

CAGRID PORTAL 2.2

User's Guide



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caGrid 1.3 License

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Contents

Document Change History	ii
Illustrations	vii
About This Guide	1
Purpose.....	1
Audience.....	1
Prerequisites	1
Topics Covered.....	2
Text Conventions Used	2
Credits and Resources	3
Chapter 1 About the caGrid Portal.....	4
Purpose of the caGrid Portal	4
caGrid Portal Features.....	4
Discovery.....	4
Service Metadata Exploration	5
Data Service Query	6
Accessing caBIG® Community Portlets.....	6
Browsing caBIG® Tools	6
Query Sharing	6
caGrid Account Registration	7
Grid Status Overview	8
News and Events	8
Visual Overview of the caGrid Portal Home Page.....	9
Chapter 2 Registering and Logging In	11
About Registration	11
Registering for a Login Account.....	12
Logging in with Your caGrid Portal Account.....	14
Logging in with Your NIH Account.....	16
About the Welcome Menu	16
Chapter 3 Using the Map Portlet.....	17
About the Map Portlet	17
Selecting a Category View.....	18
Selecting a Service, Participant, or POC.....	19
Selecting a Data Service.	19
Selecting an Analytical Service.	21
Selecting a Participant Institute.....	22
Selecting a Hosting Research Center.....	24
Selecting a POC.....	25
Chapter 4 Using the Discovery Portlet.....	27
About the Discovery Portlet	27
Viewing Data in a List or a Map	28
Using the List View Subtab	28
Using the Map View	31
Searching for Services, Participants, and POCs	32
Searching for a Service	32
Searching for a Participant.....	36
Searching for a POC	37
Viewing Details for Services, Participants, and POCs.....	39

Viewing Details for Services	39
Viewing Details for a Participant	42
Viewing Details for a POC	43
Using the Service Diagnostics Portlet	43
About the Service Diagnostics Portlet.....	43
Running Diagnostic Tests	45
Interpreting Results of Diagnostic Tests	45
Chapter 5 Using the Data Service Query Portlet	47
About the Data Service Query Portlet	47
Query-Building Scenarios.....	48
Scenario 1: Starting without a URL or Query.....	48
Scenario 2: Starting with a URL but No CQL Query.....	49
Scenario 3: Starting with a URL and a CQL Query	49
Building a Query Using the Query Builder Tool.....	50
Building CQL Queries	50
Building DCQL Queries.....	55
About the History Tab	65
Working with Shared Queries.....	67
Sharing a Query	67
Searching for a Shared Query	69
Chapter 6 Using the Community Portlet.....	71
About JSR 168 and the Liferay Portal	71
Accessing the Community Portlet.....	71
Deploying a Community Portlet.....	72
Chapter 7 Using Other Portal Features.....	73
Using the News Portlet	73
About the caGrid Links Portlet.....	75
Using the caGrid Status Portlet	76
Viewing Details for a Recently Registered Service or Participant	77
Viewing a List of Participants or Services	77
About the Calendar Portlet	78
Chapter 8 Using the caBIG® Tools Portlet	81
About the caBIG® Tools Portlet	81
Sorting caBIG® Tools	82
Viewing caBIG® Tool Details	85
Index	87

Illustrations

Figure 1-1. caGrid Portal home page.....	9
Figure 2-1. Register links	12
Figure 2-2. Registration page	13
Figure 2-3. Successful login message	14
Figure 2-4. Welcome message with Logout link	15
Figure 2-5. Welcome menu.....	16
Figure 3-1. Map portlet.....	17
Figure 3-2. Categories list.....	18
Figure 3-3. Callout balloon for a data service center	20
Figure 3-4. Discovery Portlet showing details for a selected data service	20
Figure 3-5. Callout balloon for a selected participant.....	22
Figure 3-6. Discovery portlet showing details for a participant institute	23
Figure 3-7. Callout balloon for an analytical service center	24
Figure 3-8. List of hosting research centers with More Details links	25
Figure 4-1. Directory tab > List View subtab – results for All Services category.....	29
Figure 4-2. Map View subtab	31
Figure 4-3. Services subtab with the Simple search mode selected	33
Figure 4-4. Services subtab with Advanced search mode selected	33
Figure 4-5. Discovered services	34
Figure 4-6. Services subtab with the EVS search mode selected	35
Figure 4-7. Results of an EVS search.....	35
Figure 4-8. Discovered services	36
Figure 4-9. Participants subtab	37
Figure 4-10. POCs subtab	38
Figure 4-11. Details for a selected data service.....	39
Figure 4-12. Selecting a UML class for a query.....	40
Figure 4-13. Details for a selected analytical service.....	41
Figure 4-14. Details for a selected participant	42
Figure 4-15. Details for a selected POC	43
Figure 4-16. Service Diagnostics portlet on the Services tab	44
Figure 4-17. URL field in the Service Diagnostics portlet	45
Figure 4-18. Successful result in the Service Diagnostics portlet	45
Figure 4-19. Unsuccessful result in the Service Diagnostics portlet	46
Figure 5-1. Starting a query from a selected result.....	48
Figure 5-2. Working query	49
Figure 5-3. Query Builder subtab with selected UML class <code>ArrayDesign</code>	50
Figure 5-4. Attributes and associations for selected class.....	52
Figure 5-5. Specifying a predicate and value for a selected attribute	53
Figure 5-6. Query Builder subtab with added criterion.....	53
Figure 5-7. Query XML tab	54
Figure 5-8. History tab with query information	54
Figure 5-9. Query Builder specifying a service and URL	56
Figure 5-10. Services with the same UML class to aggregate from	56
Figure 5-11. Summary of data services selected for aggregation	57
Figure 5-12. History tab with query information	57
Figure 5-13. Query Builder specifying a service and URL	58
Figure 5-14 Query Builder tool with selected <code>NucleicAcidSequence</code> class.....	58

Figure 5-15 Tree view of attributes and associations for the <code>NucleicAcidSequence</code> class	59
Figure 5-16 Query criterion tree view for caBIO <code>NucleicAcidSequence</code> class	60
Figure 5-17 Service information for semantically equivalent UML class	60
Figure 5-18 Selecting the join condition	61
Figure 5-19 Entering criterion value for <code>Organism scientificName</code> attribute	61
Figure 5-20 Enter criterion value for <code>Gene name</code> attribute	62
Figure 5-21 Complete federated query for caBIO <code>NucleicAcidSequence</code> class	62
Figure 5-22 XML federated query for caBIO <code>NucleicAcidSequence</code> class	63
Figure 5-23 History Tab with the running DCQL query	63
Figure 5-24 Results of federated query for caBIO <code>NucleicAcidSequence</code> class	64
Figure 5-25. Results tab showing query results	65
Figure 5-26. Form for adding a query name and description	68
Figure 5-27. Saved query	68
Figure 5-28. Shared Queries tab > Find Shared Queries subtab – Search form	69
Figure 6-1. Community Portlet, caBIO Portlet example	71
Figure 7-1. News links	74
Figure 7-2. News page	75
Figure 7-3. Status portlet	76
Figure 7-4. Calendar portlet	78
Figure 8-1. Tools portlet	82
Figure 8-2. caBIG® tools sorted by Area of Focus	83
Figure 8-3. caBIG® tool details	86

About This Guide

This section introduces you to the *caGrid Portal 2.2 User's Guide* and provides an orientation to using the guide. It also includes support contact information.

Topics in this chapter include:

- *Purpose* on this page
- *Audience* on page 1
- *Prerequisites* on page 1
- *Topics Covered* on page 2
- *Text Conventions Used* on page 2
- *Credits and Resources* on page 3

Purpose

This guide introduces you to the caGrid Portal. It explains how to use the portal features to do the following:

- Discover caGrid services, caBIG® participants, and caGrid points of contact
- Explore the service metadata of a discovered service
- Build queries using the CQL and DCQL query languages
- Share queries and search for shared queries
- Access community portlets
- Register for an account so that you can interact with secure caGrid services
- View the status of caGrid services
- View caGrid-related news using the portal or using an RSS 2.0-compliant news reader
- View a calendar of caGrid-related events.

Audience

This guide is intended for the following users:

- Non-developer members of the caBIG® community
- caGrid service developers
- Anyone interested in caBIG® and caGrid

Prerequisites

To get the most out of this guide, you should have the following skills:

- Ability to browse the Internet using a Web browser
- Understanding of caGrid metadata concepts (for building queries)

Topics Covered

This brief overview explains what you will find in each chapter and appendix.

- Chapter 1, *About the caGrid Portal* (p. 4), provides an overview of the caGrid Portal and its feature set.
- Chapter 2, *Registering and Logging In* (p. 11) covers the registration process and the procedures for logging in as a new portal user or an NIH user.
- Chapter 3, *Using the Map Portlet* (p. 17), explains how to use the Map portlet to select a service or institution and link to more detailed information.
- Chapter 4, *Using the Discovery Portlet* (p. 27), explains how to use the Discovery portlet to browse, search, and view details for caGrid services, caBIG® participants, and caGrid POCs.
- Chapter 5, *Using the Data Service Query Portlet* (p. 47), explains how to use the Data Service Query portlet to build and share queries.
- Chapter 6, *Using the Community Portlet* (p. 71), explains how to access portlets developed by the caBIG® community within the caGrid Portal.
- Chapter 7, *Using Other Portal Features* (p. 73), covers the News, caGrid Links, Grid Status, and Calendar portlets.
- Chapter 8, *Using the caBIG® Tools Portlet* (p. 81), explains how to use the caBIG® Tools portlet to sort and browse caBIG® tools.

