

SAJACC Use Case Definition and Testing

Phase II Report and New Proposed Phase III Activities

NIST SAJACC Working Group

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NIST Cloud Computing Forum and Workshop VIII

July 10, 2015

Background

- US Agencies were instructed in 2009 to shift to “Cloud First” by the US CIO. This has since been extended to include other topics, such as Big Data, and a generally increased emphasis on “Digital Government”.
- US National Institute of Standards (NIST) was charged in 2010 with creating a roadmap for standards for US government adoption of cloud.
- NIST formed several working groups to create roadmaps for cloud computing and big data standards, beginning with the SAJACC (“Standards Acceleration to Jumpstart Adoption of Cloud Computing”) effort.

US NIST SAJACC Use Cases

- “Standards Acceleration to Jumpstart the Adoption of Cloud Computing” = SAJACC.
- One of several NIST Cloud Computing working groups that has been active since 2010 to pursue their mandate to produce guidance to the US government. Other CC working groups for reference architecture, security, standards roadmap, accessibility, metrics and forensics.
- SAJACC Phase I was focused on use case definition & refinement to produce *testable cloud computing scenarios*. Demo code and presentations were produced and made part of public record.
- SAJACC Phase II launched Feb. 2013 to refine and extend Phase I use case test cases and process based on a community-developed Priority Action Plan (PAP).

NIST Cloud Public Process

 **Cloud Computing Collaboration Site**

 [Edit](#)  [Attach](#)

Reference Architecture | SAJACC | Security | Standards Roadmap | Business Use Cases | Documents and Resources | Koala Project

 CloudComputing

 Log In

 CloudComputing Web

 Create New Topic

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 Statistics

 Preferences

Webs

 CloudComputing

 Main

 Sandbox

 TWiki

Standards Acceleration to Jumpstart the Adoption of Cloud Computing

Description

The goal of the SAJACC initiative is to drive the formation of high-quality cloud computing standards by providing worked examples showing how key use cases can be supported on cloud systems that implement a set of documented and public cloud system specifications. The SAJACC initiative will develop and maintain a set of cloud system use cases through an open and ongoing process engaging industry, other Government agencies, and academia. Simultaneously, the SAJACC initiative will collect and generate cloud system specifications through a similarly open and ongoing process.

The SAJACC initiative will develop tests that show the extent to which specific use cases can be supported by cloud systems that implement documented and public cloud system specifications, and will publish test results on the SAJACC web portal (this web site).

The SAJACC web portal will provide pointers to known cloud system implementations, use case documents, upcoming events, and will also provide a convenient means to provide feedback to the SAJACC team. These resources will serve to both accelerate the development of high- quality cloud computing standards and reduce technical uncertainty during the interim adoption period before many cloud computing standards are formalized.

Objectives

Mailing List and Meeting Information

Weekly SAJACC working group meetings will be held as teleconferences. Meeting discussion materials and meeting minutes are posted to this site as they become available.

The dial-in information for the bi-weekly meeting series is as follows:

- Phone: (Toll Free) +1 (855) 834-4888
- Conference ID: 73390239

The URL for the web conference tool for the meeting is: <http://webconf.soaphub.org/conf/room/sajacc>

Coordinators and contacts:

[http://collaborate.nist.gov/twiki-cloud-computing/
bin/view/CloudComputing/SAJACC](http://collaborate.nist.gov/twiki-cloud-computing/bin/view/CloudComputing/SAJACC)

NIST SAJACC Phase I Cloud Computing Use Cases

[1 Introduction](#)

[2 Important Actors for Public Clouds](#)

[3 Cloud Management Use Cases](#)

[3.1 Open An Account](#)

[3.2 Close An Account](#)

[3.3 Terminate An Account](#)

[3.4 Copy Data Objects Into a Cloud](#)

[3.5 Copy Data Objects Out of a Cloud](#)

[3.6 Erase Data Objects In a Cloud](#)

[3.7 VM Control: Allocate VM Instance](#)

[3.8 VM Control: Manage Virtual Machine Instance State](#)

[3.9 Query Cloud-Provider Capabilities and Capacities](#)

[4 Cloud Interoperability Use Cases](#)

[4.1 Copy Data Objects between Cloud-Providers](#)

[4.2 Dynamic Operation Dispatch to IaaS Clouds](#)

[4.3 Cloud Burst From Data Center to Cloud](#)

[4.4 Migrate a Queuing-Based Application](#)

- Public project to define *testable* use cases that can provide the basis for independent evaluation of cloud standards, products and processes.
- Phase I completed and working group report “SAJACC Working Group Recommendations to NIST” delivered *Feb. 12, 2013*.
- Working group continues with Phase II to define and refine use cases with greater technical detail.



