non-Standards Track RFCs:
 - Experimental – An Experimental RFC “typically denotes a specification that is part of some research or development effort,” and is typically published for general informational purposes (p.13).
 - Informational – An Information RFC is just that – a purely informational document that can consist of nearly anything. Uses of this designation have included Ed Krol’s “Hitchhiker’s Guide to the Internet,” the precursor to his book, bibliographies, and even the occasional poem.

Assessment

Although the IETF standards process began in a somewhat *ad hoc* fashion, that may in the end be its strength. That is, aspects of the process were added only as they became necessary. This has created a somewhat lean and responsive process that allows anyone to suggest a standard via an Internet-Draft. If others perceive the specification described by an Internet-Draft to be of some use, they can experiment with it and provide feedback to the author. Internet-Drafts that attract no notice are simply removed after six months of inactivity.

Internet-Draft RFCs that attract working implementations can be upgraded to a standards-track RFC as a Proposed Standard. The key here is that only those specifications that are supporting actual running systems (whether experimental or production) make it into the standards track. Therefore, the specification has already achieved a level of use, agreement, and improvement that demonstrate a high likelihood of future implementation and use. The IETF does not create standards that are unused because the system itself prevents such events.

The non-standards track RFCs (Experimental and Informational) provide a communications mechanism that can both foster the eventual development of standards-track RFCs as well as provide an important cross-fertilization role (i.e., standards published by other bodies can be published as an Informational RFC, thus potentially bringing the attention of the IETF community to related standards efforts by other bodies).

The IETF standards development process demonstrates a number of qualities that NISO may wish to emulate:

- 1) It is easy (trivial, even) to suggest a new standard (as an Internet-Draft).
- 2) Only tried-and-true specifications (those with at least two separate implementations) make it into the standards track.
- 3) There is a mechanism for associated non-standards-track information to be promulgated (i.e., Experimental and Informational RFCs).
- 4) Competing interests – patent applications, companies that wish to stifle standards for corporate self-interest rather than support them.

World Wide Web Consortium

The W3C standards process can be summarized as (World Wide Web Consortium Process Document, 2004):

1. “People generate interest in a particular topic (e.g., Web services). For instance, Members express interest in the form of Member Submissions, and the Team monitors work inside and outside of W3C for signs of interest. Also, W3C is likely to organize a workshop to bring people together to discuss topics that interest the W3C community. This was the case, for example, with Web services.”
2. “When there is enough interest in a topic (e.g., after a successful workshop and/or discussion on an Advisory Committee mailing list), the Director announces the development of a proposal for a new Activity or Working Group charter, depending on the breadth of the topic of interest. An Activity Proposal describes the scope, duration, and other characteristics of the intended work, and includes the charters of one or more Working Groups, Interest Groups, and possibly Coordination Groups to carry out the work. W3C Members review each Activity Proposal and the associated Working Group charters. When there is support within W3C for investing resources in the topic of interest, the Director approves the new Activity and groups get down to work. For the Web Services Activity, the initial Activity Proposal called for one Working Group to work on Web Services Architecture and one to work on a language for Web Services Description. The Activity Proposal also incorporated an existing Working Group (from another Activity) working on XML Protocols.”
3. “There are three types of Working Group participants: Member representatives, Invited Experts, and Team representatives. Team representatives both contribute to the technical work and help ensure the group's proper integration with the rest of W3C. The Working Group charter sets expectations about each group's deliverables (e.g., technical reports, test suites, and tutorials).”
4. “Working Groups generally create specifications and guidelines that undergo cycles of revision and review as they advance to W3C Recommendation status. The W3C process for producing these technical reports includes significant review by the Members and public, and requirements that the Working Group be able to show implementation and interoperability experience. At the end of the process, the Advisory Committee reviews the mature technical report, and if there is support, W3C publishes it as a Recommendation.”

Assessment

The W3C process has much in common with other processes, including the “Classic” process below, and therefore may not be all that instructive to us. However, NISO may wish to emulate one part of this process, which is the “Activity Proposal”. A W3C Activity Proposal must include or reference the following (World Wide Web Consortium Process Document, 2004):

1. “An Activity summary. What is the nature of the Activity (e.g., to track developments, create technical reports, develop code, organize pilot experiments, or for education)? Who or what group wants this (providers or users)?”
2. “Context information. Why is this Activity being proposed now? What is the situation in the world (e.g., with respect to the Web community, market, research, or society) within the scope of the proposal? Who or what currently exists that is

- pertinent to this Activity? Is the community mature/growing/developing a niche? What competing technologies exist? What competing organizations exist?”
3. “A description of the Activity's scope. How might a potential Recommendation interact and overlap with existing international standards and Recommendations? What organizations are likely to be affected by potential overlap (see the section on liaisons with other organizations)? What should be changed if the Activity is approved?”
 4. “A description of the Activity's initial deployment, including:
 - a. The duration of the Activity.
 - b. What groups will be created as part of this Activity and how those groups will be coordinated. For each group, the proposal **MUST** include a provisional charter. Groups **MAY** be scheduled to run concurrently or sequentially (either because of a dependency or an expected overlap in membership and the desirability of working on one subject at a time). These charters **MAY** be amended based on review comments before the Director issues a Call for Participation.
 - c. The expected timeline of the Activity, including proposed deliverable dates and scheduled workshops and symposia.
 - d. If known, the date of the first face-to-face meeting of each proposed group. The date of the first face-to-face meeting of a proposed group **MUST NOT** be sooner than eight weeks after the date of the Activity Proposal.”
 5. “A summary of resources (Member, Team, administrative, technical, and financial) expected to be dedicated to the Activity. The proposal **MAY** specify the threshold level of effort that Members are expected to pledge in order for the Activity to be accepted.”
 6. “Information about known dependencies within W3C or outside of W3C.”
 7. “Intellectual property information. What are the intellectual property (including patents and copyright) considerations affecting the success of the Activity? In particular, is there any reason to believe that it will be difficult to meet the Royalty-Free licensing goals of section 2 of the W3C Patent Policy [PUB33]?”
 8. “A list of supporters and references. What community is expected to benefit from this Activity? Are members of this community part of W3C now? Are they expected to join the effort?”

If NISO has an equivalent to the above when launching a new standards effort, I have not seen it.

The “Classic” Standards Development Process

At minimum, the Canadian Standards Organization, the Federal Geographic Data Committee (FGDC), and the International Organization for Standardization (ISO) all describe the same basic process for standards development, which can be characterized by the following steps (summary descriptions are quoted or paraphrased from documents describing the processes of those organizations):

- 1) Proposal stage – On receipt of a request for the development of a standard, an evaluation is conducted and the project is submitted for authorization.
- 2) Preparatory stage – A working draft is prepared and a project schedule is established.