Text Conventions Used

This section explains conventions used in this guide. The various typefaces represent interface components, keyboard shortcuts, toolbar buttons, dialog box options, and text that you type.

Convention	Description	Example
Bold	Highlights names of option buttons, check boxes, drop-down menus, menu commands, command buttons, or icons.	Click Search .
<u>URL</u>	Indicates a Web address.	http://domain.com
text in SMALL CAPS	Indicates a keyboard shortcut.	Press ENTER.
text in SMALL CAPS + text in SMALL CAPS	Indicates keys that you press simultaneously.	Press SHIFT + CTRL.
<i>Italics</i>	Highlights references to other documents, sections, figures, and tables.	See <i>Figure 4.5</i> .
<i>Italic boldface monospace type</i>	Represents text that you type.	In the New Subset text box, enter <i>Proprietary Proteins</i> .

Convention	Description	Example
Note:	Highlights information of particular importance.	Note: This concept is used throughout this document.
{ }	Surrounds replaceable items.	Replace {last name, first name} with the Principal Investigator's name.

Credits and Resources

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⁴ . 5AM Solutions	⁵ . Lockheed Martin Management System Designers	

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Chapter 1 About the caGrid Portal

This chapter introduces you to the caGrid Portal and describes its feature set.

Topics in this chapter include:

- *Purpose of the caGrid Portal* on this page
- *caGrid Portal Features* on this page
- *Visual Overview of the caGrid Portal Home Page* on page 9

Purpose of the caGrid Portal

The caGrid Portal is a Web-based application that enables you to discover and interact with the services that are available on the caGrid infrastructure. The portal serves as the primary visualization tool for the caGrid middleware and provides a standards-based platform for hosting caBIG®-related tools. It also serves as a caBIG® information source. Using the caGrid portal, you have instant access to information about caBIG® participants, caGrid points of contact (POCs), and caGrid-related news and events.

caGrid Portal Features

The following sections discuss the various caGrid Portal features:

- *Discovery* on this page
- *Service Metadata Exploration* on page 5
- *Data Service Query* on page 6
- *Accessing caBIG® Community Portlets* on page 6
- *Browsing caBIG® Tools* on page 6
- *Query Sharing* on page 6
- *caGrid Account Registration* on page 7
- *Grid Status Overview* on page 8
- *News and Events* on page 8

Discovery

One of the goals of the caGrid infrastructure is to enable you to easily discover and access services. To achieve this goal, caGrid services register with a central index service. This service allows other applications to locate caGrid services and retrieve the necessary information for interacting with those services.

The caGrid Portal uses caGrid component APIs to provide an interface that you can use to query information gathered from one or more index services. Regardless of whether you are a service developer or non-developer, you can use this interface to determine how to use and benefit from caGrid.

In addition to service information, the portal also provides information about caBIG® participant institutions and caGrid points of contact (POCs). The goal is to enable you to quickly determine who the point of contact is for specific activities and easily obtain contact information for that person.

The process of locating services, participants, and POCs is known as *discovery*. The portal provides the following modes of discovery: *map view*, *directories*, *keyword search*, and *EVS search*. The following subsections describe these modes.

Once you discover a service, you can also run diagnostic tests on it to check the service's status in the caGrid Portal, availability of the service, service metadata, and index service.

Map View

The portal home page displays a map of the U.S. that shows the geographic location of services and participant institutions. You can click the icon for a service or institution and link to more detailed information.

Categories

Services, participants, and POCs are grouped into categories. You can browse these categories and click hyperlinks that lead to more detailed information.

Keyword Search

The portal provides an intuitive, keyword search interface that enables you to enter one or more keywords and match them against one or more fields.

EVS Search

This feature allows the user to enter free text that the Portal matches against concepts found in the NCI Thesaurus. As you type characters into the search field, the Portal presents candidate concepts. After you select a concept, the Portal starts the search. Services whose metadata refer to the concept or any sub-concept are presented in the search results.

Service Metadata Exploration

To support the caBIG® goals of syntactic and semantic interoperability, caGrid services expose a rich, standard set of metadata. This metadata not only describes the operations that the services support; it also links the data types that those operations use to concepts defined in the NCICB Enterprise Vocabulary Services (EVS), common data elements defined in the Cancer Data Standards Repository (caDSR), and XML schemas defined in the Global Metadata Exchange (GME) service.

caGrid services that support the caGrid Query Language (CQL) also expose an XML representation of the UML domain model that the service supports. This model is also linked to the EVS, caDSR, and GME. While caGrid services support standard Web service APIs for retrieving metadata, the caGrid project provides client API components that facilitate the process.

The portal uses caGrid client APIs to build an interface that enables you to explore caGrid service metadata. You can view the semantic descriptions that come from

the EVS, the data type descriptions from the caDSR, and XML schemas that are registered with the GME. The interface makes it easier for you to determine whether a service meets your needs and what is necessary to interact with the service.

Data Service Query

caGrid services that support CQL are known as *data services*. They expose a UML domain model, support a query operation that processes CQL queries against that domain model, and return XML documents that contain serialized instances of the UML classes defined in the domain model. These serialized instances conform to the XML schemas that are registered with the GME.

The portal provides an interface that enables you to select a service and target UML class, build a query, execute the query, view the results in tabular form, and export to a Microsoft Excel or XML document. While using the discovery tool or while exploring service metadata, you can select the service and UML class to be queried. You can then use a graphical query-building interface to construct CQL or DCQL, or you can manually type the query text.

If you are a registered caGrid Portal user (discussed under *caGrid Account Registration* on this page), the portal maintains a complete history of your queries so that you can always retrieve and work with previously executed queries. The results of all queries that you execute during a single session (while your browser is open) are available for viewing.

Accessing caBIG® Community Portlets

Developers in the caBIG® community may create Java Specification Request 168 (JSR 168) compliant portlets and then deploy them to the caGrid Portal. This provides an instant hosting environment for custom applications that may be of value to the entire caBIG® community.

Browsing caBIG® Tools

To increase the cancer research community's access to key bioinformatics tools, platforms, and data, the caGrid Portal exposes the same inventory of applications, software tools, database technologies, and Web-based applications that appear on the [caBIG® Community Website](#). As on the caBIG® website, caGrid users can search for these tools based on name, compatibility level, keyword, area of focus, workspace, and technical specifications.

Query Sharing

Although data service domain models are linked to semantic metadata and data type specifications, you still need to do a fair amount of exploring to construct useful queries. If you have query-building knowledge, the portal enables you to share that knowledge with the rest of the community. Any portal user can publish CQL queries and provide documentation to accompany the query. Others can search for CQL queries based on the target service, the target UML class, the creator of the query, or the associated name and description of the query.

For more information on queries, see *Using the Data Service Query Portlet* on page 47.

caGrid Account Registration

The caGrid security infrastructure, known as GAARDS, uses an authentication approach that is based on Public Key Infrastructure (PKI). PKI requires that users have an X.509 certificate and private key, also known as *grid credentials*.

The caGrid Dorian service is used to provide users with grid credentials. To obtain grid credentials, you must register either with the Dorian service or another Identity Provider (IdP) that has established a trust relationship with Dorian.

Secure caGrid services apply an authorization policy to incoming requests based on the identity of the client (*i.e.*, the user who is making the request). The identity is determined through the authentication process by inspecting the client's grid credentials. So, in order to interact with secure services, caGrid users need to obtain grid credentials.

While nearly all the functionality that the portal provides is available to un-authenticated users, only authenticated users can share queries and maintain a query history across browser sessions. The portal uses GAARDS to authenticate users. So, to use the query sharing and persistent query history features, you need to obtain grid credentials.

The portal provides an interface that enables you to register for an account with the caGrid Dorian service that is hosted by the NCICB. This service provides a Level of Assurance 1 (LOA1), which means anyone can request an account and the request will automatically be approved. Once your request is approved, you can provide log in to the portal using your username and password. The portal will then use the grid credentials obtained from Dorian when interacting with secure caGrid services.

Grid Status Overview

The caGrid Portal provides a quick, visual description of the scale and activity of caGrid. The map on the front page of the portal not only indicates where services are being hosted, but whether those services are currently running. Icons of various colors indicate the service status.

In addition to the map, a status portlet presents up-to-date counts of all participants, all services, data services, and analytical services. It also provides links to more information about the five most recently registered services.

News and Events

A news portlet on the front page of the portal displays a running list of the latest caGrid-related news items. You can click each item to link to the full news article. You can also click a link to subscribe to the news feed using your browser or any other RSS 2.0-compliant news feed reader.

The portal provides a news feed editor application that is available to the portal administrator. This application can be used to maintain one or more RSS news channels.