**National Institute of
Standards and Technology**
U.S. Department of Commerce

Internal Group Report

Feb 12, 2013

SAJACC Working Group Recommendations to NIST

**National Institute of Standards and
Technology**

NIST Cloud Computing

Standards Acceleration to Jumpstart Adoption
of Cloud Computing (SAJACC) Working Group

SAJACC Phase II Priority Action Plan

Item Description

- 1 Replace the [SAJACC](#) use case internal organization with one based on the current structure of the NIST Cloud Computing Reference Architecture and Taxonomy.
(Strategy: Resolve different taxonomies and identify a structure that could be used to replace the existing/old [SAJACC](#) Phase I one.)
- 2 Add further use cases based on current extensions to this taxonomy for recently developed Cloud SLA Metrics and NIST Cloud Computing Security components.
(Strategy: Added use cases can be schematic at first, but should be filled out eventually to full level of detail.)
- 3 Integrate further input as necessary from the NIST Business Use Case, Security and Standards Roadmap groups, and work closely with these groups to identify additional use cases.
(Strategy: Rewrite and re-template use cases to follow recommendations in the [SAJACC](#) Phase I report.)
- 4 Study and adopt use case template elements from the US VA Bronze, Silver and Gold Use Cases and from additional formal input from US Government agencies, including applicable requirements and controls (such as FedRAMP) as references where possible.
(Strategy: Might be integrated with the above.)
- 5 Add automation and tooling, if possible, to the NIST web site to support community downloading of the NIST [SAJACC](#) use cases and their associated templates for testing scenarios and uploading of externally produced test results.
(Strategy: Investigate options for automation, tooling and proceduralization of use case testing, including applicable tools and techniques.)
- 6 Conduct, invite and document additional use case demonstrations of cloud standards and applicable products against the [SAJACC](#) use cases to illustrate their features
- 7 Solicit and add further recommendations from the community at large through meetings of the [SAJACC](#) working group
(Strategy: Leverage international partnerships and contact with other global standards roadmap groups.)

Basic Goals of SAJACC Phase II

- Drastically increase the level of detail and modularity of the use cases for portability, interoperability, security and for other NIST goals added, such as mobility and accessibility.
- Bring organization and definition of use cases into line with NIST Cloud Computing Reference Architecture and other NIST working group output.
- Add sections necessary for USG agency and organization adoption.
- Improve technical guidelines and content for possible automation, and to provide the basis for more formal testing.
- Write enhanced use cases and leave a legacy for future reuse by defining the process for writing testable use cases.

Progress on SAJACC II Plan

- Bi-weekly or weekly group meetings held Feb. 2013 - Oct. 2014 on an ongoing basis.
- Group made good progress toward each of its defined goals.
- Good progress in particular toward the following:
 - Alignment of use case collection with NIST Reference Architecture
 - Incorporation of feedback from USG agencies, in particular US VA, in terms of organization and internal content of use cases
 - Improved definition of actors, expected success and failure outcomes and detailed technical workflow of each use case
 - Incorporation of diagrams and definitions for use with modeling tools
- Preliminary report given at 2014 NIST CC forum & workshop.
- All task list items completed, but implementation feedback needed.

SAJACC Phase II Output

NIST Cloud Computing Test Scenario Use Cases - Version 2

[Introduction to SAJACC Version 2 Use Cases](#)

[Important Actors for Public Clouds \(Version 2\)](#)

Cloud Management Use Cases (CM)

- [CM - Allocate IaaS Instance](#) [IaaS](#) Virtual Machine Control: Allocate VM Instance
- [CM - Manage IaaS Instance State](#) Virtual Machine Control: Manage VM Instance State
- [CM - Query Cloud-Provider Capabilities and Capacities](#) Query Cloud-Provider Capabilities and Capacities
- [CM - Broker](#) Cloud Management Broker
- [CM - Fault-Tolerant Cloud Group](#) Fault-Tolerant Cloud Group or Multi-Cloud with defined failover

Data Management Use Cases (DM)

