



**caBIG<sup>®</sup>**

cancer Biomedical  
Informatics Grid<sup>™</sup>

# **caLIMS v2: cancer Laboratory Information Management System**



**caLIMS2**

***A Brief Update for  
ICR Workspace***

**August 25, 2010**





# Update for caLIMS v2.0



Today's presentation includes:

- About the development team and community
- Reminder of project description/goals
- Models, method internal workflow, examples, integration plans, and proposed services
- Timeline and development process
- Project Wiki and JIRA Project: sources for additional information about the caLIMS v2 project
- Questions, suggestions, comments, etc.



Collaboration: LPG and CBIIT

- NCI/LPG: Jenny Kelley, Bob Clifford, Cu Nguyen, Henry Zhang
- CBIIT: Anand Basu, Juli Klemm, Robert Shirley, Rachel Shortt
- Moxie Informatics: Sasikumar Thangaraj, Michael Visee, and Mike Connolly
- LS Mentors: Stephen Goldstein, Chris Piepenbring
- SAIC-F: Rod Winkler, Ulli Wagner

caLIMS v2 Development Working Group (DWG): JAX- Abigail Ames/Grace Stafford, IUPUI – Ganesh Shankar, UT – Scott Hunike-Smith, UAZ – Dave Thompson/Nirav Merchant, DFCI – Jomol Mathew/Erica Jones, UPenn – Avrum Goodblatt, Dartmouth – Paul Thompson, LabAnswer – Deven Atnoor, UCSF – Mark Bridge/Sudeep Basnet/Alyssa Lalanne

NCI LIMS Consortium – group interested in LIMS development



# caLIMS v2 Overall Project Goals



**The purpose of the caLIMS v2 project is** to create a research Laboratory Information Management System (LIMS) that is interoperable within established caBIG® standards and guidelines and will track a complete laboratory workflow that uses materials from a specimen management service (e.g. caTissue) to generate experimental results for one of the caBIG® data management services (e.g. caArray).

## **Primary goals for caLIMS v2 include:**

- To create an Open Source "near" commercial grade LIMS application that allows laboratories to focus on scientific research and scientific investments.
- To create a general-purpose LIMS application that seamlessly integrates with caBIG® data management systems and analytical tools.
- To develop a generic core LIMS infrastructure that can be used by multiple laboratory types.
- To build a basic LIMS that allows easy extension and customization for a specific Laboratory domain.
- To establish an Open Development Initiative (ODI) that allows LIMS developers to contribute LIMS customizations and enhancements to the end user community.



# caLIMS v2.0 Project Goals



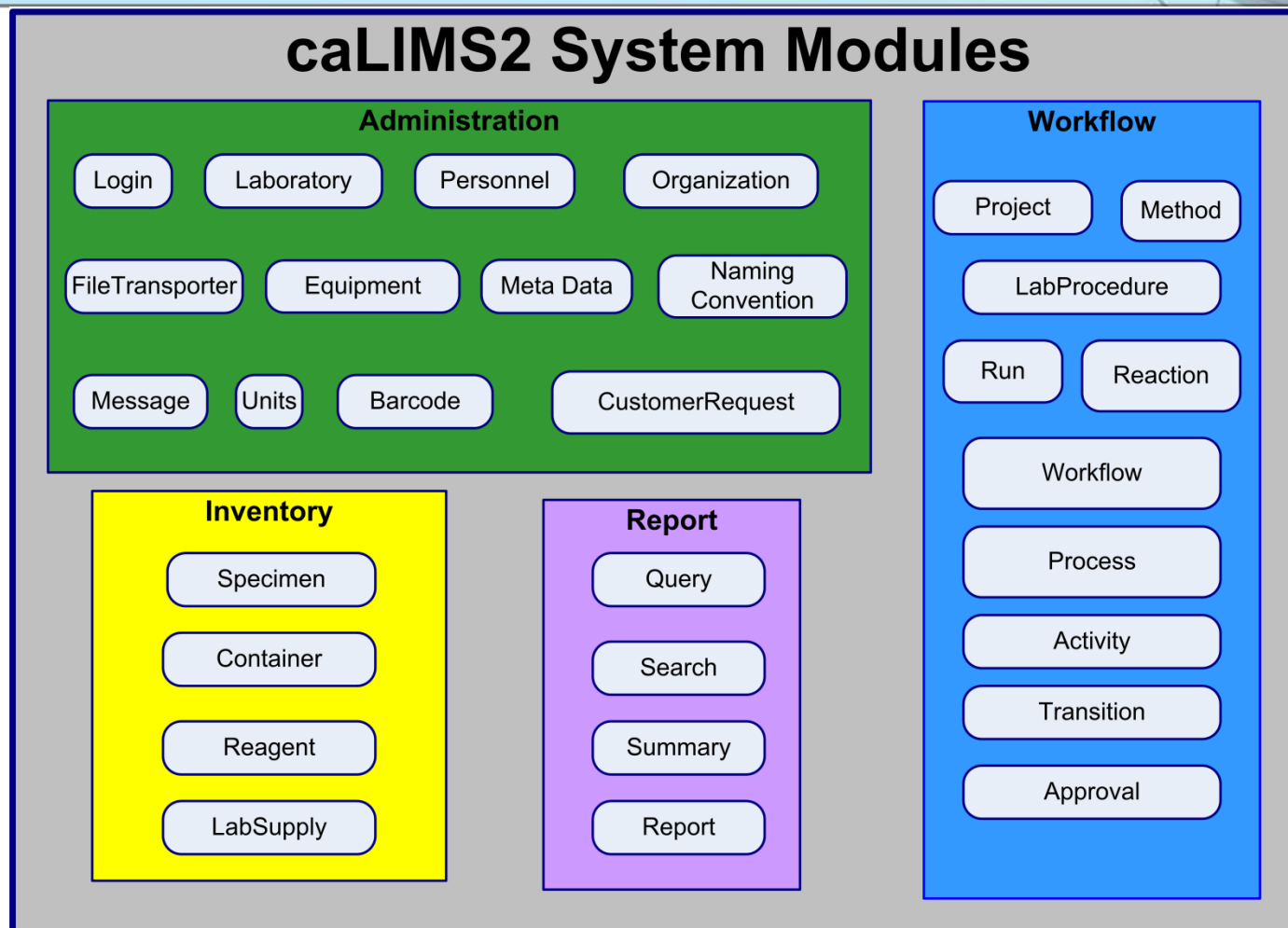
**Functional objectives for the initial implementation of caLIMS v2.0 are:**