The portal home page also includes a full-featured calendar application. This application enables you to browse through caGrid-related events by day, week, month, and year. A portal administrator can import and export calendar events using the standard iCal format, which is described at <http://tools.ietf.org/html/rfc2445>.

Visual Overview of the caGrid Portal Home Page

The caGrid Portal is located at <http://cagrid-portal.nci.nih.gov/web/guest/home>. This address launches the portal home page, shown in Figure 1-1.

Each numbered callout represents one of the features discussed in *caGrid Portal Features* on page 4.

The screenshot shows the caGrid Portal home page with the following features highlighted by numbered callouts:

- 1**: caGrid Portal logo and navigation tabs (HOME, SERVICES, TOOLS, COMMUNITY, NEWS, REGISTER).
- 2**: caGrid Status section showing the five newest services.
- 3**: Gateway to the cancer Biomedical Informatics Grid section, including a map of the United States with service locations.
- 4**: Portal Sitemap section with links to Home, Login, Help, Contact, Privacy, Accessibility, Application Support, and Disclaimer.
- 5**: Calendar view for October 2, 2008, showing 0 results.
- 6**: Welcome! dropdown menu.
- 7**: News section with links to Subscribe to caGrid News Feed and recent news items.
- 8**: caGrid Links section with links to caGrid Portal Users Guide, caGrid Portal Wiki Pages, caBIG Community Website, caGrid Website, and caGrid Wiki.

The footer contains links for CONTACT US, PRIVACY NOTICE, DISCLAIMER, ACCESSIBILITY, APPLICATION SUPPORT, and the FIRSTGOV logo.

Figure 1-1. caGrid Portal home page

For a description of each numbered callout in Figure 1-1, see Table 1-1 on page 10.

Callout Number	Feature/Description
1	<p>Main Navigation Bar with four links:</p> <ul style="list-style-type: none"> • Home: Returns to the home page from any other portal page. • Services: Opens the Tools page, where you can use the Discovery and Data Service Query tools to search for services, participant institutions, and POCs, and run diagnostic tests on services. You can also build and share queries from this page. • Tools: A directory of caBIG® tools is provided here. • Community: Access community developed portlets. • News: Displays a News page with announcements and links to caGrid-related news. • Register page: Enables you to register as a caGrid Portal user.
2	caGrid Status portlet: Provides a quick, visual description of the scale and activity of caGrid.
3	Map portlet with legend: Shows the geographic location of services and participant institutions. You can click the icon for a service or institution and link to more detailed information.
4	Portal Sitemap: Click any link to go to that page of the portal.
5	Calendar: Enables you to browse through caGrid-related events by day, week, month, and year.
6	Log In and Register links: Links for logging in with your existing account, or registering as a caGrid Portal user.
7	News portlet: Enables you to link to caGrid-related news stories and subscribe to the caGrid News Feed.
8	caGrid Links portlet: Lists links to external caGrid-related sites. Each link destination opens a new window or tab.

Table 1-1. Description of feature callouts in Figure 1-1

Chapter 2 Registering and Logging In

Although you can freely browse and use the caGrid Portal without logging in to an established account, consider becoming a *registered* user. This chapter explains the benefits of registration, the procedure for registering, and the procedures for logging in as a new portal user or an NIH user.

Topics in this chapter include:

- *About Registration* on this page
- *Registering for a Login Account* on page 12
- *Logging in with Your caGrid Portal Account* on page 14
- *Logging in with Your NIH Account* on page 16
- *About the Welcome Menu* on page 16

About Registration

As discussed in *caGrid Account Registration* on page 7, becoming a registered caGrid Portal user gives you Grid credentials so that you can interact with caGrid services. If you are a registered user, the portal maintains your query history from previous sessions and enables you to share queries with other users. In addition, future releases of the portal will enable you to further customize your user experience.

Note: If you already have a login account through the National Institutes of Health (NIH), you can log in to the portal using your existing credentials. For more information, see *Logging in with Your NIH Account* on page 16.

Registering for a Login Account

To register for a caGrid Portal login account, follow these steps:

1. Click either of the following **Register** links:
 - The link appearing on the main navigation toolbar, or
 - The link appearing in the upper right of the home page.

Figure 2-1 shows pointers to both links.

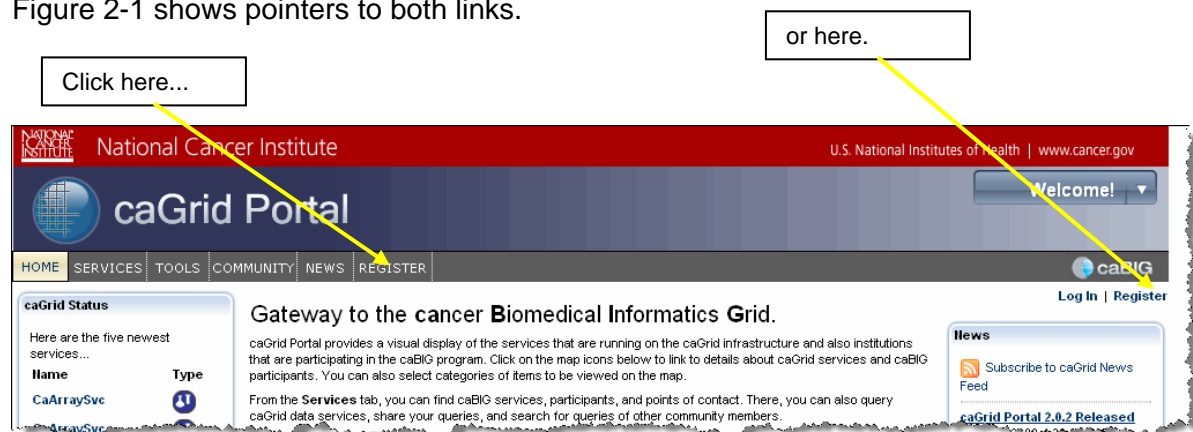


Figure 2-1. Register links

The Registration page appears, as shown in Figure 2-2.

Registration

Why Register?
 If you have an NIH username and password, then you do not need to register. You can just select the NCICB AuthenticationService IdP on the [Log In screen](#). If you don't have an NIH account then you will need to register in order to take advantage of some of the portal's features, e.g. sharing queries and interacting with secure caGrid services. Registering for an account here will enable you to log in to the portal using the NCICB Dorian Identity Provider. You cannot use this account to log in to the portal using the NCICB AuthenticationService Identity Provider.

Username Constraints:
 Must be between 4 and 15 characters in length.

Password Constraints:
 Must be between 10 and 20 characters and CANNOT contain a dictionary word and MUST contain at least one upper case letter, at least one lower case letter, at least one number, and at least one symbol (~!@#\$\$%^&*()_+={}|;,<>,.,?).

First Name: *

Last Name: *

Username: *

Password: *

Email: *


Phone: *

Organization: *


Street Address 1: *

Street Address 2: *

City: *

State: 

Postal Code: *

Country:  *

* Indicates that a field is required.

Figure 2-2. Registration page

2. Complete the registration fields.

Note: Pay special attention to the password constraints. A password cannot be a dictionary word and must be constructed as follows:

Length: 10 to 20 characters (10-character minimum)

Characters: at least one uppercase letter, one lowercase letter, one number, and one of the following symbols:

~!@#\$%^&*()_{}[]|;,<>,.,?

3. When you are finished, click **Submit**.

- If your username or password did not conform to the required constraints, an invalid username or password message appears in red.
- If your submission was successful, the following message appears in green: *Your account was approved, your current account status is Active.*

Note: Although you are still on the Registration page, do not click **Submit** again if you received a successful confirmation message.

4. Do either of the following:

- Click the **Home** link on the navigation bar to return to the home page, or
 - Click the **Log In** link to log in using the account that you just created.
5. Log in by following the instructions in *Logging in with Your caGrid Portal Account* on page 14.

Logging in with Your caGrid Portal Account

To log in with your caGrid Portal (non-NIH) account, follow these steps:

1. If you are not currently viewing the home page, click the **Home** link on the navigation bar.
2. Click the **Log In** link in the upper right corner of the page.
3. Enter your username and password.
4. Ensure that the **Identity Provider** field shows **NCICB Dorian**.
5. Click **Log In**.
 - If your login is not recognized, the following message appears:
Invalid username and/or password.
 - If your login was successful, the following message appears:
You are logged in as: {your name}

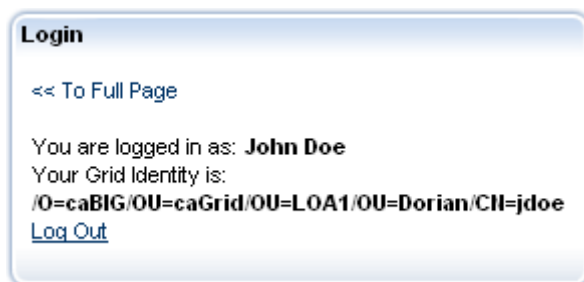


Figure 2-3. Successful login message

6. Click the **<< To Full Page** link to return to the home page.

In the upper right corner of the home page, a welcome message confirms that you are logged in.

Note: At the end of your session, be sure to log out by (1) clicking the **Log Out** link below the welcome message, or (2) clicking the drop-down arrow to the right of the Welcome message and selecting **Sign Out**.