- [DM - Copy Data Into Cloud](#) Copy Data Objects Into a Cloud
- [DM - Copy Data Out of Cloud](#) Copy Data Objects Out of a Cloud
- [DM - Erase Data In Cloud](#) Erase Data Objects In a Cloud
- [DM - Transfer Data Ownership](#) Transfer of ownership of data within a cloud

Cloud Interoperability Use Cases

- [CI - Copy Data Between Providers](#) Copy Data Objects Between Cloud-Providers
- [CI - Dynamic Dispatch to IaaS](#) Dynamic Operation Dispatch to IaaS Clouds
- [CI - Cloud Burst From Data Center](#) Cloud Burst From Data Center to Cloud
- [CI - Migrate Queuing-Based App](#) Migrate a Queuing-Based Application
- [CI - Migrate Fully-Stopped VMs](#) Migrate (fully-stopped) VMs from one cloud-provider to another

Identity Management Use Cases

- [IM - Open Account](#) Open An Account
- [IM - Close Account](#) Close An Account
- [IM - Terminate Account](#) Terminate An Account
- [IM - Provision Account](#) Identity Management - User Account Provisioning based on external ID
- [IM - User Authentication](#) User Authentication in the Cloud
- [IM - Data Access Authorization](#) Identity Management - Data Access Authorization Policy Management in the Cloud
- [IM - User Credential Synchronization](#) Identity Management - User Credential Synchronization Between Enterprises and the Cloud

Reorganize
and rewrite
previous
SAJACC Use
Cases

SAJACC Phase II Output

Design document for technical workflow modeling of SAJACC use cases

*NIST ~~NIST~~ Cloud Computing,
Standards Acceleration to Jumpstart Adoption of Cloud Computing (SAJACC)
Working Group*

The purpose of this document is to perform technical workflow modeling of SAJACC use cases. As described in the SAJACC working group report [2], about twenty-four use cases are defined. Although the use cases are a well-known tool for expressing requirements to be used at cloud system, the provided use cases has a limitation for users to understand them. Therefore, it is important to have alternatives and differences in interpretation of use cases especially following technical work flows. Specifically, Unified Modeling Language (UML) is utilized.

1. Important Considerations

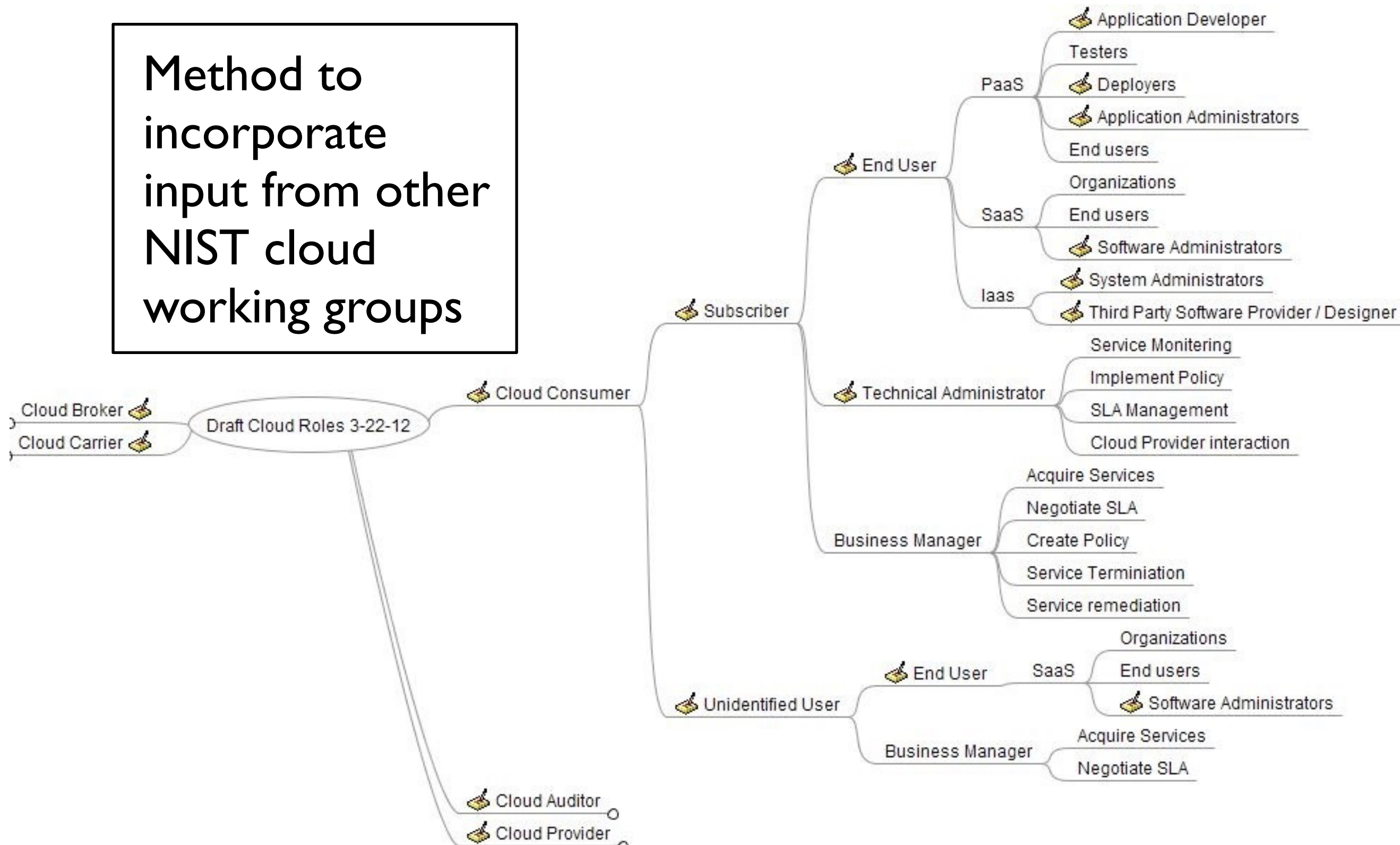
In designing alternative use cases by following technical workflows, there are six items need to be addressed.