- 3) Committee stage – The committee develops the draft through an iterative process that typically involves a number of committee meetings.
- 4) Enquiry stage – The draft is offered to member organizations for review and comment, and preliminary voting.
- 5) Approval – The final draft is circulated to member organizations for a final yes/no vote.
- 6) Publication – The final specification is published and disseminated.
- 7) Maintenance & Review – The standard is reviewed periodically (often on a five-year cycle) for confirmation, revision, or withdrawal.

The above summary also largely reflects the current NISO SDP.

Assessment

The “classic” standards model has proven effective for reaching consensus among diverse parties when time is not of the essence, or when enough preliminary work and testing has been accomplished as to make the standards process a “rubber stamp” operation. Since time is increasingly of the essence, the classic model will no longer suffice in and of itself. It is unlikely, however, that we should or could get rid of this process completely, particularly if we wish to retain ANSI accreditation for at least some of our standards.

Constraints on the NISO Standards Development Process

We must acknowledge that there are a number of constraints on the NISO standards development process that will continue to shape any future process the NISO Board may wish to implement. However, at least some of these constraints can be removed or influenced by the Board (e.g., by garnering more resources). To be clear, some of the recommendations to follow assume increased resources; therefore, if increased resources are not forthcoming then at least some recommendations will be difficult or impossible to implement.

Existing constraints to the NISO standards development process:

- 1) ANSI requirements – although not commonly perceived to be onerous, ANSI nonetheless defines certain procedures that must be followed to achieve ANSI approval of NISO standards. These include the following (*ANSI United States Standards Strategy*, 2005, p. 6):
 - a. Transparency – Essential information regarding standardization activities is accessible to all interested parties.
 - b. Openness – Participation is open to all affected interests.
 - c. Impartiality – No one interest dominates the process or is favored over another.
 - d. Effectiveness and Relevance – Standards are relevant and effectively respond to regulatory and market needs, as well as scientific and technological developments.
 - e. Consensus – Decisions are reached through consensus among those affected.
 - f. Performance Based – Standards are performance based (specifying essential characteristics rather than detailed designs) where possible.
 - g. Coherence – The process encourages coherence to avoid overlapping and conflicting standards.
 - h. Due Process – Standards development accords with due process so that all views are considered and appeals are possible.

- i. Technical Assistance – Assistance is offered to developing countries in the formulation and application of standards.

Although the Board exhibited interest in determining when ANSI accreditation should be pursued for NISO standards and when it should not, I was unable to determine what I deemed to be an appropriate set of criteria. The benefits of ANSI accreditation are likely to be increased visibility, a major step on the road to international adoption, and a greater likelihood of broader adoption. But quantifying this benefit to NISO escapes me. My guess is that pursuing ANSI accreditation for any given standard will be a question best answered as it arises, and not *a priori*.

- 2) Resources available – The human and monetary resources available to NISO comprise a significant constraint on both the timeliness and extent of NISO’s standards efforts.
 - a. Money – As a membership organization, NISO’s main source of funding is by membership dues. NISO’s ability to attract and keep members will in large part define the monetary resources available to support standards development. If the Board is successful in diversifying the income stream, then those new resources will diminish the impact of this constraint on the standards development process.
 - b. Staff – Money can be translated into staff, but that is not the only constraint imposed from the perspective of staff. Staff can be more or less able to lead the standards process, they may lack appropriate knowledge of the environment or technology, and they may lack the all-important political skills to work with a diverse constituency.
 - c. Industry participants – The standards process can be hamstrung if not enough knowledgeable and experienced practitioners in the field choose to participate.
- 3) Positioning – If NISO’s target does not perceive NISO as the organization best suited to serve their standardization needs, they will take their resources and attention elsewhere. Comments from interviewees suggest that NISO could do better to position itself more effectively.

Problems with the NISO Standards Development Process

Interviewees identified a number of issues with the current SDP.

Communication & Community

“NISO is a big mystery to a lot of people.”

“NISO doesn't have large meetings where people come together to discuss standards activities in the profession. Meetings are useful for driving action since attendees don't want to show up and not have their standards work done. Without meetings, you just don't see people. The sense of belonging to a community at an individual level is missing because the activities that foster it that are lacking.”

“Regular meetings would be good, need to create a meeting environment where you can convene active committee but also work on the big picture agenda. I think that is something the community would support and it can't be attached to any other professional event.”

“I’m unsure how NISO currently fits into the information standards landscape. How does it relate to W3C, OASIS, etc.? I perceive an isolation that is not healthy. The reason is that standards are being created within NISO that could have an impact on the broader community. When I look specifically at OpenURL, it has enormous broad applicability...[but] I think NISO lacks the ability to get the message across to the other communities about the potential benefits of it to them.”

“Membership fees are too low. I don’t think NISO understands what its community is. The community at the moment are those that congregate around the classical supply chain. When you look at instructional technology or digital preservation or e-research, the potential NISO community is different than the classical community. The players in the classical supply chain potentially have different interests or adversarial positions with the potential community.”

“It’s not entirely clear to me that NISO understands its core constituency – the world has changed and NISO hasn’t changed with it. It needs a much better sense of what its area of attention should be, which translates into a value proposition for a particular constituency.”

As I was interviewing one person they began looking for the OpenURL 1.0 standard, and were confused by having two different web sites (one the NISO site and the other being the committee site hosted on another server) – neither of which had an obvious link to the approved standard! In relation to this the interviewee said “This reflects badly on the standards themselves – NISO has the façade of formality without the corresponding infrastructure in place.” The infrastructure to which they referred would include a history of drafts, comments, and changes – none of which was apparent because the infrastructure is not there to track it.

Ineffectiveness

“What’s making NISO look bad are standards that no one is using anywhere and they took a long time to develop.”

“The most frustrating aspect is that standards can be approved and published without being used. You can end up with a whole bunch of shelf-sitters and you look irrelevant. If I can change one aspect of what we do, it would be that – every standard must be used. That’s the aspect of the program that has to change. The standards must have market relevance. You need to demonstrate there is a community that wants that standard at an early stage.”

“There’s a real business advantage to having a weak standards organization, so if you keep a lid on the organization you can call the shots.”

“Delay is bad. You have to move faster or the world will move on without you. I implemented SRU and I had no idea whether it worked. Then I implemented OpenSearch and I knew immediately that it didn’t work, so I could fix it, because there was a tool to test compliance. When you’re an implementer and there’s something you can do in 4 hours you want to know at the end of 4 hours that it works.”