Figure 2-4. Welcome message with Logout link

Logging in with Your NIH Account

To log in with your NIH account, follow these steps:

1. If you are not currently viewing the home page, click the **Home** link on the navigation bar.
2. Click the **Log In** link in the upper right corner of the page.
3. Enter your username and password.
4. Ensure that the Identity Provider field shows **NCICB Authentication Service**.
5. Click **Log In**.
 - If your login is not recognized, the following message appears:
Invalid username and/or password.
 - If your login was successful, the following message appears:
You are logged in as: {your name}
6. Click the **<< To Full Page** link to return to the home page.

In the upper right corner of the home page, a welcome message confirms that you are logged in. (See Figure 2-4 on page 15.)

Note: At the end of your session, be sure to log out by clicking the **Log Out** link below the welcome message.

About the Welcome Menu

The Welcome message in the upper right corner of the caGrid Portal includes a drop-down menu with four commands:

- **Home:** Returns to the home page
- **Sign Out:** Logs you out of the caGrid Portal
- **My Places:** Links to public pages.

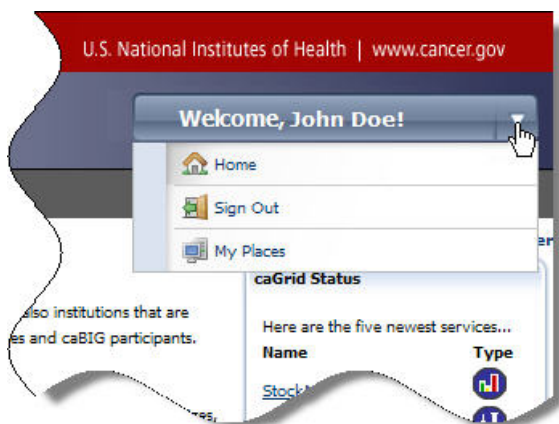


Figure 2-5. Welcome menu

Chapter 3 Using the Map Portlet

As discussed in Chapter 1, the caGrid Portal home page includes a Map portlet that shows the geographic location of services and participant institutions in the United States. This chapter explains how to use the Map portlet to select a service or institution and link to more detailed information.

Topics in this chapter include:

- *About the Map Portlet* on this page
- *Selecting a Category View* on page 18
- *Selecting a Service, Participant, or POC* on page 19

About the Map Portlet

The Map portlet provides a visual perspective of caGrid services, participants, and POCs. It serves as an access point for getting started with discovery.

As shown in Figure 3-1, the map is preceded by a **Categories** drop-down list and a legend explaining the map icons. The next two sections explain the list and the icons.

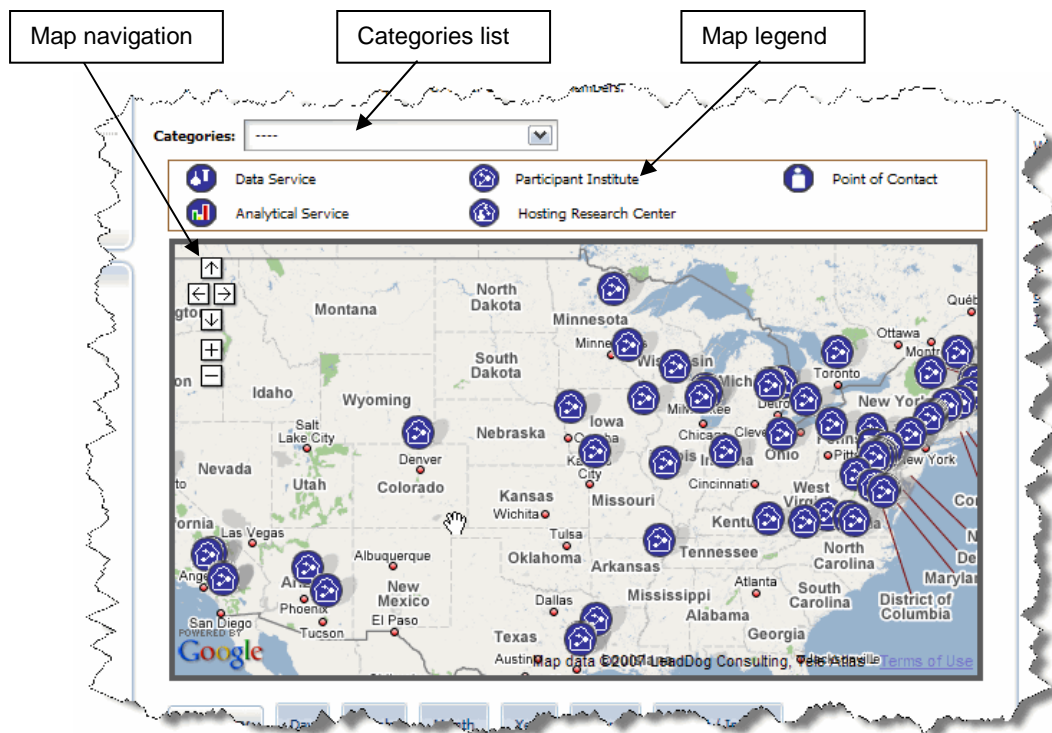



Figure 3-1. Map portlet

The Map portlet uses the Google Maps API and has standard Google Maps navigation features. These include navigation arrows, zoom in (+) and zoom out (-) buttons, and the “grabbing hand” mouse pointer  for moving around the map.

Selecting a Category View

The **Categories** list enables you to filter the map view to show specific categories. The default view, shown as a series of dashes (----), displays all participant institutes.

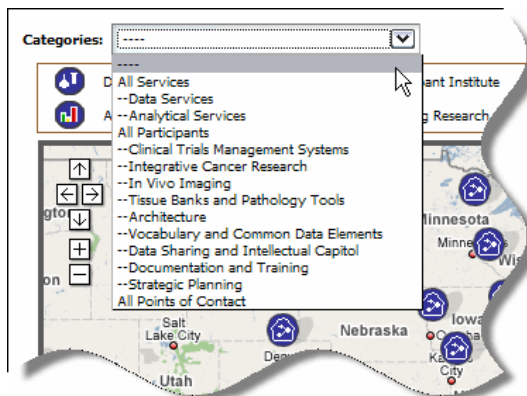


Figure 3-2. Categories list

The list also provides the following views:

- All Services
 - Data Services
 - Analytical Services
- All Participants
 - Clinical Trials Management Systems
 - Integrative Cancer Research
 - In Vivo Imaging
 - Tissue Banks and Pathology Tools
 - Architecture
 - Vocabulary and Common Data Elements
 - Data Sharing and Intellectual Capitol
 - Documentation and Training
 - Strategic Planning
- All Points of Contact (not currently available)

To select a category view, follow these steps:

1. Click the drop-down arrow to the right of the **Categories** list.
2. Select a category from the list.

Selecting a Service, Participant, or POC

Map portlet icons are clickable links. Table 3-1 lists each icon type and includes a cross-reference to the relevant section for working with the selected type.

Note: Icons for active entities appear in dark blue. Identical icons appearing in gray indicate inactive entities. Those appearing in red indicate partially active entities. Table 3-1 shows only icons for active entities.






Icon	Description
	Data Service See <i>Selecting a Data Service</i> on this page.
	Analytical Service See <i>Selecting an Analytical Service</i> on page 21.
	Participant Institute: See <i>Selecting a Participant Institute</i> on page 22.
	Hosting Research Center See <i>Selecting a Hosting Research Center</i> on page 24. Note: A hosting research center represents one or more services (data or analytical) that are hosted at the same location.
	Point of Contact (POC) The Map portlet does not currently display POC information. For more information on finding and viewing details for a POC, see the following sections: <ul style="list-style-type: none"> • <i>Searching for a POC</i> on page 37 • <i>Viewing Details for a POC</i> on page 43

Table 3-1. Map icon descriptions for active entities

Selecting a Data Service.

To locate and view details for a data service, follow these steps:

3. Select the **Data Services** category from the drop-down list.

The map refreshes to show only data services.

4. Click a **data service** icon to select the represented service.

A callout balloon appears above the icon. The balloon displays the following information:

- a link to more details
- the name of the hosting center
- the current status of the hosting center (active, inactive, or partially active).

Figure 3-3 shows the results of clicking the NCICB hosting center *GridPIR*.

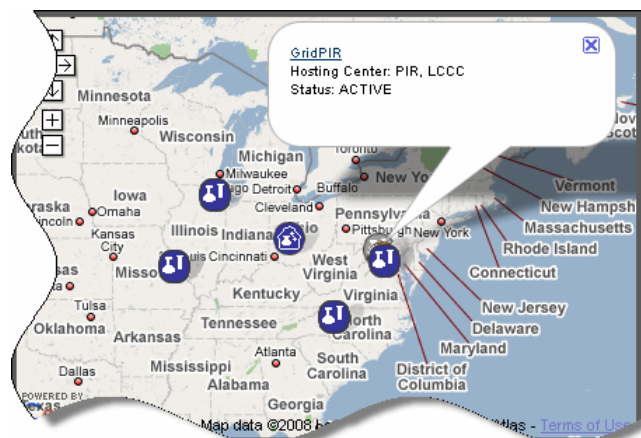


Figure 3-3. Callout balloon for a data service center

5. Click the underlined link.

The Services page appears with the **Details** tab and **Service** subtab of the Discovery portlet selected, as shown in Figure 3-4.