1. How do we partition the use case into units of activities? Too many small atomic units are not a good thing, makes execution more difficult and tedious to track and control. Working on a few use cases will help figure out some best practice rules for this (e.g. should failure handling tasks be separate or part of related activity, etc.)
 2. Which party or role (as defined in ref architecture) is driving or responsible for each activity unit?
 3. How do we express time limits (maximum duration) for activities? And how do we model the related failure (timeouts).
 4. If an activity unit fails, in some cases that means failure of the entire use case to proceed further but in other cases the failure is one that is planned as possible and just one path among several in the use case workflow. What failures are fatal and which ones are not?
 5. Some use cases seem to rely on other use cases as subpart or as precondition. Should we use such references to avoid repeating some activities or sequences of, from one use case to the other?
-

Add technical components for workflow modeling and improved use case internal detail.

Use Case Identification:

Method to incorporate input from other NIST cloud working groups



SAJACC Phase II Template

1. USE CASE IDENTIFICATION

Use Case Name:	PI
Agency:	W
Model Matrix:	<input checked="" type="checkbox"/>
	<input checked="" type="checkbox"/>
Version:	1.
Date Updated:	
8/30/2013	Ni

8. DEPLOYMENT MODEL

Is this a Private, Public, Hybrid, or Community Cloud? Are there any benefits to a specific deployment?

9. NECESSARY CONDITIONS

9.1 **Security:** Describe security requirements.

9.2 **Interoperability:** Describe interoperability requirements.

9.3 **Portability:** Describe portability requirements.

9.4 **Other:** Describe any other requirements.

10. PRIORITIES AND RISKS

Describe the priority of this use case within the agency. What are some of the risks? See risk register on point 16.

11. ESSENTIAL CHARACTERISTICS –

How does it meet the essential characteristics of a cloud computing environment?

On-demand self-servi

Broad network acces

Resource pooling:

Rapid elasticity:

Measured service:

16. APPLICABLE FEDERAL REGULATION REQUIREMENTS

Applicable federal regulation requirements.

17. SPECIAL REQUIREMENTS

List any special requirements to support this use case.

18. NOTES AND ISSUES

List additional comments here.

12. SUCCESS OUTCOME

List the possible user:

19. GENERAL SECURITY CONSIDERATIONS:

List additional comments here.