- to use existing caBIG<sup>®</sup> tools to programmatically search caTissue for specimens with particular characteristics
- to track laboratory activities involving these specimens and all metadata necessary for submitting data files to caArray
- to facilitate the programmatic submission of laboratory data and metadata to caArray
- to record laboratory workflow-specific information - such as sample generation and storage conditions, key reagent lot numbers, and parameters for experiments, equipment and software - which may be important for establishing provenance of data submitted to caArray.



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# caLIMS v2.0 Core Modules



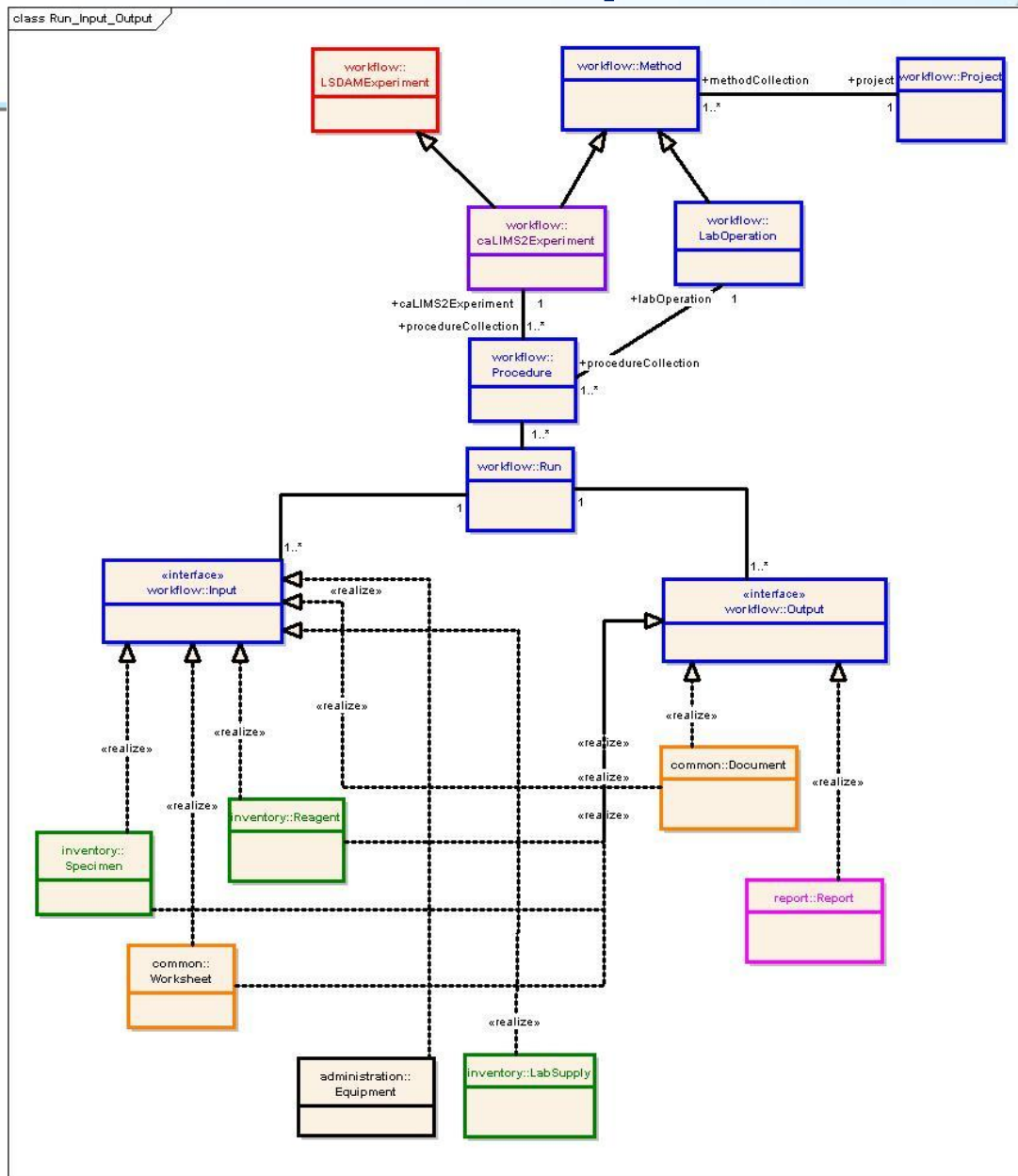
**Common classes:** Audit, Status, Type, Document, Notes, SOP, EnvironmentalCondition, Events, ExternalIdentifier, Safety, Scheduling.