Complexity

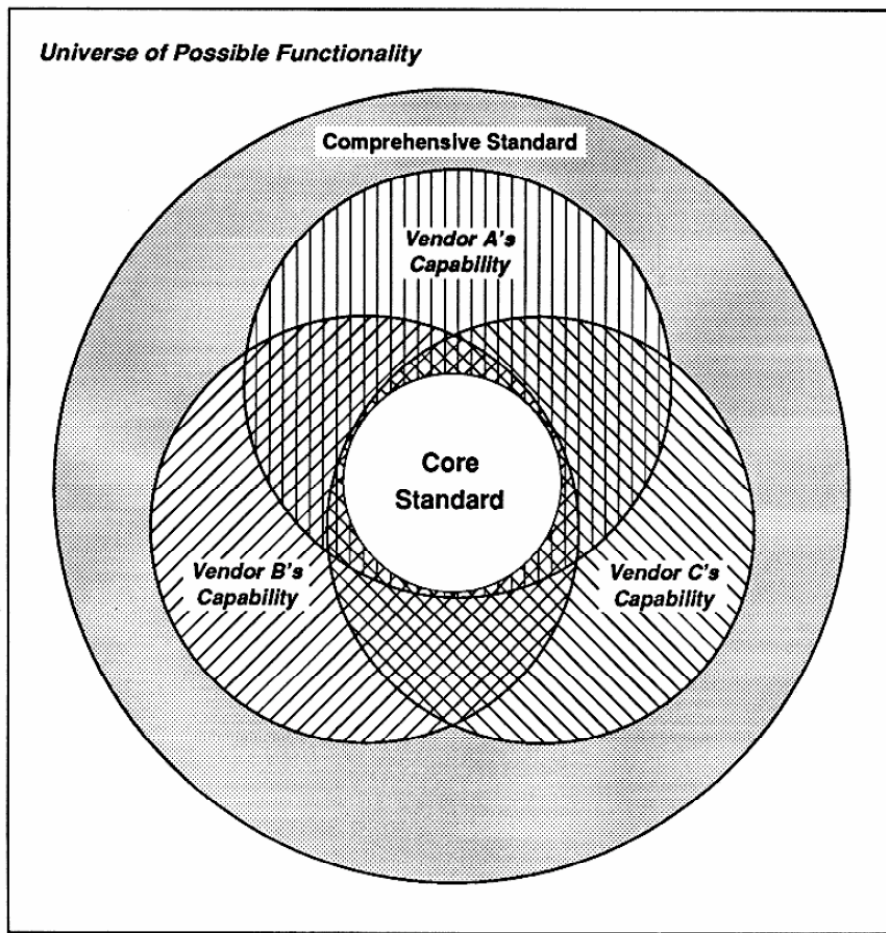
“NISO has a tendency to over-complicate.”

“Since the process takes so long, vendors feel like they need to get everything put into it. However, if vendors knew that a standard was going to be revisited within a year, then they may be willing to do things more in phases.”

“The consensus approach results in a lowest common denominator standard – we certainly saw it in Z39.50 – without profiles it was all over the place.”

Crawford, “The library and publishing fields seem prone to excessively detailed standards” (p. 86) (see entire chapter “Problems and Dangers of Standards”).

See Figure 1 for a depiction of this problem that appears appropriate to NISO’s existing model for standards development. NISO standards typically attempt to achieve the level that Libicki labels “Comprehensive Standard”. Instead, NISO should strive to specify an initial core standard that can be built upon only as needs dictate.



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Figure 1. How comprehensive a standard? (Libicki, 1994, p. 12).

Standards Agenda

“A lot of our standards processes are shotgun – we’re missing the grand vision, where is it we’re trying to get to? Because we don’t have that grand vision in place, we get dragged into standards for which the need isn’t as obvious to the organization as it is to the individual sponsoring it.”

“NISO is very reactive – it takes up things that people bring to it. I think also that historically a lot of its activities have come from the set of relationships surrounding the historic supply chain (e.g., publishers, aggregators, libraries). As an organization it hasn’t yet caught up with the ways the world has changed. That, coupled with its reactive nature means it’s spotty or ad hoc in its attention. NISO should have a clear road map of critical areas that need attention rather than acting reactively. Agenda should be derived from pain points and areas that need attention rather than being reactive.”

“SDC is supposed to oversee various topical areas (individuals assigned to oversee a certain area), but this doesn’t work very well in practice.”

“I would start – this is the sea-change of the Internet – with the business case rather than the standards case. Basically write a business model plan for what you’re trying to do. This is the method that corporations use. This is the problem I want to solve, this is how to do it, this is the cost. Instead we start with this thirst for perfection (e.g., SRW/U) – we want every T crossed, every I dotted.”

“NISO has not done a good job of putting individual standards within a context – how they relate to each other, etc. SDC hasn’t provided this very well – it is seen as the group that standards go through, but not as an architectural group.”

“It’s not entirely clear to me that NISO understands its core constituency – the world has changed and NISO hasn’t changed with it. It needs a much better sense of what its area of attention should be, which translates into a value proposition for a particular constituency.”

“Standards should tie in to demonstrable products and services very quickly to demonstrate the benefit of it. It makes it far easier to see what comes out of the pipe. And we don’t do that at all right now.”

Process & Support

“A lot of ‘thrash’ happens in the committee work that could be avoided by provided standard ‘template’ services.” [template services can be as prosaic as an MS Word template with preconfigured styles, or as complicated as an online collaborative authoring environment, with many things in between]

“It’s very easy for the whole process to get sidetracked by a vocal few with a different agenda. If you had someone other than the volunteer committee to watch this and monitor the work it might help.”

“The NISO standards process is known to be slow and tedious, not in keeping with the fast pace of information technology today” (Coyle, July 2005, p. 375).

“I think the key thing is to have someone at NISO headquarters responsible for keeping things moving.”

“[An] indication that NISO may not be completely up to speed with the way the world has evolved is the example of how it failed to deal with the patent issue. W3C has very specific guidelines on how to deal with patent issues.”

“The standards process needs better defined deliverables and better defined protocols in terms of conducting the committees (here’s how you proceed, here’s how you resolve conflicts, here’s your interim deliverables – a process where your first set of objectives is to produce your use cases or whatever and come back to get validated so you can go back and develop the next phase). Here’s your reactor panel, etc. The standard could come out in phased versions so you come out with something meaningful soon and then go back and further develop.”

“ANSI accreditation imposes bureaucracy on everything when clearly there are times when we don’t need ANSI accreditation. The NISO name has its own value in the marketplace, and can be entirely adequate at times.”

“There’s a qualitative problem that librarians have an instinct to account for everything – this is a horrible philosophy to take into a standards process. There should be some sort of external review structure to say “you’ve gone too far” – “this is enough, you can stop here” – an external check on our librarianly instincts.”

“I really feel that trust is important. Again and again what comes up is you have to be fully documented, prove you’re doing what you say you do – you have to be completely transparent. You have to have procedures, you have to follow them, and they have to see the evidence that you followed them.”

“I was a little confused about the process for even exploring whether there’s a standard worth talking about – whether there’s potential...I didn’t feel like I had a roadmap of what the steps would be to explore the idea of a standard. The escalation steps would be good to know.”