13. ERROR OUTCOMES AT

Data here

20. RISK REGISTER:

14. DETAILED TECHNICAL

Data here

15. FREQUENCY OF USE

Estimate the frequency

2. BACKGROUND

Give more details for thi

3. DEFINITIONS

Define components of th

4. CONCEPT OF OPERATION

4.1 Current System

How this use case i

4.2 Desired Cloud Impl

How should this us

5. PRIMARY ACTORS

Describe the Primary Act

6. BUSINESS GOAL

What is the business goi

7. SERVICE MODEL

Is it SaaS, PaaS, IaaS? A

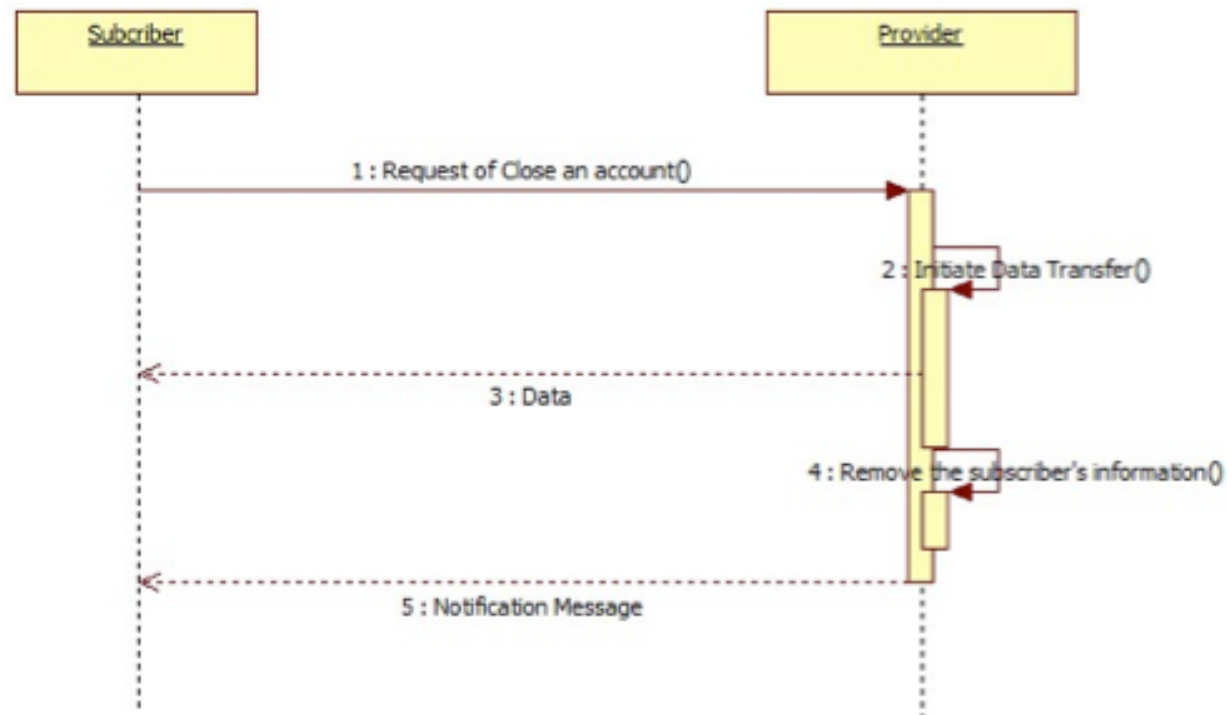
Improved
Phase II use
case template
elements and
content!

Date	Description	Likelihood	Severity	Countermeasures	Status
8/24/2012	Later.	Medium (31-70%)	High (>70%)	Later.	Current
8/24/2012	Later.	Low (<30%)	High (>70%)	Later.	Current
8/24/2012	Later.	Low (<30%)	Low (<30%)	Later.	Current

“Technical Workflow”

5.2.1. Technical Workflow

Include diagrams where appropriate to improve clarity of the logic sequence and workflow of a complex operation, step or procedure.



Phase II Conclusions

- SAJACC Phase II developed methods to rewrite, extend, and enhance use case definition for the NIST program to allow the SAJACC use cases to remain an integral part of the evaluation of cloud computing operations in general, and in a US Government agency context.
- This work was based on public WVG input as well as on feedback from USG agencies and aligned SAJACC methods with the NIST Cloud Computing Reference Architecture, NIST Security framework and other provided input.
- Phase II led to improvements in the NIST Cloud Computing collaborative online TWiki and a new organization of the use case collection and methods. Now need to try these out on real USG agency and public use cases!

SAJACC Phase III

New!

We are now ready to move on (back) to the original SAJACC Phase I mission and take on new, updated USG use case descriptions, explorations and demonstrations.