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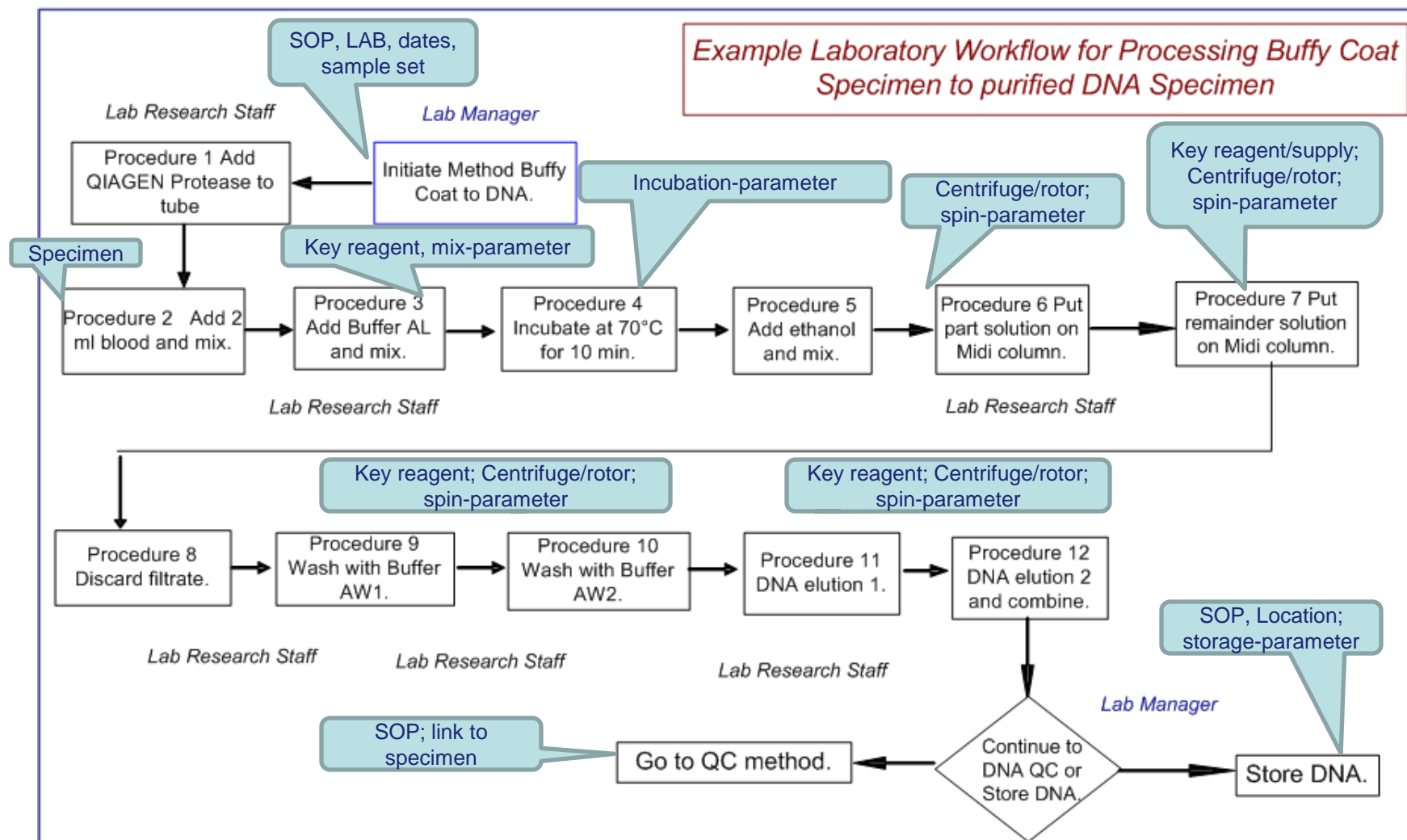
# caLIMS v2.0 OM – Experiment





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# caLIMS v2.0 Sample Lab Workflow – Specimen processing