“Current model that we have in place where we have everyone vote on every standard is insane. They don’t all have expertise. They should only vote on standards and areas that they’ve had registered interest and expertise in.”

“There is no playbook on how to chair a NISO standards committee. Some sort of boilerplate for here’s how you do it, here’s what’s expected. It doesn’t seem like that would be extremely hard to produce.”

“A real document management system would help immensely. The most productive time is when people are writing things down, and a listserv gets unwieldy...A better written communication system would really help.”

A Proposed NISO Standards Development Process

To be as responsive and effective as it needs to be, NISO must create a multi-track standards development process. Besides marshalling the NISO organization and the members it serves, NISO must form a process that welcomes participation from a broad range of interested individuals. It must also pursue direct and frequent communication with related organizations in other fields.

Whether the particular recommendations of this report are followed or not, the NISO Board of Directors is encouraged to determine a set of principles to which its SDP should adhere, and judge any proposal against those principles.

I suggest the following principles may serve as points for discussion:

NISO Standards Development Process Principles:

- Simple things will be easy – both within specific standards as well as the process itself (e.g., posting a Discussion Document will be easy).
- Work will be open.
- Standards will only specify what is required for interoperability and effectiveness; scope will be kept as tight as possible within any given standard.
- All standards efforts will strive to identify a “core” specification that will codify a basic set of elements/functionality/specifications that can be referenced by related standards for specific purposes and audiences.
- Whenever applicable, draft standards will be tested by two or more organizations before voting.
- Not every activity will result in a standard. Draft specifications, implementation guidelines, and best practices are all valid and valuable outcomes of NISO activities.

The process as outlined below has the following goals:

- Minimize or remove barriers that inhibit participation in recommending, drafting, and using NISO standards.
- Focus the participation of NISO members on the specific topical areas in which they have direct interest.
- Increase active efforts by NISO to identify and fill standards gaps.
- Decrease the time required to move a standard from an idea to implementation.
- Gain implementation experience while standards are in draft.
- Create mechanisms to encourage and support standards use; for example, sample profiles, best practices, testing tools, and implementation guidelines.
- Create a mechanism to encourage and support *ad hoc* standardization efforts moving under NISO sponsorship.
- Reduce the barriers presented by patent activities.
- Improve organizational infrastructure support for standards Working Groups.

Recommendations

I recommend that the NISO Board do the following. In formulating these recommendations I have ignored the constraints of staff and money; therefore, implementing all of these recommendations assumes that the NISO Board has been successful in garnering increased

resources. Should this assumption not be the case, the recommendations will need to be adjusted accordingly.

- 1) The NISO Board should resolve issues regarding NISO's appropriate constituency and reformulate NISO's mission accordingly.
- 2) Based on the constituency and reformulated mission, the Board should create and maintain an architectural overview of the standards landscape, as identified in the Blue Ribbon report and the NISO Board's *NISO Strategic Direction* document (p. 4). A primary deliverable of the architectural overview is the identification of key areas of possible standards development to which NISO will commit to being active. This responds to the Blue Ribbon Panel finding that "NISO lacks any type of synthesizing framework for the technical and standards-development-related work that it needs to do on behalf of its constituencies."
- 3) The NISO Board should dismiss the Standards Development Committee with their compliments.
- 4) Based on the architectural overview, the NISO Board should appoint Standing Committees for each of the main areas identified by the architectural overview. These groups should be charged with actively soliciting draft specifications and standards, appointing Working Groups as required to accomplish specific tasks, and reporting to the NISO Standards Coordinator (see recommendation below) on progress and barriers encountered. They should also be charged with identifying, monitoring, and communicating with any other standards development organizations doing work appropriate to their area of purview – including making other organizations aware of NISO standards activities that may be useful to those organizations.
- 5) NISO Member organizations will be required to register their interest in participating in, and voting on, standards within any area of interest established by the Board according to the architectural overview. Members will be allowed to vote only on draft standards within the particular area(s) for which they have registered interest. The Board may wish to link membership fees to voting pools; for example, the base membership fee would include membership in one voting pool, membership in additional voting pools would incur additional fees.
- 6) The NISO Board should create and recruit a new staff position, the Standards Coordinator, charged with helping all active standards working groups with executing their work with efficiency and speed. The Standards Coordinator will report to the Board in print and/or in person at each meeting on the status of all active standards activities. The Standards Coordinator will write and maintain a document outlining what is expected of Working Group Chairs, what support they can expect to receive from NISO, and references to appropriate boilerplate documents, the NISO styleguide, etc. The Standards Coordinator will also be responsible for assisting Working Group chairs as needed, providing editorial assistance, and helping to keep Working Groups on schedule. Should the Board acquire software to support the Working Groups (see recommendation below), the Standards Coordinator will be responsible for orienting Working Group Chairs to appropriate system functions.
- 7) The *NISO Patent Policy* should be expanded to include appropriate procedures for the exposure of relevant patent activities by participants in the NISO standards

- development process. Reference can be made to such documents as the *W3C Patent Policy* for examples on what should be specified and how.
- 8) A new pathway into the standards process should be created that can be used by anyone — member or non-member. An example of such a process is described, based on the IETF Internet-Draft process.
 - a. A *Discussion Document* can be submitted by anyone, member or non-member, in an easy web-based posting process such as a wiki. By posting the document, the author(s) agree to accept any comments on the draft directly and be responsible for any revisions.
 - b. The person posting the Discussion Document will be required to agree to a rights statement that specifies the work will remain open and unpatented, in accordance with the expanded *NISO Patent Policy* (see above).
 - c. The Standards Coordinator will review the posting to ascertain that it is not spurious, libelous, or inappropriate. Anyone will be able to sign-up for a mailing list to be automatically notified when any such document is posted. There should also be an RSS feed for these documents.
 - d. Any *Discussion Document* that is not revised within a year will be removed.
 - e. A *Discussion Document* can be promoted into the NISO standards track by the appointment of a NISO working group to take the draft and revise/update the draft according to NISO guidelines. NISO Standing Committees should be specifically charged with monitoring Discussion Documents for ideas worthy of a NISO Working Group.
 - 9) Standards that are protocols (e.g., OpenURL) should have additional requirements:
 - a. During the standardization process, at least two different working implementations using the draft standard will be required before the protocol can advance to voting.
 - b. Compliance test methods must also be provided prior to voting, so that adopters can verify their compliance.
 - 10) When a Working Group is created, the charge will include:
 - a. A summary of the activity(ies) to be undertaken by the Working Group (e.g., investigate an area and determine an appropriate response – a draft specification for trial use, guidelines or best practices, a NISO/ANSI-track standard, etc.). A Working Group can also be charged with working with other standards organizations to advocate for the needs of NISO members if a non-NISO standard presents a useful alternative to developing a library-specific standard. For example, NISO could charge a Working Group to work with the Motion Picture Experts Group (MPEG) to revise the MPEG-21 standard to make it meet library needs better.
 - b. A description of the Working Group's scope and its context within the larger standards environment. This should include guidance on any related efforts that the Working Group may wish to track or interact with, if known.
 - c. A summary of resources available – Working Group members, NISO staff, support services such as conference calling facilities, etc.
 - d. Duration and timeline – Expectations regarding regular reporting and completion of work.
 - e. An admonishment to properly scope any standards activity to first focus on a basic specification that can be built upon by further standards as experience dictates.