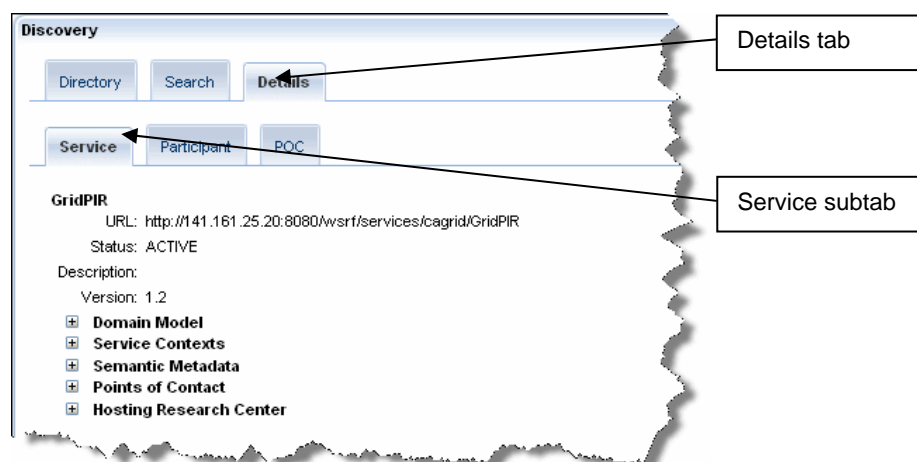




Figure 3-4. Discovery Portlet showing details for a selected data service

For more information about the Discovery portlet and the Service subtab, see *Viewing Details for Services* on page 39.


Selecting an Analytical Service.

6. Select the **Analytical Services** category from the drop-down list.


The map refreshes to show only analytical services.

Note: The portal represents some analytical services using the **analytical service** icon . Others that are part of a group of services in the same geographic location show a **hosting research center** icon . You can find analytical services by clicking either icon, but the results will differ slightly, as explained in the next step.

7. Click the appropriate icon:

- If you clicked the **analytical service** icon , the callout balloon displays the same information used for a data service center (shown in Figure 3-3 on page 20):
 - a link to more details
 - the name of the hosting center
 - the current status of the hosting center (active, inactive, or partially active).

Click the details link to view more information on the **Service** subtab of the Discovery portlet, as shown in Figure 3-4 on page 20.

- If you clicked the **hosting research center** icon , follow the steps explained in *Selecting a Hosting Research Center* on page 24.

Selecting a Participant Institute.

8. Select the **All Participants** category from the drop-down list, or select a specific sub-category (for example, **Clinical Trials Management Systems**).

The map refreshes to show only the selected participant category.

9. Click a **Participant Institute** icon  to select the represented service.

A callout balloon appears above the icon. The balloon displays the following information:

- a participant name link
- a URL to the participant's home page.

Figure 3-5 shows an example of a callout balloon for Lombardi Comprehensive Cancer Center.

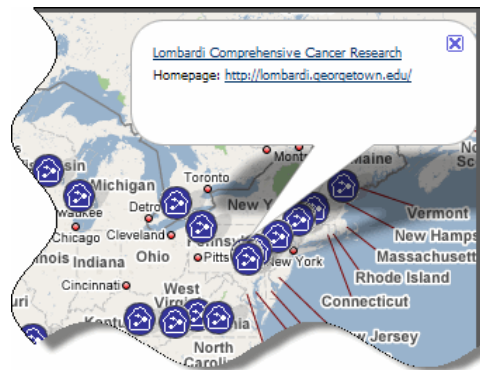


Figure 3-5. Callout balloon for a selected participant

10. Click the participant name link (top link).

The Services page appears with the **Details** tab and **Participant** subtab selected, as shown in Figure 3-6.

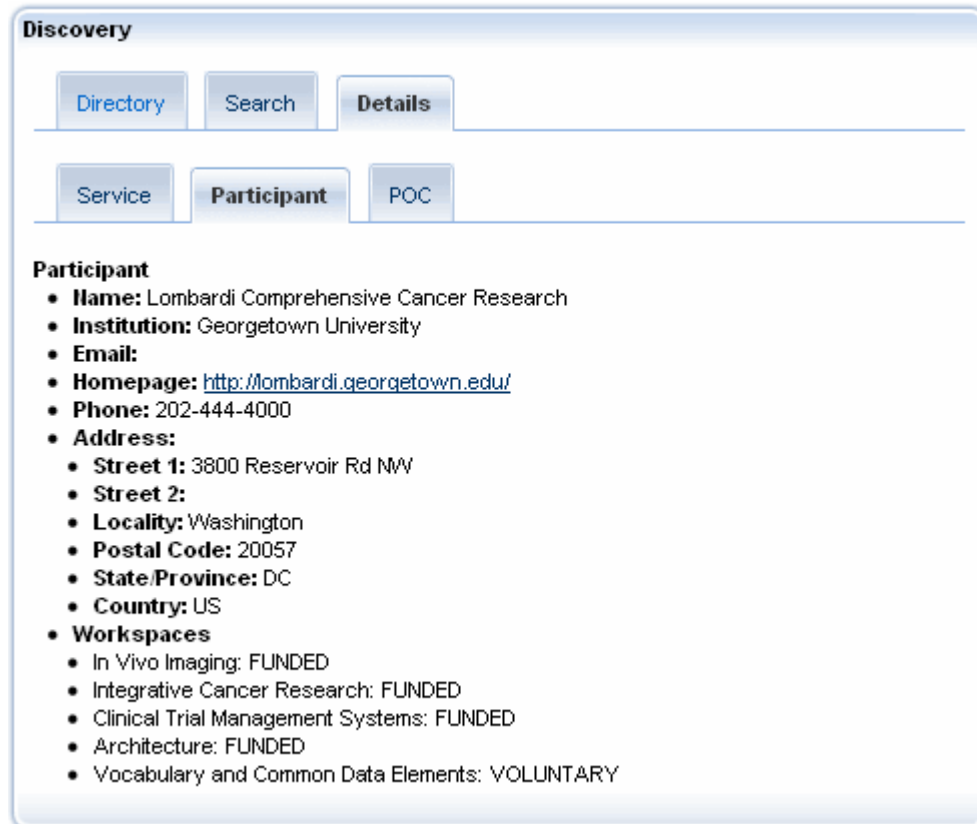


Figure 3-6. Discovery portlet showing details for a participant institute

For more information about the information available on this page, see *Viewing Details for a Participant* on page 42.

Selecting a Hosting Research Center.

1. Find a **Hosting Research Center** icon , then click the icon.

A callout balloon appears above the icon. The balloon displays the following information:

- the number of services available at the selected location
- a **View** link.

Figure 3-7 shows an example of a callout balloon for a hosting research center.

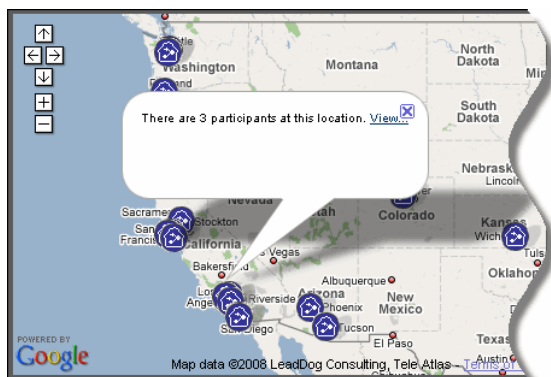


Figure 3-7. Callout balloon for an analytical service center

2. Click the **View** link.

The Services page appears with the **Directory** tab and **List View** subtab selected. The **List View** subtab displays a list of services.

3. In the list at the bottom of the page, do the following:
 - a. Locate the service that you want to view.
 - b. Select the **More Details...** link on the right, as shown in Figure 3-8.