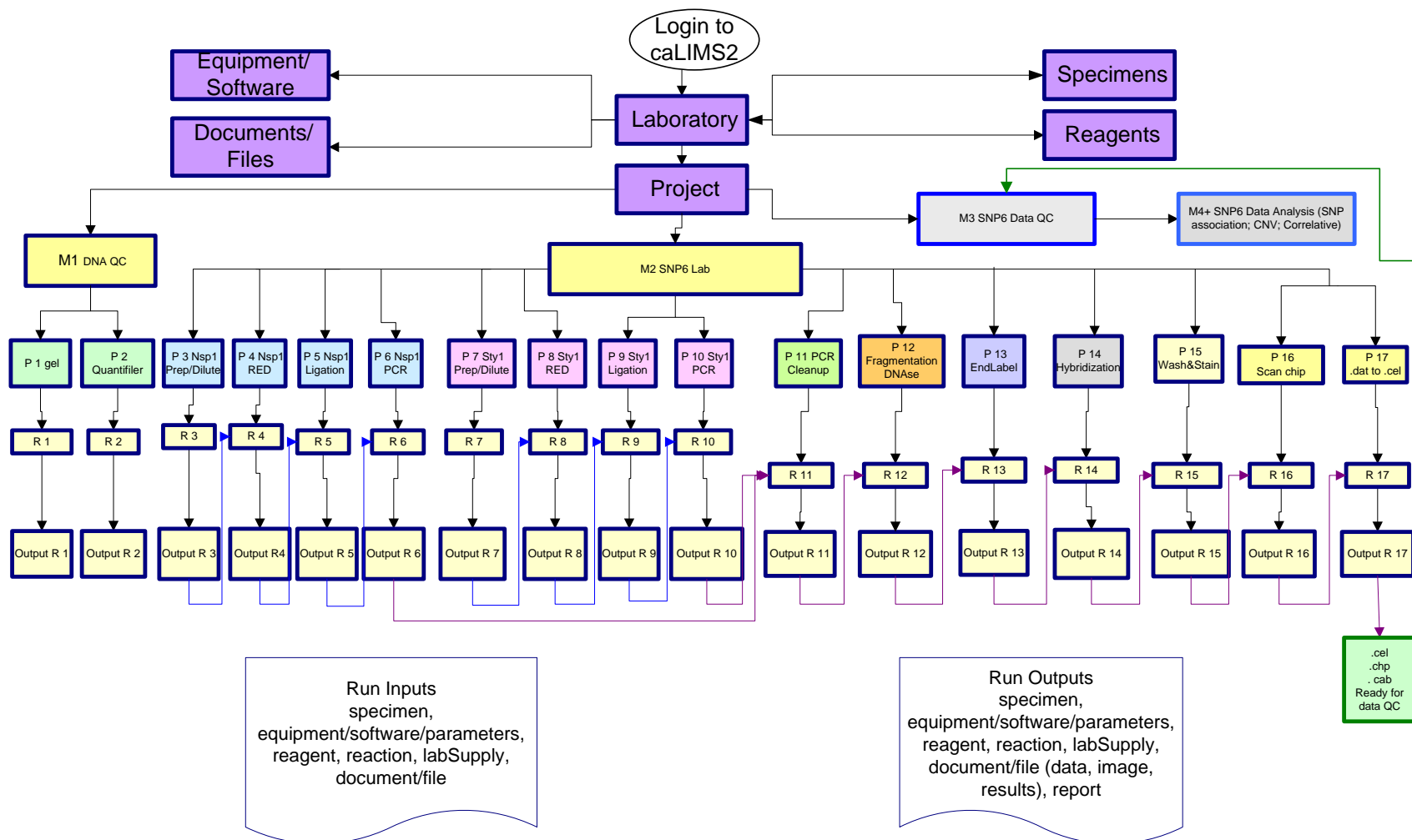






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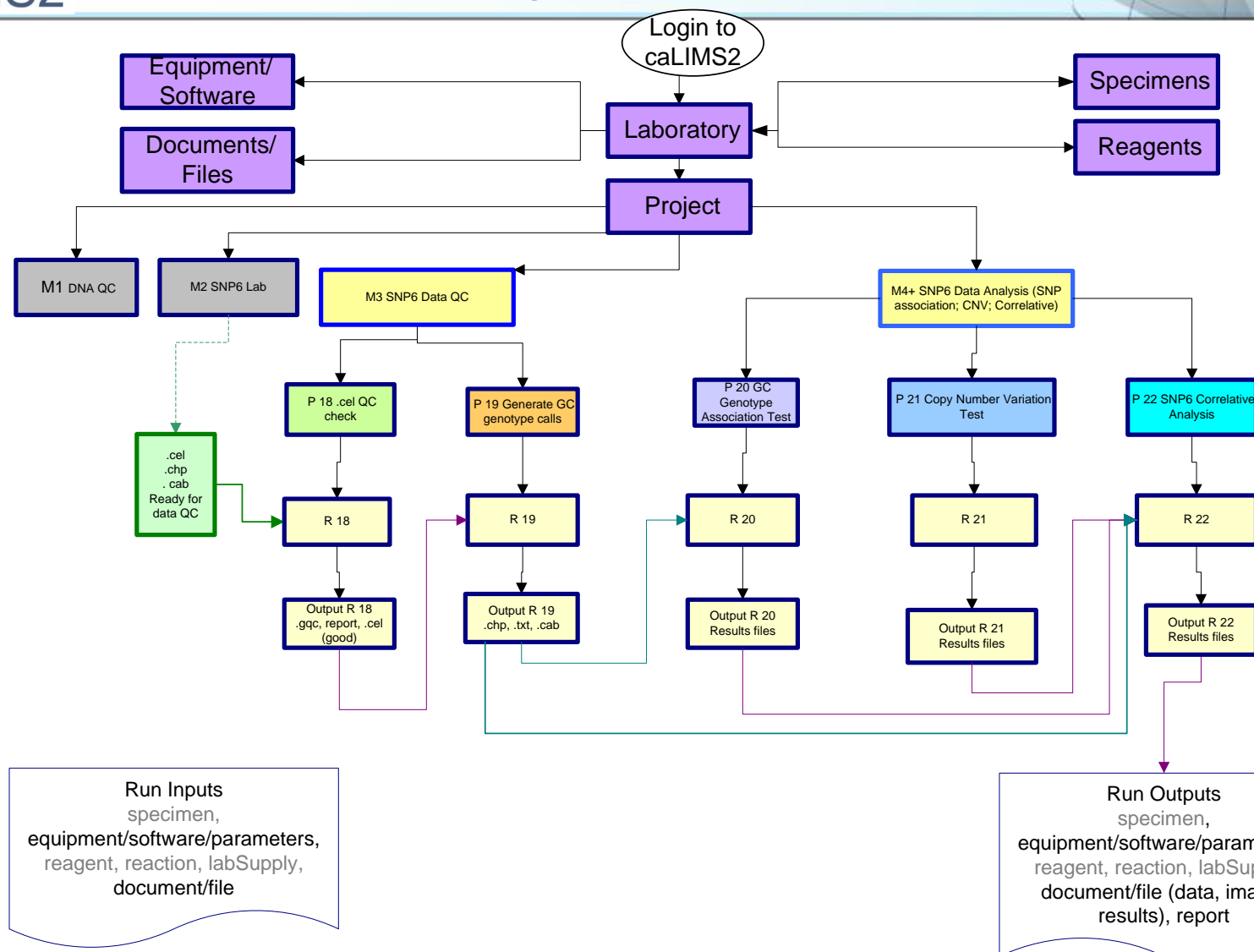
# caLIMS v2.0: Experiment – Ex. SNP6 wet lab