- f. A requirement that all members of the Working Group review and adhere to the *NISO Patent Policy* as a condition of participation.
 - g. Specification of which member of the appropriate Standing Committee will serve on the Working Group as participant and liaison.
- 11) Working Groups should also be encouraged to return to the Standing Committee should its work suggest a different path than the original charge. For example, if a Working Group has been charged with developing a draft standard, but the Working Group determines that a guidelines or best practices document is more appropriate at this stage, the Working Group should return to the Standing Committee for a possible amendment of its charge.
 - 12) The Board should acquire software to support the work of Working Groups and Standing Committees. Out of all the options reviewed (see Appendix C), I recommend Kavi [<http://www.kavi.com/>] as the most suitable to our requirements. NISO should be charged with hosting all NISO-sponsored activities on NISO web site(s).
 - 13) The Board should charge the Standards Coordinator with drafting a proposal to be presented to the Board outlining a process for welcoming *ad hoc* standards activities into the NISO process.
 - 14) A more substantial annual meeting should be established to foster a community of individuals interested in learning about, and contributing to, standards efforts. NISO membership can be encouraged by offering reduced registration fees for members. Annual meetings can offer Working Groups and Standing Committees useful in-person meeting time as well as serve to spur those groups to complete work in advance of the meeting. I recommend that NISO investigate partnering with an experienced meeting organizer such as Information Today [<http://infotoday.com/>] to handle logistics.
 - 15) Member voting representatives should receive orientation training, and should be expected to attend the annual meeting, at which there should be activities specifically planned for them.

Deliverables and Pathways

NISO can make an impact in a variety of ways that are not limited to ANSI-track standards. Therefore, to be absolutely clear that the proposed standards development process can accommodate the full range of appropriate activities, I will identify a range of possible deliverables of NISO's standards efforts and how they may be accommodated in the proposed process.

This section is illustrative, not prescriptive; that is, the Board or the various players identified in this report may have adjustments to these scenarios. Also, this section draws upon the *NISO Strategic Direction* document (p. 9-12).

ANSI/NISO Standard – An ANSI-track standard can begin as a Discussion Document, be identified by a Standing Committee as having merit, and be the focus of a Working Group appointed to take the Discussion Document into a formal NISO draft for trial use and eventual balloting. An ANSI-track standard may also be the result of the work of a Working Group charged by a Standing Committee for this purpose.

NISO Standard – A NISO standard may be the result of some of the same processes as an ANSI/NISO standard, but with less rigorous requirements for balance of interests and resolution of comments. The Board may wish to determine under which conditions NISO will not wish to pursue ANSI accreditation of a particular standard.

NISO Registered Standard – The NISO registration process allows NISO to register its interest in a standard that was developed outside of the organization. The existing registration process may remain, while pathways exist for the possibility of bringing an NISO-registered standard into the NISO standards development process (e.g., a Working Group could be charged with reviewing a registered standard for possible balloting). I personally have doubts about the efficacy of NISO registration, but given the evidence that *ad hoc* standards groups have pursued it (e.g., the METS Editorial Board recently pursued such registration), the connection to NISO must be viewed by such groups as beneficial.

Guidelines – Guidelines can be formal ANSI/NISO documents such as Z39.19 “Guidelines for the Construction, Format, and Management of Monolingual Controlled Vocabularies,” or less formal documents that may serve to provide guidance either prior to, or in addition to, the development of formal standards. Working Groups can be specifically charged to develop guidelines.

Application Profiles – Application profiles are often necessary to specify appropriate subsets of the full scope of a given standard for specific implementations of that standard. Working Groups can be charged to develop application profiles – either in addition to developing the standard itself, or as a separate, discrete activity.

Best Practices – Best practices are documents that identify the current best approach or direction within the industry with regards to a specific issue. Working Groups can be specifically charged to develop a best practices document.

Justification

Problems with the existing SDP identified by interviewees clustered around issues of communication and community, ineffectiveness, complexity, agenda, process and support.

The issue of communication and community is at least partially addressed by establishing an annual meeting. Non-members attending the meeting can gain a better sense of the organization and the benefits of membership. Communication will also be greatly improved by deploying a web site that supports Working Group collaboration and communication to the broader community of interest.

Addressing ineffectiveness requires a multi-threaded response. The Board must first establish strategic directions for NISO standards efforts based on the architectural document proposed by the Blue Ribbon committee. The organization can then be marshaled around these strategic directions.

It seemed clear in interviews that although the SDC is charged with considering appropriate standards efforts in specific areas of interest, this does not work well in practice. Rather than relying on one individual to track and actively pursue possible standards efforts in the areas

outlined by the Board's architectural document, it seemed better to give this the attention it deserved by establishing Standing Committees for each of these areas.

Also clear from the interviews was the fact that staff support is inadequate for Working Group chairs. Chairs are given very little guidance on how to approach their work, they are not provided with document templates or with web site support. The Executive Director should remain focused on managing the organization, recruiting and communicating with members, and resource aggrandizement. An administrative assistant cannot be expected to have the requisite knowledge and experience within the field to provide sufficient support to Working Group chairs. Therefore creating a new position of Standards Coordinator who is charged with directly supporting the work of Working Group chairs seems necessary. A library professional with experience in the field as well as with standards would be ideal in this position.

Complexity is another form of ineffectiveness, in that standards that are overly complex are often ignored by the marketplace and therefore are supremely ineffective. Needless complexity must be fought at every turn. The first line of defense is how a Working Group is charged. When a Working Group is charged, the work of the group must be kept tightly scoped. The group should also be encouraged to consider establishing a "core" standard that can establish some essential initial benefits without attempting to solve every issue. Yet another line of defense is requiring test implementations of any standard for which such are appropriate before they advance to voting. As Behrman puts it, "When members of a standardization committee try to anticipate all the features they think users might want, a standard can grow large and complex. Features can be added without an appreciation of the cost and difficulty of implementing them, and without market feedback regarding their desirability" (2002, p. 4). Essential market feedback should be sought at every turn.

The overall standards agenda belongs to the Board, although once the topical groups are established in concert with the architectural overview, they can be charged with actively setting agendas within their areas of purview, with oversight and approval from the Board. Since it is also apparent that good ideas can bubble up from anyone, the Discussion Document mechanism will be in place to foster the collection of good ideas from the community at large.