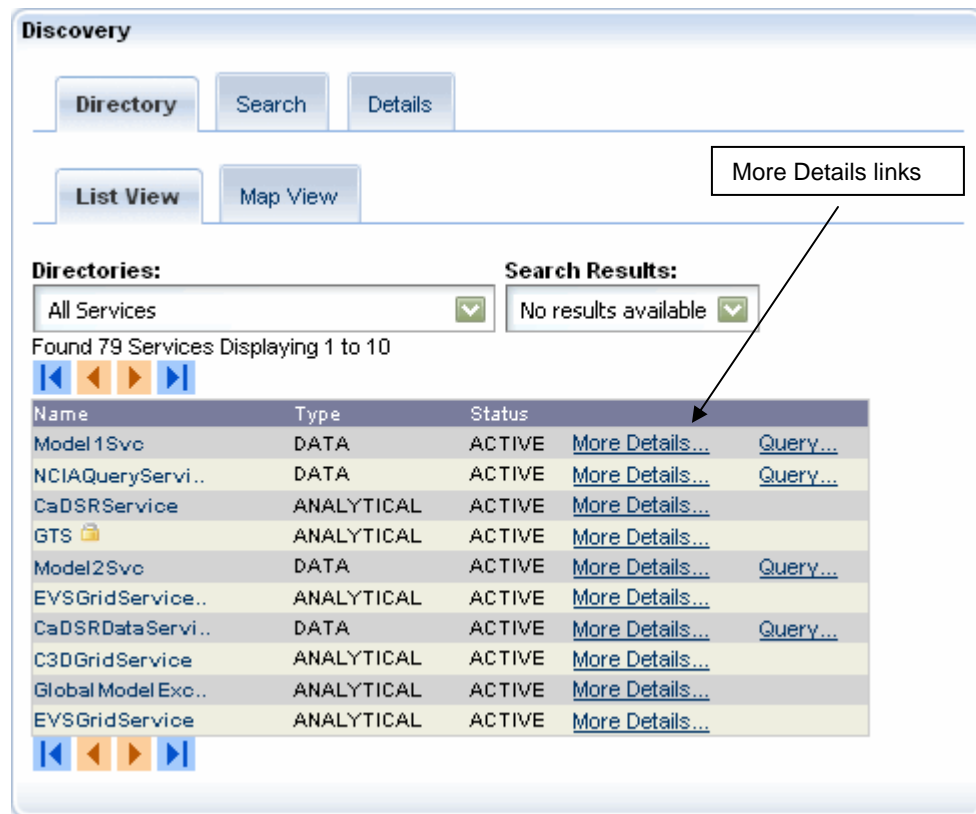


Figure 3-8. List of hosting research centers with More Details links

For more information about the information available on the List View subtab, see *Viewing Details for an Analytical Service* on page 40.

4. Click the **Home** link in the upper left to return to the home page.

Selecting a POC.

As explained in *Selecting a Category View* on page 18, the Map portlet does not currently display POC information. For more information on finding and viewing details for a POC, see the following sections:

- *Searching for a POC* on page 37
- *Viewing Details for a POC* on page 43

Chapter 4 Using the Discovery Portlet

In Chapter 1, the *Discovery* section on page 4 introduced you to the concept of *discovery*. This chapter introduces the Discovery portlet, which enables you to discover caGrid services, caBIG® participants, and caGrid POCs. It also includes information about the Service Diagnostics portlet, which you can use to learn the status of any caGrid service.

Topics in this chapter include:

- *About the Discovery Portlet* on this page
- *Viewing Data in a List or a Map* on page 28
- *Searching for Services, Participants, and POCs* on page 32
- *Viewing Details for Services, Participants, and POCs* on page 39
- *Using the Service Diagnostics Portlet* on page 43

About the Discovery Portlet

The Discovery portlet offers a versatile interface for browsing, searching, and viewing metadata. The interface includes drop-down lists, keyword entry fields, and search field selection boxes.

The various Discovery portlet features are available in a series of tabs with subtabs. Table 7-1 describes each tab and its subtabs.

Feature	Description
Directory tab	Enables you to browse for services, participants, or POCs by selecting directories from a drop-down list. You can use a List view or Map view (discussed below).
List View subtab	Displays browsing results in a paginated list. Each result includes a link for viewing more details (metadata). When you hover your mouse over a service result, a popup window appears that displays the service's name, version, type, activity status, URL, and secured status.
Map View subtab	Displays selected items on a map of the U.S. and enables you to link to further information. This tab works the same way as the Map portlet discussed in Chapter 3 on p. 17.
Search tab	Enables you to search for services, participants, and POCs using keywords and search fields.
Services subtab	Used to search for a service by entering one or more keywords and selecting fields to constrain the search. This tab includes both a simple and advanced field set.
Participants subtab	Used to search for a participant by entering one or more keywords and selecting fields to constrain the search.

Feature	Description
POCs subtab	Used to search for a POC by entering one or more keywords and selecting fields to constrain the search.
Details tab	Displays metadata for a selected service, participant, or POC.
Service subtab	Displays metadata for a selected service.
Participant subtab	Displays metadata for a selected participant.
POC subtab	Displays metadata for a selected POC.

Table 4-1. Discovery portlet tab descriptions

Viewing Data in a List or a Map

Use the **Directory** tab when you want to select a category and view its results in a list or on a map. This tab has two subtabs: **List View** and **Map View**. The next two sections explain how to use these subtabs.

Using the List View Subtab

The **List View** subtab enables you to select a category from the **Directories** list and view the results in a paginated results list. You can also select a saved result set from your current browser session.

Figure 4-1 shows the List View subtab with results displayed for the **All Services** category. The result list displays ten results per page. Note that each result includes a **More Details** link. Data services also include a **Query** link that enables you to build a query for the selected service.

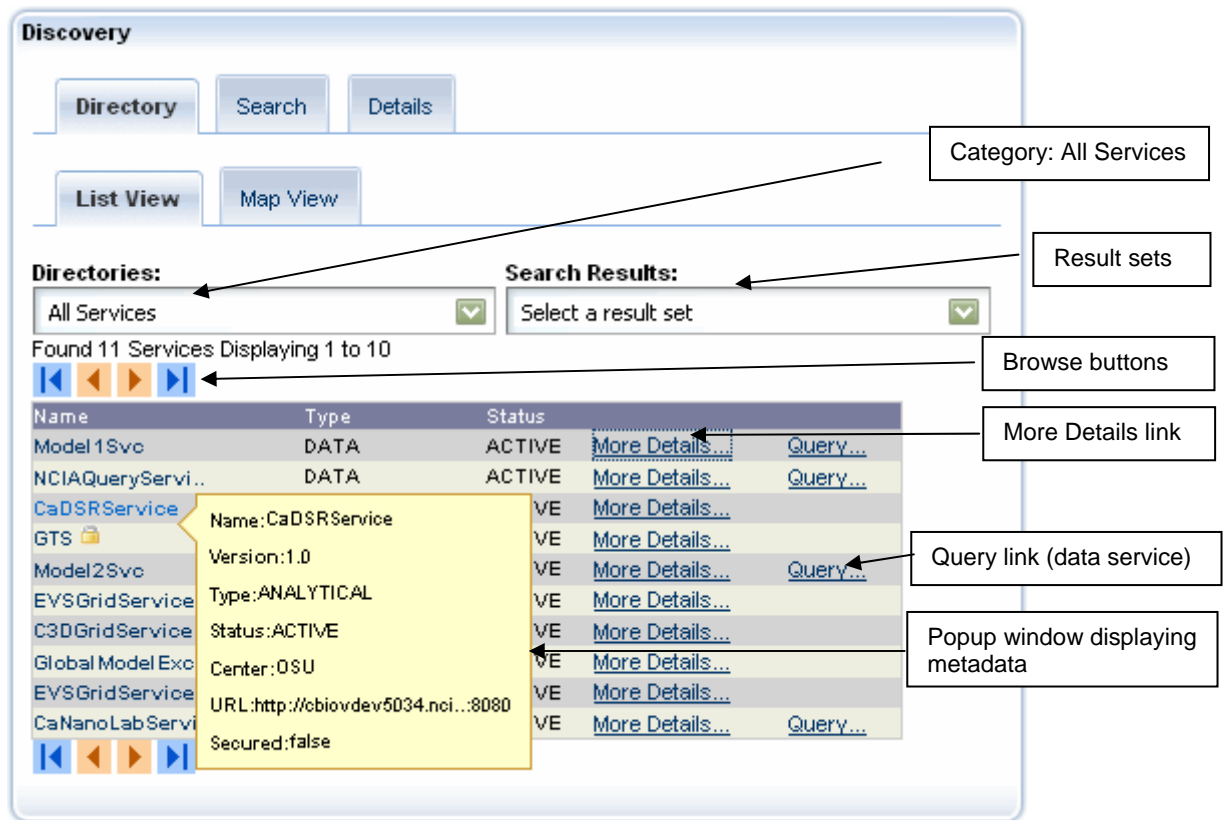






Figure 4-1. Directory tab > List View subtab – results for All Services category

To view results for a selected category, follow these steps:

1. Select the **Directory** tab.
2. Select the **List View** subtab.
3. Do either of the following:
 - Select a category from the **Directories** list; or
 - Select a result set from the **Search Results** list.

The results appear in the lower area of the subtab.
4. Use the browse buttons to page through the list:
 - Click the **Forward** button  to page forward.
 - Click the **Back** button  to page backward.
 - Click the **Return**  to return to the beginning of the list.
 - Click the **Skip to End**  to skip to the end of the list.
5. To view details for a result, click the **More Details** link.

For more information about viewing details for a result, see *Viewing Details for Services, Participants, and POCs* on page 39.

6. If the results include data services and you want to build a query for a selected service, click the **Query** link.

For more information about building queries, see *Building a Query Using the Query Builder Tool* on page 50.

Using the Map View

After you select a category and view the results, you can switch to the **Map View** subtab for a graphical view of the results. Or, instead of starting with the List View subtab, you can start with the Map View subtab and select a category or result set using its drop-down lists.

To view search results using the Map View subtab, follow these steps:

1. Use the **List View** subtab to select a category and display the results.

For complete instructions, see *Using the List View Subtab* on page 28.

2. Click the **Map View** subtab.

The map displays the results as shown in Figure 4-2.