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# caLIMS v2.0: Experiment – Ex. SNP6 dry lab







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# Proposed Experiment Method Service



Profile	Operation	Inputs	Outputs	Pre-Conditions
Query	Retrieve an experiment method by: its unique identifier, y experiment attributes (e.g., name, public identifier, experiment type, method type, equipment type, reagent type, experiment input, experiment output, status), Specimen Type (e.g., Biospecimen, TissueSpecimen, CellSpecimen, NucleicAcid, Protein, etc.), contact/investigator (createdBy, modifiedBy), data type (e.g., gene expression, genotype, or copy number variation), or by any combination of the these criteria with boolean OR/AND	Identifier	List<Experiment Method Summary>	
Query	Retrieve all details for an experiment method	Identifier	Experiment Method Details: Method (Input, Output, Parameter types, Procedure(s), I/O types, Parameter type, ContactPerson/Organization)	
Management	Create an experiment method	Experiment Method Details		user authorization
Management	Update an experiment method (e.g., attributes, Procedures, Equipment Types, Specimen Types, Software Types, Parameters, etc)	Identifier, Experiment Method Details		user authorization
Management	Delete an experiment method	Identifier		user authorization
Management	Update experiment method status	Identifier, Status		user authorization
Management	Import Experiment Method workflow file (as template to create new Experiment Method)	ExperimentMethod File Id		user authorization
Validation	Check if experiment method meets caLIMS2 compliance requirements	ExperimentMethod Id		



# Proposed Equipment Service



Profile	Operation	Inputs	Outputs	Pre-Conditions
Query	Retrieve an Equipment by: its unique identifier, Equipment attributes (e.g., name, public identifier, equipment type, propertyID, serialNumber, model, manufacturer, vendor, location, operatingSystem, operatingSoftware, contactPerson, method type, software type, reagent type, Equipment input type, Equipment output type, status), Software Type (e.g., operatingSystem, dataCollection, operatingSoftware, analysisApplication, etc.), contactPerson (investigator) (createdBy, modifiedBy), output (data) type (e.g., gene expression, genotype, or copy number variation or file type - ab1, .fsa, .cel, .chp, xls, txt, .csv, etc.), input type (e.g., Specimen type, Reagent type, Software type, etc.), or by a combination of the above criteria with boolean OR/AND.	Identifier	List<Equipment Summary>	
Query	Retrieve all details for an Equipment	Identifier	Equipment Details: I/O types, Parameter type, ContactPerson/Organization,	
Management	Create an Equipment	Equipment Details		user authorization
Management	Update an Equipment (e.g., attributes: name, I/O Types, location, Software Types, contactPerson, globalID, propertyID, serialNumber, model, vendor, manufacturer, etc)	Identifier, Equipment Details		user authorization
Management	Delete an Equipment	Identifier		user authorization
Management	Update Equipment status	Identifier, Status		user authorization
Management	Import Equipment template file from an instance of caLIMS2 (as template to create new Equipment service instance from a contributor)	EquipmentFile Id	new Equipment template instance	user authorization
Validation/Curation	Check if Equipment template instance meets caLIMS2 compliance requirements	Equipment Id	validated Equipment instance	



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# caLIMS v2.0: timeline – rough estimate



- **Use case model - completed**
- **Logical model – completed and submitted to caDSR**
- **caLIMS v2.0.0.5M1 (sample inventory search only) – released**
- **caLIMS v2.0**
  - **Funding for FY2010: 1 lead architect + 2 full time resources**
  - **Q1 – completion of v1.0 OM and submission to caDSR-done**
  - **Q2 – Construction began (Infrastructure + Administration module (Aug. 24, 2010)**
  - **Q3 – Inventory and Report module**
  - **Q4 – Workflow module**
  - **2011 Q1/Q2 – release caLIMS v2.0 with features in scope and basic workflow plus report functionalities (caLIMS v2.0 DWG members/early adopters)**





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# caLIMS v2.0: timeline - dates




TASK	DAYS	FROM	TO
Inception + elaboration	45	3/25/2010	5/24/2010
Construction I	52	5/25/2010	8/5/2010
Transition 1	11	8/6/2010	8/20/2010
Construction II	60	8/23/2010	11/16/2010
Transition 2	10	11/17/2010	12/2/2010
Construction III	47	12/3/2010	2/8/2011
Transition 3	29	2/9/2011	3/23/2011



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# caLIMS v2 Project: NCI JIRA



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### Introduction

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By using this information system, you understand and consent to the following:

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**To create a new account in JIRA, please follow this link:**  
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### Login

Username

Not a member? Contact an Administrator to request an account.

