Cloud Standards News and Updates

THIS ISSUE, I'LL DEVOTE SPACE TO RECENT NEWS ON STANDARDS-RELATED ACTIVITIES. I'll cover products of standards-developing organizations and other recent developments. The good news is that there's a lot to report.

In the classic child's fable of multiple people describing an elephant from different points of view, the idea is that they share something in common that they are trying to describe—that is, the elephant. In this sense, what constitutes "news" and how this news relates to the entire picture depends somewhat on your point of view.

Cloud computing in its present state more closely resembles a collection of individual parts than a single coherent whole; parts that can be assembled into a wide variety of products depending on the interests and resources of those choosing to do the assembly. So we have the problem of not only describing the assembled products, but also of describing, designing, and specifying the individual parts as separate entities.

Using this analogy, it's easy to see that certain portions of cloud computing will be easier to describe and to standardize on their own, but also that there are benefits to designing components so that they can fit together to make a larger construct. A current challenge in cloud computing is that many such larger constructs are being designed, built, and produced at the same time, and their components vary as a result, depending on their intended use. Not all of them fit together, so keeping track of news in a coherent way is a complex task, even in the relatively isolated and well-defined area of standards.

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US DOJ Reviews IEEE Standards Association Policy Changes

As an overall topic of interest, the US Department of Justice (DOJ) recently completed a business review of proposed changes to the patent policy and related rules on injunctions of the IEEE Standards Association (IEEE-SA). Its outcome constitutes genuine news.

In this review, the DOJ was asked by the IEEE-SA to respond to proposed changes that tighten the conditions and rules that govern fees that can be requested by patent holders whose contributions are included in a published standard, and that strongly limit the possibilities to pursue prohibitive injunctions until other avenues for negotiation of compensation have been exhausted.

Specifically, this update clarifies and extends provisions of the "reasonable and non-discriminatory" (RAND) terms used by the IEEE-SA in ways that reduce both the likelihood and the consequences of patent infringement litigation, and facilitate early and comprehensive licensing negotiation. The changes also require potential licensees to grant back a license for their directly related patents essential to the same standard to other licensors upon request, and clarify the scope of permissible patent-related demands. The update leaves in place existing provisions that allow negotiation of licenses, including voluntary mutual cross licensing of patent portfolios.

The adoption of such changes could have a ripple effect throughout the standards-setting world. Patent disputes have often been at the core of significant legal conflicts. As noted by the DOJ, the

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Table 1. Working group areas and documents in progress for ISO/IEC JTC1 SC38.

Working Group	Area of focus	Current documents in progress
WG3	Cloud computing service-level agreement (CCSLA)	Framework and Technology—Part 1: Overview and Concepts (ISO/IEC CD 19086-1); Part 2: Metrics (ISO/IEC NP 19086-2); Part 3: Core Requirements (ISO/IEC NP 19086-3)
WG4	Cloud computing interoperability and portability (CCIP)	ISO/IEC AWI 19941
WG5	Cloud computing data and their flow across devices and cloud services (CCDF)	ISO/IEC AWI 19944

Notes: CD designates a committee draft in progress; NP denotes a new work item proposal; and AWI means that a work item has been accepted, indicating that the group is working on producing documents according to its charter.

IEEE policy update "has the potential to benefit competition and consumers by facilitating licensing negotiations, mitigating hold up and royalty stacking, and promoting competition among technologies for inclusion in standards."

The DOJ's positive response indicates that it's unlikely to challenge these policy changes, which were subsequently adopted by the IEEE-SA Board of Directors at its February 2015 meeting. More broadly, these changes are likely to be looked at seriously by other standards-setting organizations that also seek to reduce the likelihood of unresolvable legal conflicts that result from implementation of technologies included in their published standards.

It's also worth noting that the review explicitly acknowledges in its introductory text the "procompetitive" benefits of standards development. The DOJ review highlights these benefits by stating that "standards can facilitate product interoperability, ensuring that products from a variety of suppliers will work together efficiently, thereby reducing costs for consumers and producers, making products more valuable, and promoting innovation" and "the standards-setting process can increase competition among technologies for inclusion in standards, benefiting consumers through increased functionality or lower prices (and sometimes both)."

This endorsement underlines the reasons that many organizations working in information technology are interested in standards development. The review further notes that "the Update may provide participants in IEEE-SA standards-setting processes with better ex ante knowledge about licensing terms, potentially broadening ex ante competition among technologies for inclusion in a standard."