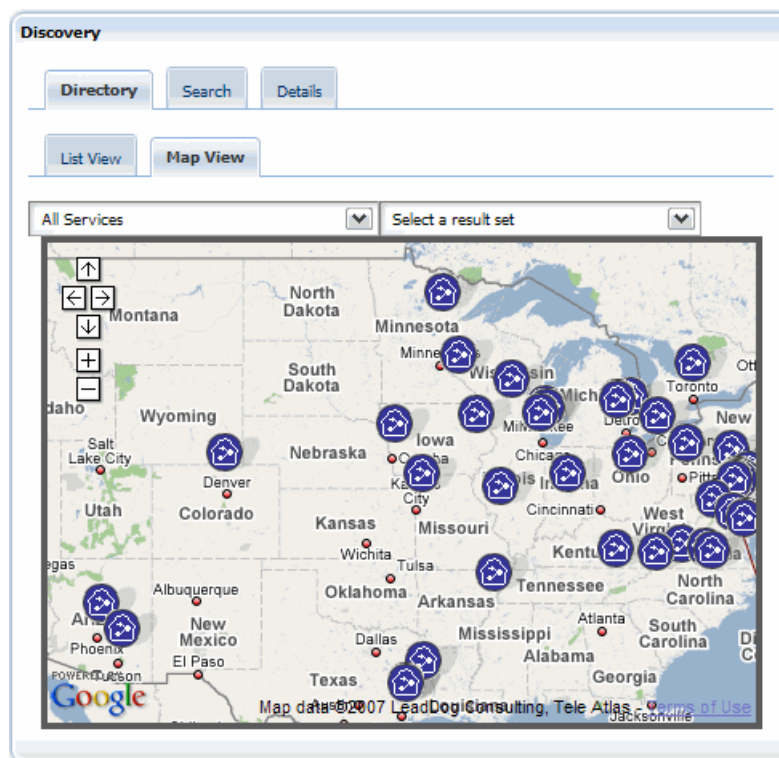


Figure 4-2. Map View subtab

The Map View subtab functions exactly like the Map portlet. For more information, see the following sections in Chapter 3, *Using the Map Portlet*, on page 17.

- *About the Map Portlet* on page 17
- *Selecting a Category View* on page 18
- *Selecting a Service, Participant, or POC* on page 19

Searching for Services, Participants, and POCs

The **Search** tab provides a comprehensive solution for finding caGrid services, caBIG® participants, or and caGrid POCs. Each entity has its own search subtab.

The following topics explain how to use each subtab to execute a search:

- *Searching for a Service* on this page 32
- *Searching for a Participant* on page 36
- *Searching for a POC* on page 37

Searching for a Service

Use the **Services** subtab to search for a service. You have three options for how to perform the search: Simple, Advanced, and EVS.

The Simple and Advanced search modes involve entering one or more keywords and then optionally selecting fields to narrow your results. The Simple search mode includes standard metadata fields while the Advanced search mode expands the available fields by including metadata from the domain model that services expose.

Using the EVS search mode involves entering concept names from the NCI Thesaurus. You can then find services that are related to these concepts. As you type each character in a concept name, the concept-based discovery Portlet suggests concepts that you can select. Results include all services involving the selected concept.

All searches use sub-string, case-insensitive matching.

For more information, see *Performing a Simple or Advanced Search* on page 32 and *Performing an EVS Search* on page 34.

Performing a Simple or Advanced Search

To perform a Simple or an Advanced search, follow these steps:

1. Click the **Search** tab.
2. Click the **Services** subtab.
3. Select the **Simple** or the **Advanced** search option. The Advanced search option includes more fields by which you can narrow your search results.

Figure 4-3 shows the layout of the Services subtab when the Simple search mode is selected.

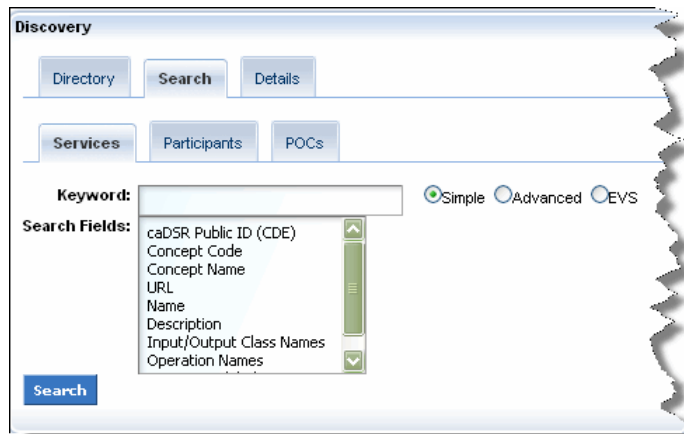


Figure 4-3. Services subtab with the Simple search mode selected

Figure 4-4 shows the layout of the Services subtab when the Advanced search mode is selected.

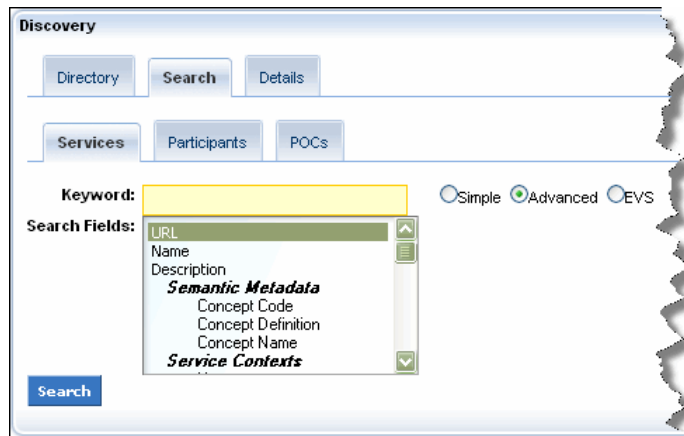


Figure 4-4. Services subtab with Advanced search mode selected

4. Enter one or more keywords in the **Keyword** field.
5. Optionally, restrict your search by selecting one or more fields in the **Search Fields** selection box.

Note: If you do not select any fields in the Simple or Advanced search modes, caGrid Portal includes all fields in its search.

To select consecutive fields in the **Search Fields** selection box, select a field, press and hold the SHIFT key, and then select the last field. To select fields that are not consecutive, select a field, press and hold the CTRL key, and then select additional fields.

6. Click **Search**. The results appear in the lower area of the subtab.

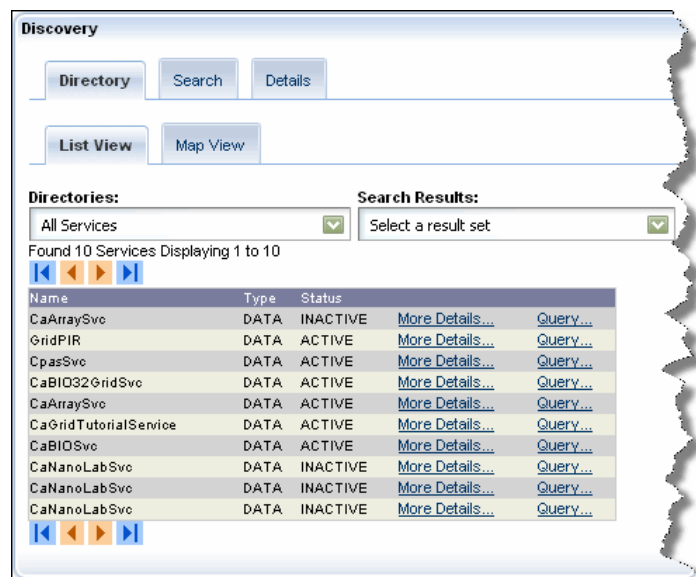






Figure 4-5. Discovered services

7. Use the browse buttons to page through the list:
 - Click the **Forward** button  to page forward.
 - Click the **Back** button  to page backward.
 - Click the **Return**  to return to the beginning of the list.
 - Click the **Skip to End**  to skip to the end of the list.
8. To view details for a result, click the **More Details** link. For more information about viewing details for a result, see *Viewing Details for Services, Participants, and POCs* on page 39.

Note: When you hover your mouse over a service result, a popup window appears that displays the service's name, version, type, activity status, URL, and secured status.
9. If the results include data services and you want to build a query for a selected service, click the **Query** link. For more information about building queries, see *Building a Query Using the Query Builder Tool* on page 50.

Performing an EVS Search

To perform an EVS search, follow these steps:

1. Click the **Search** tab.
2. Click the **Services** subtab.
3. Select the **EVS** search option.

Figure 4-3 shows the layout of the Services subtab when the EVS search mode is selected.