One issue upon which interviewees uniformly agreed was the slow pace of standards through the existing process. Solving this requires another multi-threaded response. Working Groups clearly require a better start and more ongoing support. Tightly scoping their work from the outset will help them achieve early wins. Requiring working implementations of applicable standards before balloting will provide useful early experience. Providing chairs with more advice and information, boilerplate documents, and web support will enable them to be much more effective. An annual meeting will help spur groups to achieve milestones. Changing the voting process will reduce the ability of a few uninterested members to slow the process.

But I hasten to caution the Board against overly high expectations of what can be achieved even should all these recommendations be implemented. Gaining consensus on standards from a diverse community ranging from libraries to vendors to publishers is not trivial, nor is it likely to be rendered dramatically more rapid by tweaking the process. There is some

evidence (Jacobs, 2000, p. 19-34) that a standards development organization can emphasize speed or consensus, but achieving the right level of both is quite difficult. The Board should bring their own perceptions of the relative importance of speed vs. consensus to the challenges before us, and choose wisely.

Nonetheless, I believe that the changes I've outlined will result in a revitalized, more effective standards development process and by extension a more vital and effective standards organization. It will not have escaped your notice, however, that many of these recommendations will require more or reallocated resources. If additional resources are not possible, I still urge the Board to consider the changes that do not require additional support. It's clear to all involved that we need a better process, and even small changes can potentially result in large benefits.

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Appendix A: Charge

Standards Development Process Review

Assignment

Review the current standards development process and provide recommendations on process improvement as part of NISO's strategic direction implementation.

Brief

A critical part of NISO's strategic plan is to more optimally align the standards development process with the emerging needs and drivers of the current operational environment and marketplace.

This assignment should:

- Ascertain a set of requirements for the Standards Development Process from the perspective of key stakeholders – NISO's members, constituents, directors and potential funders.
- Provide a critical review of the current Standards Development Process employed by NISO.
- Review the ad-hoc and formal processes that are employed in other related standardization activities (both formal and informal).
- Map the advantages and disadvantages of various models against the NISO requirements
- Provide recommendations for an enhanced process/processes to meet the requirements of the new environment.

Rationale

To meet the goals of the strategic plan many issues surrounding the standards development process must be addressed. The Standards Development Process (SDP) is at the heart of what NISO is; moving the process into alignment with modern-day requirements is essential to NISO's future.

Typical issues faced include:

- Speed of development – there is a feeling that the current SDP is too lengthy leading to an industry that is moving slower than the surrounding environment. (eg NCIP)
- Heavy-weight standards – the current SDP generally produces 'heavy-weight' standards that then require years of effort profiling back to something useful and implement-able. Experience from other sectors would suggest lightweight standards generate uptake. (eg NCIP)
- Responsiveness – aligned to the above 2 issues is the requirement to be more responsive to changes and developments in the surrounding environment. (eg the time taken to board web services)

- Federation of effort – there is an increasing trend for localized standardization efforts – given other trends in networked working this is likely to continue. How can NISO’s processes capitalise on this opportunity rather than be threatened by it? (eg OpenURL, OAI etc)
- Outward looking – NISO’s SDP is very inward-looking, leading to inward-looking standards (standards that concentrate on interworking between libraries, rather than between libraries and other systems). How can the process become more outward looking.
- Opportunity cost & Strategic Vision – the SDP must be cognisant of the opportunity cost involved in standards development. The industry can only afford to expend a finite and limited amount of resource in the standardization activity – it is essential that this resource is directed optimally.
- Appropriate layer in the application stack – the process should ensure that the standards developed are appropriate for NISO’s remit and positioning.

It is not believed that all these issues can be resolved merely through a revision of the SDP. However, there is a strong desire to move the SDP in a direction that can start to address these concerns and project NISO as more flexible and responsive to the current environment.

Deliverable

A written report matching the requirements of the brief + presentation to NISO board.

Timescale

First draft for review by September board.

Appendix B: Interviewees

The following individuals were interviewed in the preparation of this report. Any quotations in the report were approved by the individual to be used without attribution (I did not request to use the quotes with attribution).

Interviewees were drawn from a list provided by the NISO Board and by individuals selected by the author to have had 1) experience with standards development processes, or 2) enlightened self-interest in an effective and efficient standards development process, or 3) both.

Organizational affiliations are provided for identification purposes only; the comments of these individuals should not necessarily be construed as representative of their respective organizations. NISO voting member organizations are indicated by an asterisk (*).

Priscilla Caplan, Florida Center for Library Automation
Dan Chudnov, Yale University
Lorcan Dempsey, OCLC*
Jeremy Frumkin, Oregon State University
Carl Grant, VTLS*
Pat Harris, former NISO Executive Director
John Kunze, California Digital Library*
Sally McCallum, Library of Congress*
Evan Owen, Ithaka*
Andrew Pace, North Carolina State University*
Oliver Pesch, EBSCO*
Pat Stevens, Acting Executive Director and Chair, NISO SDC
Herbert Van de Sompel, Los Alamos National Laboratory*
Eric Van de Velde, California Institute of Technology
Jenny Walker, ExLibris*
Donald J. Waters, The Andrew W. Mellon Foundation

Appendix C: Software Review

Executive Summary

At the September 15-16, 2005 Board meeting, the charge (see Appendix A) was expanded to include a review of software options for supporting the standards development process.

A review of software options turned up four options: 1) One of hundreds of options for content management systems that are not specifically tailored for managing the standards development process, 2) association management applications, 3) an IEEE support service for standards organizations, and 4) Kavi.com, a software suite specifically designed for supporting standards development as well as general administrative uses (e.g., membership management) [Note: I also looked into ASTM Forums, but discarded it as being too primitive to pursue as a possibility].

After reviewing these options, including telephone contacts with both IEEE and Kavi, *I recommend that the NISO Board pursue acquiring an appropriate package of hosted and managed software services from Kavi.com* (see below for more information and justification).

Introduction

Software specifically designed to support the standards development process is rare. Rather, it is more common to find applications that support group document editing and management that could be applied to the needs of standard development groups. It should be noted that I have specifically excluded software and services that are focused solely or primarily on organizational management (an example would be Virtual, Inc. <<http://www.virtualmgmt.com/>>) as being out of scope for my charge.

Content Management Systems (CMS)

This category of solutions includes a wide array of commercial and free open source applications that are focused on the online management of documents and workspaces. Examples include OpenText LiveLink (e.g., used by ISO, <http://isotc.iso.org/livelink/livelink>), Plone (e.g., used by the IEEE Learning Standards Committee, <http://ieeeltsc.org/>), Drupal, and others.

Recommendation and Justification

There are hundreds of these systems, and although comparisons can be made between them at <http://www.cmsmatrix.org/>, any of these will likely require a significant amount of tailoring to NISO's particular needs. Installing, configuring, and managing any of these solutions will also require a significant amount of technical expertise and support. For these reasons I am recommending that a general purpose CMS not be considered at this time, when NISO has its hands rather full.