Password

### Projects

<b>caB2B</b> (CAB2B)	 
Lead Baris Suzek	
<b>caGrid Services Security</b> (CSS)	 
Lead Braulio Cabral	
<b>caLIMS2</b> (CALIMS2)	 
Lead Sasikumar Thangaraj	
<b>caMOD</b> (CAMOD)	 
Lead Ulrike Wagner	
<b>CBIT BDA</b> (BDA)	 
Lead Steven Saksa	
<b>CTRP</b> (PO)	 



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# caLIMS v2 Project: NCI JIRA



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caLIMS2

Summary

Issues

Road Map

Change Log

Popular Issues

Calendar

Versions

Components

Agile

## Summary

### Description

LPG caLIMS2 project

URL: <https://wiki.nci.nih.gov/display/caLIMS2>

Lead: [Sasikumar Thangaraj](#)

Key: CALIMS2

### Issues: Due

[More](#)

- [CALIMS2-3](#)  
Investigate grid security integration
- [CALIMS2-4](#)  
Investigate workflow engines
- [CALIMS2-5](#)  
Investigate grid services integration

### Issues: 30 Day Summary

Issues: **116** created and **62** resolved

### Versions: Due

[More](#)

- [Backlog](#)
- [0.2](#)
- [0.1](#)

### Activity Stream

August 24 - 2:00 PM

Mike Connolly created CALIMS2-322 (Copy Button on CustomerService List page does not work.)

August 23 - 5:00 PM

Sasikumar Thangaraj created CALIMS2-321 (Reorder of fields in List of Storage Space)

Sasikumar Thangaraj created CALIMS2-320 (Add 'Create New Layout' button in Create/Update Storage Space Page)

Sasikumar Thangaraj created CALIMS2-319 (Reorder and mandatory fields in Create/Update Naming Convention Page)

Sasikumar Thangaraj created CALIMS2-318 (Display columns in List of Storage Devices)

Sasikumar Thangaraj created CALIMS2-317 (Add icons in List of Storage Devices)

Sasikumar Thangaraj created CALIMS2-316 (Add Laboratory in Create/Update Storage Device Page)

Sasikumar Thangaraj created CALIMS2-315 (Mandatory fields in Create/Update Storage Device Page)

Sasikumar Thangaraj created CALIMS2-314 (Reorder of fields in List of Software)

Sasikumar Thangaraj created CALIMS2-313 (Reorder of fields in Software Details Page)

[Show more...](#)



## caLIMS2 Wiki Home page

by [Ann Willey](#), last edited by [Sasikumar Thanagaraj](#) on Aug 23, 2010 ([view change](#))

### Contents

- [Overview of caLIMS2](#)
- [Using the caLIMS2 Wiki](#)

### Where

- [caLIMS2 Software](#)
- [caLIMS2 Development](#)
- [caLIMS2 Download](#)
- [caLIMS2 GForge project](#)
- [Report Bugs](#)

### Content

- [caLIMS2 Wiki Home](#)
- [caLIMS2 Background](#)
- [caLIMS2 Project Goals](#)
- [caLIMS2 Overview](#)
- [caLIMS2 Features](#)
- [caLIMS2 Documentation](#)
- [caLIMS2 Collaborations](#)
- [caLIMS2 Presentations](#)
- [caLIMS2 Development Working Group](#)
- [caLIMS2 Software](#)
- [caLIMS2 Communication](#)
- [NCI LIMS Consortium](#)
- [caLIMS2 Community Input](#)
- [caLIMS2 Deployment Artifacts](#)
- [caLIMS2 Contact Us](#)

## Overview of caLIMS2

The purpose of the caLIMS2 project is to create a Laboratory Information Management System (LIMS) that is interoperable within established caBIG® standards and guidelines and will track a complete laboratory workflow that uses materials from a specimen management service (e.g. caTissue) to generate experimental results for one of the caBIG® data management services (e.g. caArray). Core LIMS functions include the management of personnel, equipment, lab supplies and reagents, samples, laboratory workflow and experimentally derived metadata and data. caLIMS2 will complete the caBIG® bench to bed model by bridging the gap between biospecimen repositories, data repositories and analysis tools. The application is designed to allow easy customization by users and to facilitate integration with laboratory equipment, analytical tools and data sources. caLIMS2 is highly flexible, making it suitable for use by research labs, high throughput core facilities and public health labs. caLIMS2 will help further translational cancer research through the organization of laboratory workflow, tracking of specimens, acquisition of laboratory data and metadata, and the appropriate sharing and dissemination of the data to support subsequent analyses. More information and project details can be found using the following links. If you have questions, please contact [Robert Clifford](#) or [Jenny Kelley](#).

