



Cloud Computing: An Interview with Don Deutsch, Chairman of ISO/IEC JTC 1/SC 38, Distributed Application Platforms and Services

Don Deutsch, chairman of [ISO/IEC JTC 1/SC 38](#), Distributed Application Platforms and Services, shares his thoughts on the importance of standards for the paradigm-shifting field of cloud computing within the information technology sector, the roles of SC 38, JTC 1, and various consortia in the development of cloud computing standards, and what is to be expected for the future of cloud computing.

Q: Why are standards important for cloud computing?

Standards are important in the Information Technology (IT) sector because standards enable products to interoperate. That is information technology products from multiple vendors can work together when they incorporate standard interfaces. IT products rarely operate in isolation or only with other products from the same vendor. Consequently, in today's interconnected world, standards are absolutely essential.

An emerging paradigm for providing information technology services, cloud computing can benefit from standards. When people talk about cloud computing they mean various things; to provide clarity and a basis for developing future cloud computing standards SC 38 is developing a definition of cloud computing. Currently under development by SC 38, ISO/IEC 17788: *Cloud Computing – Overview and Vocabulary*, includes a concise definition of cloud computing. Since the standards process is a process of gaining consensus among various different constituencies, this is a consensus definition. Cloud computing, according to this document that is being proposed as an international standard, is:

“a paradigm for enabling network access to a scalable and elastic pool of shareable, physical or virtual resources with self-service provisioning and administration on-demand.”

At the bare minimum, cloud computing is a form of information technology involving the use of resources that are not owned, controlled and maintained by the single user. Rather, the resources are accessed over a network and are shared among some community of users. With cloud computing those resources can be dynamically provisioned – if users need more computing power, more storage, or more processing capabilities, then these resources can be provided. Cloud computing services may be provided by more than a single computer or even a single computing center; users may actually be sharing resources across various, multiple – and maybe even not co-located – facilities.

It is important to note the word “paradigm” in the definition of cloud computing outlined in the ISO/IEC 17788 draft standard. Cloud computing is a shift in the paradigm for providing IT capabilities to users, and a great deal of future IT activity is likely to be done within the context of cloud computing. Because cloud computing has the potential to disrupt the IT products and services marketplace, there are strong demands for near-term cloud computing standards, especially from governments. The information technology industry has gone through significant transitions throughout its history, such as the transition

from the mainframe era to the personal computing or distributed computing era. With cloud computing, we may be experiencing another important transition; the standards developed by SC 38 promise to be an essential part of getting that transition right.

Q: What is ISO/IEC JTC1's role in cloud computing standards? What is SC 38 doing?

ISO/IEC JTC 1 recognized the emerging field of cloud computing (and the desire to develop cloud computing standards) when in 2009 it established SC 38, Distributed Application Platforms and Services. At the time, there were three different converging demands that were brought to the JTC 1 plenary. After studying over a period of six years standardization requirements for web services – a technology for providing capabilities across the network through the World Wide Web – JTC 1 was considering whether to begin developing web services standards. At the same time, China proposed that JTC 1 work in the area of service oriented architecture (SOA), which is another underlying technology closely related to web services. The third converging initiative came from Korea, with a proposal that JTC 1 look into the new area of cloud computing. Recognizing the strong relationships among these three technologies, JTC 1 established SC 38 with the title of Distributed Application Platforms and Services (DAPS) to address those three areas: web services, service oriented architecture, and cloud computing.

As SC 38 has worked over the last four years, and as the work has evolved, I have found that the overwhelming focus of SC 38 today is on cloud computing. The work on web services is nearly finished and there is no new development of web services standards. The work on SOA in SC 38 is still ongoing, but winding down. However, there is a tremendous amount of interest and effort in the area of cloud computing. To date, SC 38 has focused on preparing two important documents for cloud computing in collaboration with ITU-T: ISO/IEC 17788: *Cloud Computing: Overview and Vocabulary* and ISO/IEC 17789: *Cloud Computing – Reference Architecture*. In addition to preparing these documents, SC 38 has initiated work on the definition of a standard Service-Level Agreement (SLA) for cloud computing.

Recognizing the shift in focus of SC 38 heavily towards cloud computing, at the fall 2013 SC 38 Plenary in Kobe Japan I initiated a study group on future work of SC 38 in the area of cloud computing and related technologies. My anticipation is that, as a result of the work of this study group, we will have new projects proposed, and possibly new structures within SC 38 to carry out those projects. The current working groups – one each for web services, SOA, and cloud computing – do not properly reflect the interest and level of effort that we have in the cloud computing area; new structures might better deploy our resources to carry out, what I'm hopeful will be, a more robust program of work in the area of cloud computing.

Q: What is ahead for SC 38 – what do you expect the committee to be doing in the coming year or two?

