United States Government Cloud Standards Perspectives

in the context of the NIST initiative to collaboratively build a

USG Cloud Computing Technology Roadmap

EC-ETSI Standards in the Cloud Workshop September  28, 2011

Dawn Leaf, NIST Senior Executive for Cloud Computing
NIST Cloud Computing Program Goal

- **Goal:** Accelerate the US federal government’s adoption of cloud computing
  - Build a [USG Cloud Computing Technology Roadmap](#) which focuses on the highest priority USG cloud computing security, interoperability and portability requirements
  - Contribute to the identification & development of standards and guidelines in close consultation and collaboration with US federal, state and local government, as well as the private sector including academia, standards developing organizations, industry, commercial and international community stakeholders;
NIST Cloud Computing Program Concept

Strategic Program

1. Define Target USG Cloud Computing Business Use Cases
2. Define Neutral Cloud Computing Reference Architecture & Taxonomy

Tactical Program

NIST CC efforts
- Standards Working Group, SDO liaison, submissions
- Standards Acceleration to Jumpstart the Adoption of Cloud Computing (SAJACC) – through qualitative testing of specifications against interoperability, security, and portability requirements

Interagency Report:
USG Cloud Computing Technology Roadmap list of Tactical Priorities & Deliverables

Concurrent & Iterative 3-step process that drives tactical efforts
NIST Cloud Computing Program Timeline

**STRATEGIC**

- **May 2010**
  - NIST CC Forum & Workshop I
  - Outreach & Fact finding with USG, Industry, SDOs
  - Evaluate past models & lessons learned

- **Nov 2010**
  - NIST CC Forum & Workshop II
  - Define fresh approach to support secure & effective USG cloud computing adoption, prioritize interoperability, portability, & security requirements, collaborate, more quickly respond to operational needs

- **March 2011**
  - NIST CC Forum & Workshop III
  - Launch CC Strategic Program
  - Initiate Stakeholder Meetings
  - Collaboratively define working group scope & resources
  - Develop Refined Plan

- **Oct 2011**
  - NIST CC Forum & Workshop
  - Execute CC Strategic program
  - Continue Stakeholder meetings
  - Integrate results into tactical priorities

**Tactical efforts**

- Complete 1st draft
- USG Cloud Computing Technology Roadmap
- Interagency Report
- Assess Results & Replan
## Inventory of Standards Relevant to Cloud Computing

This table gathers references and details of the most relevant standards that are associated with cloud computing. It includes information on the standards, their developers, and the organizations involved.

### Basic Definitions and Standards

<table>
<thead>
<tr>
<th>Name</th>
<th>Developed By</th>
<th>Purpose</th>
<th>Document Info</th>
<th>Standard Status</th>
<th>Categorization</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSL/TLS</td>
<td>IETF</td>
<td>Secures network communications by coding data</td>
<td>RFC 5246</td>
<td>RFC 5246</td>
<td>Transport, Network</td>
<td></td>
</tr>
<tr>
<td>DNS</td>
<td>IETF</td>
<td>Translates domain names into IP addresses</td>
<td>RFC 6333</td>
<td>RFC 6333</td>
<td>Transport, Network</td>
<td></td>
</tr>
</tbody>
</table>

### Example:

- **HTTP**: Hypertext Transfer Protocol (HTTP) is a networking protocol for distributed, collaborative, hypermedia information systems. HTTP is the foundation on which the World Wide Web is built.
- **SSL/TLS**: Secure Sockets Layer (SSL) and Transport Layer Security (TLS) are protocols for the establishment of secure communication channels over a network.
- **DNS**: Domain Name System (DNS) is a hierarchical system for mapping domain names and Internet Protocol addresses.

### Notes:

- May 2011 – 12th public working group Draft NIST Cloud Computing Standards Roadmap
- Issued NIST SP 500-291 August 2011
Assessment -- Fast changing landscape of cloud computing relevant standardization

- **Present areas with standardization gaps** include: SaaS functional interfaces; SaaS self service management interfaces; PaaS functional interfaces; business support/provisioning/configuration; and security and privacy

- **Present standardization areas of priority to the US federal government** include: security auditing and compliance; identity and access management; SaaS application specific data and metadata; and resource description and discovery

**STRATEGIC & TACTICAL aspects – standards work needs to be relevant**

**NIST Contributions**: Two fundamental NIST special publications are under consideration by various standards bodies as the basis for formal cloud computing standards

- NIST Definition of Cloud Computing - Special Publication (SP) 800-145
- NIST Cloud Computing Reference Architecture – Special Publication (SP) 500-292
Definition – why is it important?


“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.”

Beyond the Definition – Security in the context of more complex logical & physical system boundaries drives the need to examine service & delivery models

(NDST SP – 146 DRAFT Cloud Computing Synopsis and Recommendations)

Usefulness & relevance -- if Cloud providers map services and products because USG (& others) can compare apples to apples

The Reference Architecture and Taxonomy Working Group has developed a draft neutral reference architecture that depicts a generic high level conceptual model for discussing the requirements, structures and operations of cloud computing. The model and its companion taxonomy are a basis for discussing the characteristics, uses and standards for cloud computing. Using this taxonomy, the NIST Standards Roadmap Working Group has mapped cloud computing relevant standards to portability, interoperability and security requirements.
Contact Information

NIST invites and welcomes you to collaborate with us in the arena of Cloud Computing!


Public NIST cloud web site: http://www.nist.gov/itl/cloud/index.cfm

Dawn M. Leaf
Senior Executive For Cloud Computing
United States Department of Commerce
National Institute of Standards and Technology
Information Technology Laboratory
100 Bureau Drive Stop 2000
Gaithersburg, MD  20899-2000

Tel: (301) 975-4500
Email: dawn.leaf@nist.gov