The full text of this business review is available on the DOJ website (www.justice.gov/atr/public/busreview/311470.htm). Current and previous drafts of the IEEE-SA Standards Board Bylaws and Letter of Assurance and its Patent Policy Frequently Asked Questions are also available (http://grouper.ieee.org/groups/pp-dialog/drafts_comments/index.html) and include links to comments from the community.

Updates on ISO/IEC Cloud Computing Work

Several community-developed standards address various aspects of cloud computing, as discussed in previous issues and also covered in the next section. Up to now, each of these has had to pursue its foundational efforts in an environment in which several basic terms and concepts lack agreed-upon standard definitions. For this reason, activities are underway in a variety of international organizations to define the basic terms and fundamental architectural relationships between different aspects of cloud computing. I covered the need for such terminology and architecture standards in the first issue of this magazine.[1]

Among these activities are several projects being pursued in working groups of the International Organization for Standardization/International Electrotechnical Commission (ISO/IEC). Here I'd like to focus on those of the working groups in Joint Technical Committee 1 Special Committee 38 (JTC1 SC38), which is the branch of ISO/IEC that focuses on cloud computing and distributed platforms. (Despite its unwieldy name, this committee is a familiar entity among people who work actively on the topics to which it's devoted.)

JTC1 SC38 groups have previously worked to produce a reference architecture, terminology, and ontology for service-oriented architecture (SOA) concepts, and have now extended similar efforts to topics in cloud computing. Work was begun on these topics in late 2014 and is now underway in SC38 on several new documents, as spelled out in Table 1. Further information on JTC1 SC38 activities is available at www.iso.org/iso/jtc1_sc38_home.

The goals of the current SC38 groups focus on setting common frameworks for concepts, terminology, ontology, and

Table 2. Current specification status for several active cloud-specific standards.

Parent SDO	Specification title	Current version and date
OASIS	Topology and Orchestration Specification for Cloud Applications (TOSCA)	TOSCA v1.0, Nov. 2013 (v1.1 in progress)
	Cloud Application Management for Platforms (CAMP)	CAMP v1.1, Nov. 2014
OGF	Open Cloud Computing Interface (OCCI) (Specification Set)	OCCI v1.1, Jun 2011 (v1.2 in progress)
DMTF	Open Virtualization Format (OVF)	OVF 2.1.0, Jan. 2014 (plus associated profiles)
	Cloud Infrastructure Management Interface (CIMI)	CIMI v1.1, Oct. 2013 (v2.0 in progress)
SNIA	Cloud Data Management Interface (CDMI)	CDMI v1.1, Aug. 2014

descriptions of cloud computing areas in terms that provide a suitable basis for further standardization. These efforts aim to produce international standards for each of these areas, but at the moment stop short of the goal of providing normative operational standards to specify how specific tasks in each of these areas should be achieved. (I discuss examples of such operational standards from other organizations next.)

My view is that such efforts don't appear to aim to restrict development and growth of new techniques, but are intended to catch up with emerging technology in terminology and concepts, so that further standards based on these will be as up to date as possible with current developments.

Other related efforts are underway in the US National Institute of Standards and Technology (NIST) through its ongoing roadmap efforts and cloud computing working groups.[2]

Progress on Cloud Computing Normative Standards

A great deal of progress is also being made by organizations that have developed cloud-specific standards that are applicable to important sectors of cloud computing functionality and operations. A short list of such standards was discussed in previous issues, and would currently include, at minimum, the TOSCA (www.oasis-open.org/committees/tosca) and CAMP (www.oasis-open.org/committees/camp) standards from the Organization for Advancement of Structured Information Systems (OASIS, www.oasis-open.org), the OCCI (http://occi-wg.org) specification set from the Open Grid Forum (OGF, www.ogf.org), the Open Virtualization Format (OVF) and Cloud Infrastructure Management Interface (CIMI) from the Distributed Management Task Force (DMTF, www.dmtf.org), and the Cloud Data Management Interface (CDMI) specifications from the Storage Networking Industry Association (SNIA, www.snia.org).