Association Management Software

This category of solutions is focused on helping organizations manage their administrative processes. One example is Avectra's netFORUM (avectra.com), which offers a wide range of administrative modules in its flagship product, or a much smaller array of tools with its "on demand" product with an ASP "pay as you go" license.

Recommendation and Justification

Although these applications may make NISO more administratively efficient and effective, they lack key features for supporting the work of standards development working groups, such as online balloting. Therefore, I recommend that this type of software not be considered.

IEEE-ISTO

<http://www.ieee-isto.org/>

The IEEE-Industry Standards and Technology Organization (IEEE-ISTO) was formed in 1999 to help trade associations to develop and deploy standards. They provide a legal umbrella under which trade associations can operate without incorporation. Although they also offer a technical infrastructure to the groups they support, they usually also provide their customers with office staff support as well. Technical infrastructure components include (quoted from their web site):

- “Establish and/or maintain each group's unique web presence
- Web site creation, maintenance and continued development utilizing the latest technologies, as appropriate (e.g., CGI scripts, and back-end databases)
- Domain name support - groups are able to maintain their unique identity by registering a domain name
- Private, password protected web areas for posting "members only" information including draft standards, unapproved working documents, minutes, etc.
- E-mail list management and maintenance (Majordomo and web-based archives)
- Optional log-in accounts for groups who wish to administer their own web sites
- Administrative tools include: HTML validators, link checkers, "web hit" analysis)
- FTP site management and maintenance.”

Their services also include community development, marking the deployment of the technology (not simply the standards documents themselves), interoperability and certification testing, and offering developer workshops.

Recommendation and Justification

In my conversation with the IEEE-ISTO representative we both came to the conclusion that they were not the best fit for our needs. NISO does not require many of the services they provide, and the services we do need are probably better served by the Kavi software. The ballpark pricing range I was quoted was no less expensive than Kavi and could potentially be more quite a bit more expensive. Therefore, I do not recommend hiring IEEE-ISTO to provide infrastructure support at this time. If, however, Kavi does not work out for any reason, IEEE-ISTO technical infrastructure support may serve as a reasonable second choice.

Kavi

<http://www.kavi.com/>

Kavi offers a hosted software solution for SDOs. In a nutshell, Kavi is a content and organization management system optimized for SDOs. It has a number of features

(discussed in more detail below) that will empower NISO staff, standards working groups, and members, to create, vote on, and maintain standards and information about our standards work. I discussed the product and ballpark pricing with Martha Keizur (martha@kavi.com) of Kavi (pronounced “kuh-vee”) on November 23, 2005. I also had a follow-up conversation with David White regarding current and future development work.

I hasten to point out that Kavi is not yet ANSI-compliant, but Ms. Keizur stated that this is their top development priority for 2006, and that they expect to be ANSI-compliant by the end of the year, if not before. In addition, David White, a key developer, invited us to work with him to make sure that their product development path would meet our specific needs.

Kavi is not a monolithic application, but rather a suite of tools that interact with each other and that build on the core component of a membership database. Pricing will depend on a number of variables that would need to be identified for a solid quotation, but I am providing a preliminary estimate under separate cover.

Our selection of tools would be hosted by Kavi using the <http://www.niso.org/> address, which would replace our existing web site. There are different options for moving over existing content, but if Kavi performs the work that may add to the setup charge. Part of the Kavi suite includes WYSIWIG web editing tools, thereby making the maintenance of the core NISO web site easy for NISO staff.

Available system tools include (see Figure C1 for an overview of tools):

Membership Database – This is the “core” application, upon which most all other applications depend. It is highly configurable and flexible, and can accommodate organizational members, individual members, and individuals as representatives (both primary and secondary) of organizations. Online billing, including automatic email reminders and notifications is available.

Mailing List Manager – A tool to create and manage mailing lists. Mailing lists can be private, public, moderated or unmoderated).

Content Editor – A tool to create and manage web site content and navigation. The WYSIWIG (what you see is what you get) nature of the tool means staff do not need to know HTML.

Workgroup Management – This tool would facilitate the work of our standards working groups, by providing an online collaborative workspace. Different roles (and accompanying privileges) can be accommodated, such as Chairman, participant, observer, etc. Some of the tools available include the ability to create and maintain a roster of participants, create and maintain mailing lists, manage a document repository, and balloting (see Figure C2). Documents can be limited to work group members or made public.

Event Registration – The Kavi software can perform event registration, including online payment.

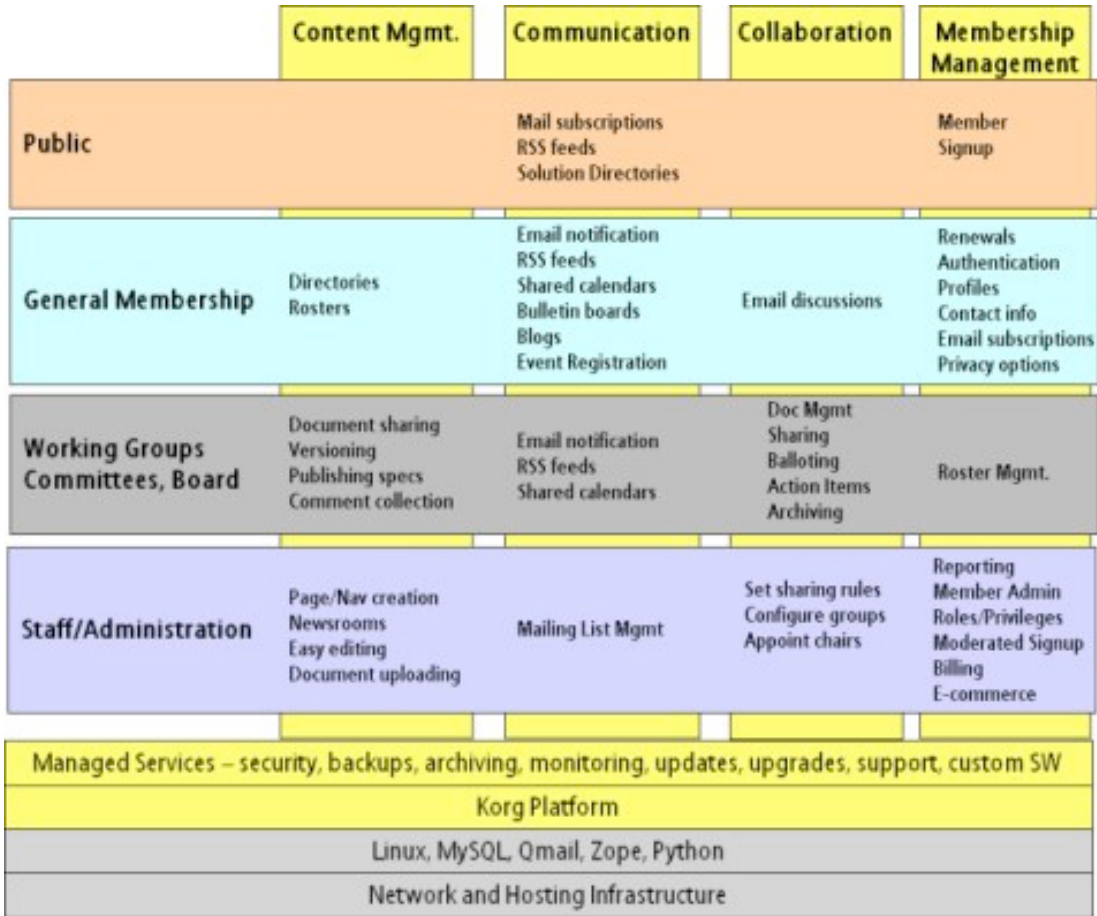


Figure C1. The Kavi architectural diagram (source: Kavi.com).