- [caLIMS2 Project Goals](#)
- [Project Background](#)
- [Project Overview](#)
- [Product Features](#)
- [Project Documentation](#)
- [Project Collaborations](#)
- [caLIMS2 Presentations](#)
- [caLIMS2 Software and Development](#)
- [caLIMS2 Development Working Group](#)
- [caLIMS2 Communication](#)
- [caLIMS2 Community Input](#)
- [caLIMS2 Deployment Artifacts](#)
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## Using the caLIMS2 Wiki

This is the wiki home page of **caLIMS2** (Cancer Laboratory Information Management System 2). Project team members may edit this page and add more pages. Any user may add a comment and we welcome feedback!



## caLIMS2 Development Working Group

Added by [Jenny Kelley](#), last edited by [Jenny Kelley](#) on Aug 17, 2010 ([view change](#))

### Contents

- [caLIMS2 Development Working Group Overview](#)
  - [Meeting Information](#)
  - [Community Input](#)
  - [Special Interest Working Groups \(SIGs\)](#)
  - [Design artifacts and detailed documentation](#)
- [caLIMS2 Development Group Members:](#)

### Wiki Content

- [caLIMS2 Wiki Home](#)
- [caLIMS2 Background](#)
- [caLIMS2 Project Goals](#)
- [caLIMS2 Overview](#)
- [caLIMS2 Features](#)
- [caLIMS2 Documentation](#)
- [caLIMS2 Collaborations](#)
- [caLIMS2 Presentations](#)
- [caLIMS2 Development Working Group](#)
- [caLIMS2 Software](#)
- [caLIMS2 Communication](#)
- [NCI LIMS Consortium](#)
- [caLIMS2 Community Input](#)
- [caLIMS2 Contact Us](#)

## caLIMS2 Development Working Group Overview

The goal of the caLIMS2 project working group is to provide input and guidance to the development of an open source Laboratory Information Management System (LIMS) that is caBIG® silver compliant and will be easy to customize and extend to support multiple disciplines (genomics, proteomics, etc.) and laboratory types - basic research, clinical research, public health, and core facilities. Communities interested in having input to the design and development of the application or who have an interest in being an early adopter are welcome to join!

To join the working group, send email request with full name, affiliation, and email address to [Jenny Kelley](#) or to [Bob Clifford](#).

## Meeting Information

There are regular working group meetings on the first and third Tuesdays of the month at 1 pm Eastern time. Communication is through these meetings and meeting notes, this wiki, and the NCI LIMS Consortium List-serve. We anticipate having a community Forum site set up within this Wiki site sometime in the near future. Development meeting notes can be found on our GForge site using this link: [caLIMS2 DWG meeting notes](#). If you would like more information or would like to join the DWG, please contact [Jenny Kelley](#) or [Bob Clifford](#).

## Community Input

For additional ways to contribute input to the caLIMS2 Development team, please see the: [caLIMS2 Community Input page](#). We are now gathering laboratory workflow examples from our community which will guide the development team as they create template laboratory workflows for the caLIMS2.

## Special Interest Working Groups (SIGs)

More information on the caLIMS2 SIGs can be found on the SIG pages:

[Interface SIG \(ISIG\)](#)

[Business Information Management, Object Model, Analysis, Barcode & RF SIGS](#)

## Design artifacts and detailed documentation

Design artifacts and detailed information can be found on the [Documentation page](#).

## caLIMS2 Development Group Members:

Project/Affiliation	Name	Email
---------------------	------	-------



# caLIMS2

# caLIMS v2.x Iteration 1 Welcome



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Welcome to caLIMS



## Login

User Name:

Password:

[Can't access your account?](#)  
[Request user account](#)

Login

caLIMS2 version 1.0 will be an open source basic Laboratory Information Management System which will support programmatic integration with caBIG® applications and services - for example caArray and caTissue. The caLIMS2 core application will provide the functions needed for basic research laboratory operations. These include functions for managing users and groups, equipment, key reagents and supplies, specimens and their derivatives, laboratory workflow, experimental results, quality control, and reports. An internal adaptive workflow engine will enable users to easily create new and/or modify existing laboratory 'template' workflows to fit the specific needs of their laboratories; in addition, these workflow templates can be shared with other caLIMS2 instances. The core caLIMS2 v1.0 application will support the generic molecular biology domain; however, the flexible design will enable later releases of caLIMS2 to be customized for additional specific domains, such as next generation sequencing, nanoparticle characterizations, model organism research, or proteomics, by the integration with existing caBIG® applications or the addition of new modules.

## Features

### Administration Module

- ▶ Create Organizations/Laboratories
- ▶ Create Persons/Contact Information/Roles
- ▶ Create Collaborations
- ▶ Create Equipment/Software
- ▶ Create Locations/Storage Space
- ▶ Create Customer Accounts
- ▶ Create Naming Conventions

## Latest News

Work on CII II will begin end of August.

Construction 1 phase completes August 20.

Follow caLIMS2 development progress on the caLIMS2 wiki.

Interested parties are invited to join the caLIMS2 Development Working Group.

The caLIMS2 development team welcome submission of laboratory experiment workflows.

DWG meeting notes and presentations are available.