The first step in the standardization process is for the provider community and standards-setting organizations to come to a consensus as to which standards are required, beyond those standards that already exist or are currently being developed. Because cloud computing is still in the rapid innovation stage, this idea of consensus on required standards is extremely important to its success. As previously mentioned, I set up a study group on future work in cloud computing, and I put in charge of the study group someone from NIST in the U.S. government. NIST is one of the big demand-pull organizations and represents a major market for most of the providers in the U.S.; in addition, NIST is looked to in much of the rest of the world as a trusted player in defining requirements for users, especially for governments – many of which are represented by major players in JTC 1. I am hoping that through this study group, SC

38 will decide where to go beyond vocabulary and reference architectures, and over the next couple of years determine which standards are required for cloud computing and play a significant role in providing those standards.

I do not expect SC 38 to define all of the standards that are required for cloud computing, but I expect it to be in a role where it is able to recognize what standards are required. It can then become a consolidator of the standards that are produced from a wide and diverse community of standards setting organizations, and it can develop those additional required standards that are not being developed elsewhere. SC 38 is uniquely positioned to serve the role as a consolidator of cloud computing standards because of the JTC 1 PAS process, which allows specifications, developed through consensus processes outside of the formal structure, to be transposed into JTC 1 and recognized as international standards. To date, most of the international technical standards in the area of cloud computing have come as PAS submissions from consortia addressing the lower levels of the cloud computing technology stack; that is those focusing on infrastructure as a service standards. The standards that have been worked on directly by SC 38 are the vocabulary and reference architecture standards, ISO/IEC 17788 and ISO/IEC 17789. Over the next coming year, I expect SC 38 to complete these foundational standards, and to identify the requirements for additional cloud computing standards; only then can SC 38 embark on developing these standards and/or filling the need for these standards from outside organizations.

Q: I understand there are many standards organizations developing cloud computing standards. Are they competing with SC 38? How do you view that situation?

I do think that we are in a new era, in that technology convergence is real. The mechanisms that we set up for international standards, 50 or more years ago, divided technological standardization into three fields: with ITU doing telephones and telecommunications, IEC doing power generation and power distribution, and ISO doing that which was not covered by the other two. When the need for IT standards was first recognized, ISO and IEC both claimed to have a stake in the sector. In order to avoid competition in this field, both organizations agreed to set up their first joint technical committee, known as JTC 1.

Today it is much harder to draw the line between telecommunications, information technology, and consumer electronics than it was in the past; consequently, organizations that were established with clear charters now find their areas of work overlapping with the charters of other organizations. This is true not only for ISO, IEC, and ITU – it also applies across many standards setting organizations. This overlapping of work areas results in competition among standards setting organizations. There is competition among all the consortia and there is competition among consortia and formal standards development organizations. If you view standards setting organizations as a marketplace, you have competition in the marketplace for where standards should be set. All of these organizations – ISO, IEC, and ITU as well as the hundreds of consortia – want to be the preferred venues for setting cloud computing standards.

While there is competition among standard setting organizations, JTC 1 has substantial strength in that competition. JTC 1 is the recognized source for global information technology standards. It has a process for approving Publicly Available Specifications (PAS) – those developed outside the formal process – as ISO/IEC JTC 1 standards. Finally, JTC 1's voluntary, non-regulatory nature has allowed the IT industry to thrive over the years. Since JTC 1 has the PAS process, consortia working in the area of cloud computing can have the results of their work considered by JTC 1 for possible acceptance as international standards. As a result, consortia see SC 38 as a venue for collaboration rather than as competition. Consortia such as the Open Group, DMTF, SNIA and OASIS are engaged in SC 38, both directly and through the PAS process. In this way, SC 38 is able to act less as a competitor and more as a partner in developing cloud computing standards. For these reasons, SC 38 is positioned as the preferred venue for establishing new international cloud computing standards.

Q: Can you tell us about your experience in developing standards, and why you are interested in cloud computing?

I became involved in developing standards in the area of database management, specifically in the area of languages for accessing, storing, retrieving, and manipulating data. The result of those efforts was the SQL standard, in which I am still involved. I spent most of my career working for companies that had a stake in SQL. One could argue that the SQL standard ranks among the most successful standards in the past 30 years. Nearly every product today that stores and retrieves data provides an SQL language interface. Even when new database management approaches emerge, they are characterized in the context of the SQL standard – e.g., NoSQL databases. The development of cloud computing standards could have an equally influential impact on the IT world. Cloud computing is, as the definition says, a paradigm shift, and therefore could potentially be a discontinuity in the market. It is so important, that it has the potential to substantially impact virtually everything that goes on in information technology. It is an area that is very significant for my company, for the U.S., for JTC 1 and for the entire world of IT – that’s why I’m excited to be engaged in cloud computing standardization in SC 38.