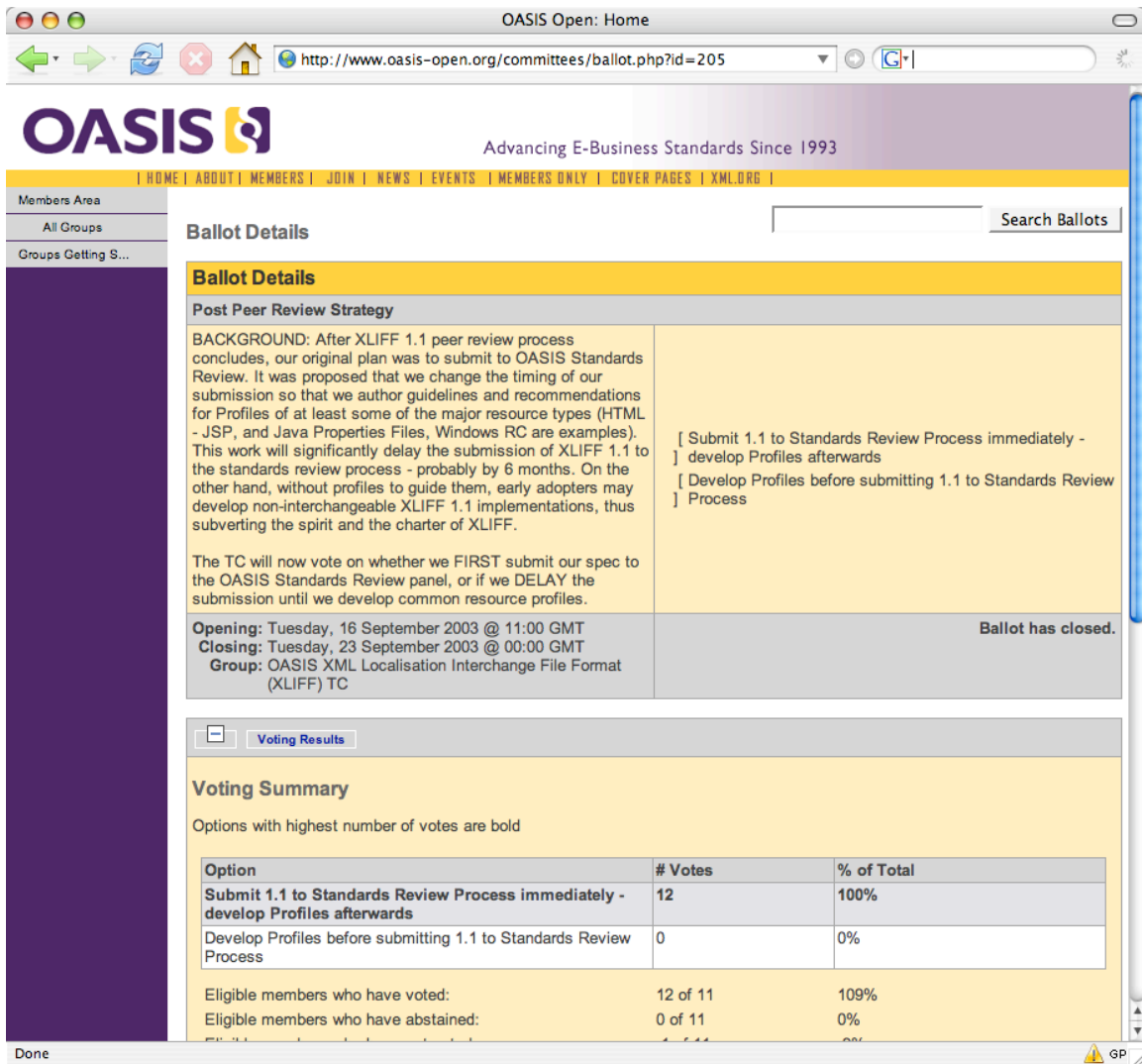


Figure C2. Example of Kavi balloting page <<http://www.oasis-open.org/committees/ballot.php?id=205>>.

In addition to the above components, Kavi offers other tools not specified here (I focused on those capabilities that appeared to meet our needs best). More information about all the Kavi components can be found at <http://community.kavi.com/>. Also, third party applications such as open source wikis, blogs, bulletin boards, etc. can be accommodated as well.

Kavi claims to have built their reputation on excellent support; this claim can be substantiated from the existing customer base (see <http://www.kavi.com/clients/>) should the Board decide to seriously pursue purchasing this software and hosting service. Ms. Keizur offered to provide customer names and addresses for just this purpose.

Recommendation and Justification

I recommend that the NISO Board pursue acquiring an appropriate package of hosted and managed software services from Kavi.com. Kavi offers a full range of software tools for not

only the standard organizational management activities (e.g., membership database, mailing lists), but also SDO-specific types of tasks (e.g., member balloting). Their pricing seems quite reasonable given the power and flexibility of the platform, especially when one considers how much staff time could be saved by empowering Working Groups to self-manage their processes.

Although the lack of full ANSI-compliance may at first glance appear to be a show-stopper for NISO, I am unconcerned for a few reasons. One is that I am convinced that this is Kavi's highest development priority. In my initial conversation with Martha, she volunteered the fact that they were not yet fully ANSI-compliant in all components of their workflow, but that they fully expected to achieve compliance by Fall 2006 or the end of 2006 at the latest. David White, the lead developer also verified that estimate and offered to work with us to make sure the changes met our needs. Second is that even without full ANSI compliance, NISO could use many of the components of the software while continuing our existing, mostly offline, practices for the actual standards development work. As an example of this, one current Kavi customer, the American Institute of Aeronautics and Astronautics, is an ANSI-accredited standards organization. Third, I think it is likely that NISO will not be ready to actively pursue the acquisition of an appropriate software platform until later in the year, at which point the issue may be moot.