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[ACCESSIBILITY](#)

[APPLICATION SUPPORT](#)







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# caLIMS v2.x I1: SU access to all



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[caLIMS2](#) [Administration](#) [Customer Service](#)

User logged as: **superuser1** | [Logout](#)

User Home Page

[Help](#)

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Today is: 8/25/10

Welcome: Super User

Your Current Projects:

Laboratory Updates:

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[PRIVACY NOTICE](#)

[DISCLAIMER](#)

[ACCESSIBILITY](#)

[APPLICATION SUPPORT](#)





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# caLIMS v2.x I1 security SU1/CR



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


























caLIMS2 Administration Customer Service

User logged as: **superuser1** | [Logout](#)

## List Customer Request Page

[Help](#)

Action	Display Name	Description	Status	Type	Customer Name	Customer Account	Submission Date	Lab Final Approval Date	Completed Date	Invoice Date	Payment Date
      	Demo R-004	Demo request R-004.	Completed	Internal	User	Account1	7/31/10	8/7/10	8/4/10	8/8/10	8/21/10
      	Demo R-003	Customer request from an external laboratory.	Approval Pending	External	User	Demo University 2 Account 1	8/15/10				
      	Demo R-002	Customer request R-002 for SNP6 Assay - SNP and CNV.	Approval Pending	Internal	User	University1 Account1	8/22/10				
      	Demo R-001	Customer Request R-001 for demonstration.	Approved	Internal	User	University1 Account1	8/21/10				
      	Customer req 2		Approved	External	User	Demo University 2 Account 1					

[Manage Customer Requests](#)

[Create New Customer Request](#)

[CONTACT US](#)

[PRIVACY NOTICE](#)

[DISCLAIMER](#)

[ACCESSIBILITY](#)

[APPLICATION SUPPORT](#)





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# caLIMS v2.x I1- security C1/CR



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Laboratory of Population Genetics 

caLIMS2 Customer Service

User logged as: **customer1** | [Logout](#)

List Customer Request Page

 Help

Action	Display Name	Description	Status	Type	Customer Name	Customer Account	Submission Date	Lab Final Approval Date	Completed Date	Invoice Date	Payment Date
     	Demo R-004	Demo request R-004.	Completed	Internal	User	Account1	7/31/10	8/7/10	8/4/10	8/8/10	8/21/10

[Manage Customer Requests](#) [Create New Customer Request](#)

[CONTACT US](#) [PRIVACY NOTICE](#) [DISCLAIMER](#) [ACCESSIBILITY](#) [APPLICATION SUPPORT](#)





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# caLIMS v2.x I1 LabManager- Org

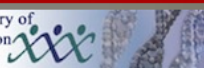


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User logged as: **labmanager1** | [Logout](#)

## List of Organizations

[Help](#)

Action	Display Name	Description	Status	Type	DUNS Number	Identifier Number	Is Tax Exempt?	Legal Category Type	Location	Parent Organization
	CCR	More than 250 scientists and clinicians working in intramural research at NCI.	Active	Federal Government			true	Federal Government	Bldg. 10	NCI
	Demo University2	Another University for demonstration.	Active	University	343343343		false	Education	Demo University 2 Location 1	
	Demo University1	A University for demonstration purposes.	Active	University	131131131	242242424	false	Education	Demo University1 Location1	
	LP6	A Laboratory in the NCI/CCR that utilizes genetic analysis to gain insight into biologic processes.	Active	Federal Government			true	Federal Government	NIH Bldg. 41	CCR
	NCI	NCI leads a national effort to eliminate the suffering and death due to cancer.	Active	Federal Government			true	Federal Government	Bldg. 10	NIH
	NIH	NIH - seek fundamental knowledge about nature & behavior of living systems; reduce burden of disease	Active	Federal Government	121121121		true	Federal Government	NIH-Bethesda	
	Test Organization1	Demo test organization1	Active	Test Organization Type	111111111	demo1dnumber	true	Federal Government	Bldg. 10	NIH
	Test Org2		Active	Institution					EJ2115	Test Organization1

[Manage Organizations](#)

[Create New Organization](#)

[CONTACT US](#)

[PRIVACY NOTICE](#)

[DISCLAIMER](#)

[ACCESSIBILITY](#)

[APPLICATION SUPPORT](#)





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# caLIMS v2 - communication



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NCI Wiki

New Account | Helpful Tip

> ICR - caLIMS2 > caLIMS2 Wiki Home page

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by Ann Wiley, last edited by Sasikumar Thangaraj on Aug 23, 2010 (view change)

ents

- Overview of caLIMS2
- Using the caLIMS2 Wiki

ware

- caLIMS2 Software
- caLIMS2 Development
- caLIMS2 Download
- caLIMS2 GForge project
- Report Bugs

Content

- caLIMS2 Wiki Home
- caLIMS2 Background
- caLIMS2 Project Goals
- caLIMS2 Overview
- caLIMS2 Features
- caLIMS2 Documentation
- caLIMS2 Collaborations
- caLIMS2 Presentations
- caLIMS2 Development Working Group
- caLIMS2 Software
- caLIMS2 Communication
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- caLIMS2 Deployment Artifacts
- caLIMS2 Contact Us

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<https://wiki.nci.nih.gov/x/2oMYAQ>

**caLIMS v2 NCI GForge site:**

<http://gforge.nci.nih.gov/projects/calims2>

**caLIMS v2 JIRA:** <https://tracker.nci.nih.gov>

**Contacts:**

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caLIMS2

## caLIMS v2: Update end



- Questions, suggestions, comments, etc.