- Need a context and modern methods to tackle more sophisticated use case models and more advanced demonstrations.
- SAJACC Phase I took on forefront topics of its time (IaaS instantiation, cloud file movement and provisioning, account handling) but we now have more sophisticated problems.
- Interoperability, portability, security (e.g., federated IdM) demonstrations are necessary.

Solution: SAJACC Phase III!

SAJACC Phase III

The purpose of SAJACC Phase III is to move back to the original goals of the SAJACC program, which were (and are) to demonstrate use of cloud methods to accomplish goals of itemized use cases applicable to US government agencies.

- Now have a new method/template to document use cases.
- New methods to document and describe more sophisticated technical workflows.
- Improved methods to identify use cases at multiple levels.
- Time to put this into action!



New NSF research facility:

“SAJACC” testbed CloudLab project now approved!

CloudLab

Operated by:



Collaboration with NSF CAC

NIST Cloud Computing Forum
and Workshop VIII

July 10, 2015

Project update: Cloud Interoperability Testbed

New CAC project on Chameleon to support standards and software interoperability testing research projects:

The screenshot shows the Chameleon project management interface. At the top, there's a green header with the Chameleon logo, a home icon, a 'Documentation' dropdown, and a user greeting 'Hello, Alan Sill'. Below this is a navigation bar with 'Dashboard', 'Projects' (highlighted in green), and 'FutureGrid@Chameleon'. The main content area shows a project titled 'Cloud Interoperability Testbed | FG-176', which is circled in red. Below the title, the 'PI' (Principal Investigator) is listed as Alan Sill <Alan.Sill@ttu.edu>, Texas Tech University. The 'Abstract' section describes the project's purpose: to serve as a mechanism for interoperability tests for various standards like OCCI, CDMI, CIMI, and OVF. The 'Type' is listed as 'Startup'.

Replaces previous pilot interoperability project

Cloud Interoperability Testbed | FG-176

PI Alan Sill <Alan.Sill@ttu.edu>, Texas Tech University

Abstract The Cloud Interoperability Testbed will serve as a mechanism to host interoperability tests for different machine control, data transfer, resource reporting and usage agreement standards and implementations of other new standards efforts. The primary purpose will be to give developers an opportunity to try out implementations of code that implements either server or client functionality for the use of multiple standards from different standards development organizations. The initial effort for this project will be focused on implementations of the Open Cloud Computing Interface (OCCI) from the Open Grid Forum (OGF), Cloud Data Management Interface (CDMI) from the Storage Network Industry Association (SNIA), the Cloud Infrastructure Management Interface (CIMI) and the Open Virtualization Format (OVF) from the Distributed Management Task Force (DMTF). Other standards will be added as the project proceeds.

Type Startup

CAC: SAJACC Interoperability Testing

- Leverage NSF available testbeds to enhance and support this project.
- Extend publicly available demonstrations as needed using testbed capabilities available to us through NSF CAC.
- Use to support SAJACC testing projects that cannot already be demonstrated elsewhere..
- Where possible, make contact with other external testbed projects and related US National Institute of Standards and Technology (NIST) projects.
- Through this project, try to incorporate and accommodate the needs of multiple working groups in the NIST cloud computing program to carry out tests and demonstrations.

Phase III Proposal & Startup

- SAJACC Phase II developed methods to rewrite, extend, and enhance use case definition for the NIST program to allow the SAJACC use cases to remain an integral part of the evaluation of cloud computing operations in general, and in a US Government agency context.
- Phase III will be a new phase of the SAJACC program to try these out on real USG agency and public use cases.
 - Meet bi-weekly or as needed
 - Leverage existing NSF cloud testbed projects
 - Can accommodate any needed software
 - US government's most sophisticated testbeds
- Apply to Phase II use cases and to new items identified in the NIST Cloud Computing overall program.

Contacts for more information

- Alan Sill: alan.sill@ttu.edu
- Eugene Luster: eugene.luster@r2ad.com

Watch for meeting
announcements!

- NIST Cloud Computing TWiki:

[http://collaborate.nist.gov/twiki-cloud-computing/
bin/view/CloudComputing/SAJACC](http://collaborate.nist.gov/twiki-cloud-computing/bin/view/CloudComputing/SAJACC)

- NIST ITL Cloud web site:

<http://nist.gov/itl/cloud/>