Each of these cloud-specific standards has risen to the level of the DevOps challenge that I posed in this column in previous issues, which is to produce viable practical implementations and to engage the developer community early in the standards development processes. They're already seeing uptake in open source and commercial settings, as I'll discuss in future issues, and hence have practical value to software developers. The US NIST cloud standards roadmap and other related cloud standards roadmap efforts have catalogued additional standards efforts.[3]

Table 2 lists the current status of these specifications. In some cases, the current published version hasn't changed in a considerable amount of time, even though progress is taking place on further revisions. This is actually a good thing, as in each of these cases this progress has been coupled with strong implementation activities within the community. I'll discuss these implementations in future issues.

Progress on Cloud-Related Security Standards

Not all standards that are applicable in cloud settings are specifically aimed at cloud computing. Several standards are quite relevant for use in clouds, while remaining generally applicable in other settings.

Some of these standards relate to cryptography and security. In this context, I'd like to mention recent updates and additions to the Key Management Interoperability Profile (KMIP, www.oasis-open.org/committees/kmip), the REST Profile of Extensible Access Control Markup Language, v3 (XACML v3, www.oasis-open.org/committees/xacml), and the public key cryptography standard (PCKS 11, www.oasis-open.org/committees/pkcs11) specification sets by OASIS, and to the OpenID Connect Standard, which is supported by its own dedicated working group and foundation (see http://openid.net/tag/final-specification). Significant updates have taken place in each of these, and are worth reviewing.

Network Functions in the Cloud

As time goes on, it's becoming increasingly clear that a large fraction of the currently unsolved problems in cloud computing are deeply related to networking. The reasons for this are fairly simple, and can be traced to drastically increasing numbers of virtual machines and containers that are used to run increasingly complex distributed and fragmented services, with the universal

Table 3. Current specification status for cloud-applicable networking standards.

Parent SDO	Specification title	Current version and date
ETSI	Network Functions Virtualization (NFV)	NFV Phase 1 document set, Jan. 2015
OGF	Network Service Interface (NSI) Connection Service; Network Service Framework and related documents	v2.0, June 2014
ONF	OpenFlow specification set (Switch Specification, Table Type Patterns, Extensions, Controller-Switch NDM Synchronization, and so on)	OpenFlow Specification 1.5.0, Jan. 2015 and related specifications

expectation that each of these can connect seamlessly to others in highly virtualized and abstracted environments.

A great deal of effort has been devoted to this topic by a number of organizations. Among these, recent work by the European Telecommunications Standards Institute (ETSI, www.etsi.org) on Network Functions Virtualization (NFV, www.etsi.org/technologies-clusters/technologies/nfv) and by OGF on the Network Service Interface (NSI, https://redmine.ogf.org/projects/nsi-wg) set of specifications for multilevel cross-domain network control both deserve mentioning.

The ETSI NFV Industry Specification Group recently completed its phase 1 document set (available at http://docbox.etsi.org/ISG/NFV/Open/Published) and has launched a second phase of work. OGF has published a proposed recommendation for its NSI connection service (www.ogf.org/documents/GFD.212.pdf) and an accompanying informational document for its network service framework (www.ogf.org/documents/GFD.213.pdf), which aim at high-level cross-domain networking. These documents join the long-standing OpenFlow family of software-defined networking specifications, which are supported by the Open Networking Foundation (ONF, www.opennetworking.org), to comprise the most modern set of open standards for advanced networking applicable to cloud settings.

Table 3 lists these standards and their most recent versions. The Internet Engineering Task Force (IETF) has also begun to review topics in this area through its Network Function Virtualization Research Group (NFVRG, https://datatracker.ietf.org/doc/charter-irtf-nfvrg), chartered in January 2015.

IN FUTURE ISSUES, I'LL EXPLORE IMPLEMENTATIONS OF THESE AND OTHER EMERGING CLOUD STANDARDS IN DETAIL. With the help of other authors to be added to this department, I'll extend the discussion to include the use of standards in the cloud-specific software community and in open source software projects.

As always, please respond with your opinions on this or previous articles and columns in this department, and include any news you think the community should know. Feel free to propose or to submit articles on topics in this area that you think we should publish. I can be reached for this purpose at alan.sill@standards-now.org.

References

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3. NIST Cloud Computing Standards Roadmap Working Group, *NIST Cloud Computing Standards Roadmap*, NIST Special Publication 500-291, v2, Nat'l Inst. of Standards and Technology, 2013; www.nist.gov/itl/cloud/upload/NIST_SP-500-291_Version-2_2013_June18_FINAL.pdf.

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