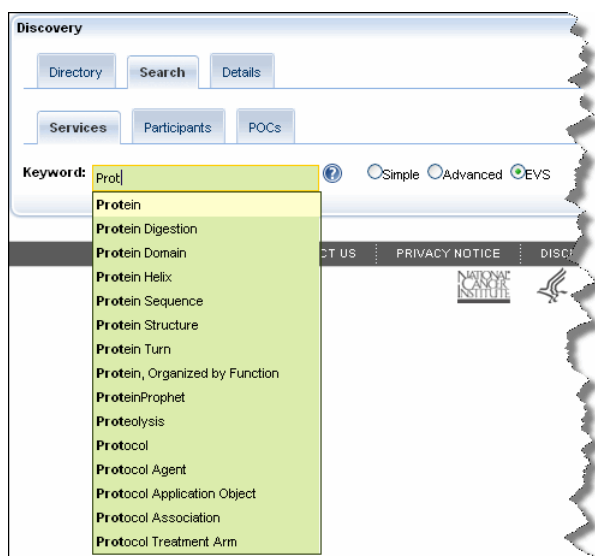


Figure 4-6. Services subtab with the EVS search mode selected

4. Discover services by entering concept names into the **Keyword** field. As you type each letter, the auto completer searches concepts relevant to services in the Portal. If it doesn't find a match, it looks up concepts in the NCI Thesaurus.
5. Select the concept matching the services you want to discover and then press ENTER. The concept code, concept definition, and relevant services for the selected concept appear in the tab.

Figure 4-7 shows the results of an EVS search.



Figure 4-7. Results of an EVS search

6. Click the link noting how many services match the concept you selected. The results appear in the lower area of the subtab.

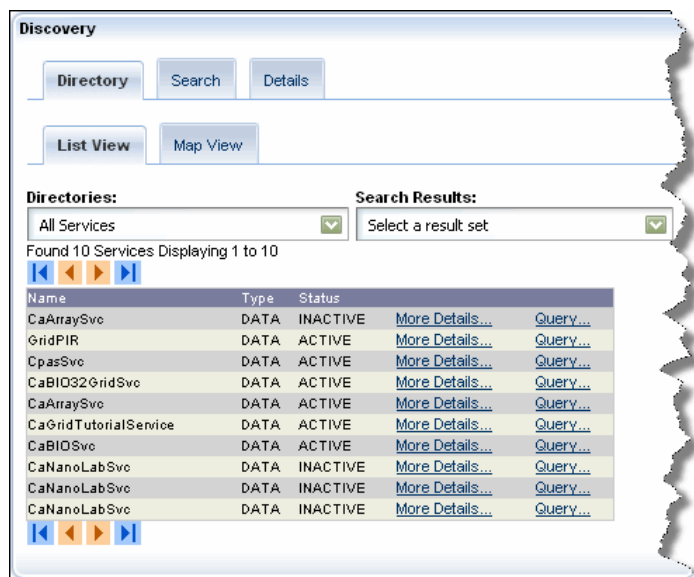






Figure 4-8. Discovered services

7. Use the browse buttons to page through the list:
 - Click the **Forward** button  to page forward.
 - Click the **Back** button  to page backward.
 - Click the **Return**  to return to the beginning of the list.
 - Click the **Skip to End**  to skip to the end of the list.
8. To view details for a result, click the **More Details** link. For more information about viewing details for a result, see *Viewing Details for Services, Participants, and POCs* on page 39.
9. If the results include data services and you want to build a query for a selected service, click the **Query** link. For more information about building queries, see *Building a Query Using the Query Builder Tool* on page 50.

Searching for a Participant

Use the **Participants** subtab to search for a participant by entering one or more keywords and selecting fields to constrain the search. The search form includes a **Keyword** field and a **Search Fields** selection box, as shown in Figure 4-9.

Figure 4-9. Participants subtab





To search for a participant, follow these steps:

1. Click the **Search** tab.
2. Click the **Participants** subtab.
3. Enter one or more keywords in the **Keyword** field.
4. Select fields from the **Search Fields** selection box.

Note: If you do not select search fields, all of the fields are used in the search.

5. Click **Search**.

The results appear in the lower area of the subtab.

6. Use the browse buttons to page through the list:
 - Click the **Forward** button  to page forward.
 - Click the **Back** button  to page backward.
 - Click the **Return**  to return to the beginning of the list.
 - Click the **Skip to End**  to skip to the end of the list.
7. To view details for a result, click the **More Details** link.

For more information about viewing details for a result, see *Viewing Details for Services, Participants, and POCs* on page 39.

Searching for a POC

Use the **POCs** subtab to search for a POC by entering one or more keywords and selecting fields to constrain the search. The search form includes a **Keyword** field and a **Search Fields** selection box, as shown in Figure 4-10.

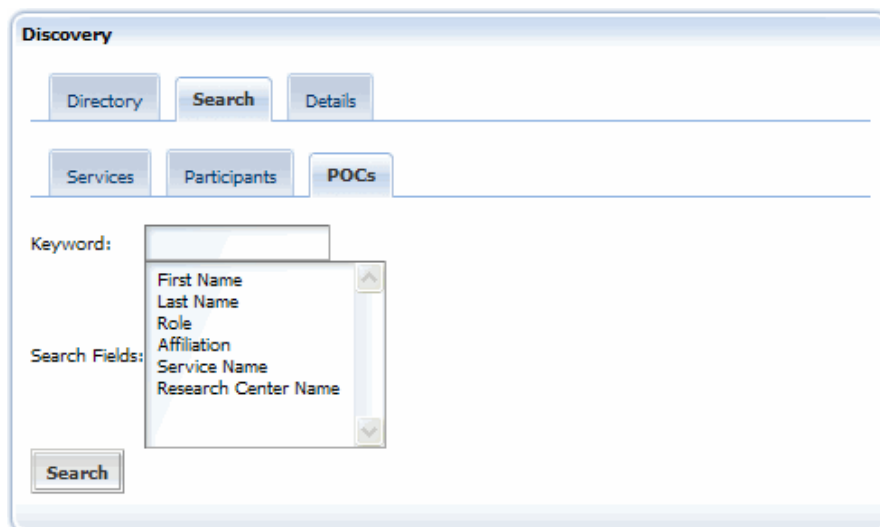


Figure 4-10. POCs subtab





To search for a POC, follow these steps:

1. Click the **Search** tab.
2. Click the **POCs** subtab.
3. Enter one or more keywords in the **Keyword** field.
4. Select fields from the **Search Fields** selection box.

Note: If you do not select search fields, all of the fields are used in the search.

5. Click **Search**.

The results appear in the lower area of the subtab.

6. Use the browse buttons to page through the list:
 - Click the **Forward** button  to page forward.
 - Click the **Back** button  to page backward.
 - Click the **Return**  to return to the beginning of the list.
 - Click the **Skip to End**  to skip to the end of the list.
7. To view details for a result, click the **More Details** link.

For more information about viewing details for a result, see *Viewing Details for Services, Participants, and POCs* on page 39.

Viewing Details for Services, Participants, and POCs

The **Details** tab displays metadata for services, participants, and POCs. The following topics discuss the level of detail for each entity:

- *Viewing Details for Services* on this page
- *Viewing Details for a Participant* on page 42
- *Viewing Details for a POC* on page 43

Viewing Details for Services

caGrid Services provide a standard set of metadata. This metadata includes descriptions of the service's operations, information about the hosting research center and, if the service is a data service, the complete domain model that is supported by the service.

In addition, data types that the service operations use are defined by XML schemas and are registered with the Global Metadata Exchange (GME) service.

Viewing Details for a Data Service

To view details for a data service, follow these steps:

1. Use the **Directory** or **Search** tabs to find the desired data service.

For more information, see the following topics:

- *Using the List View Subtab* on page 28
- *Searching for a Service* on page 32

2. Click the **Details** tab.

Details for the selected data service appear on the **Service** subtab, as shown in Figure 4-11.

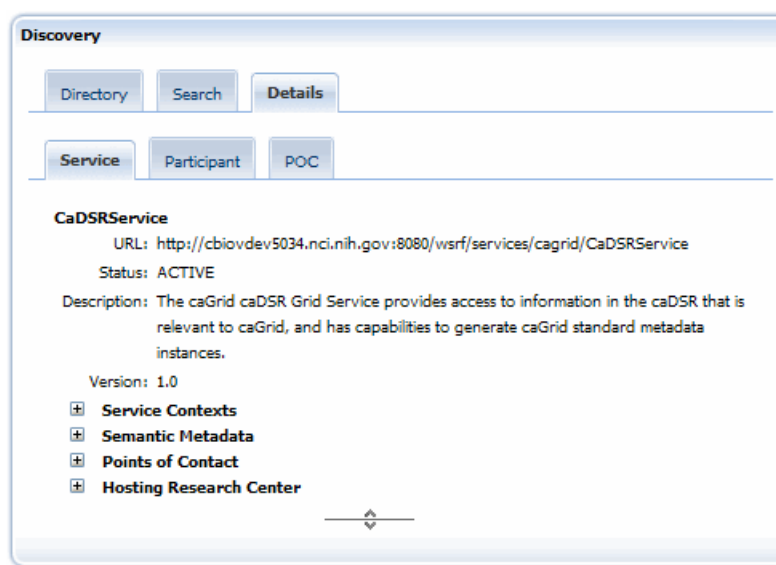


Figure 4-11. Details for a selected data service

- Click the plus sign preceding each top-level of metadata to drill down to the sub-levels.

For example, when viewing details for a data service, you can drill down through the complete domain model that the service supports. You can then select a class for a query by clicking the **Select For Query** button, as shown in Figure 4-12.

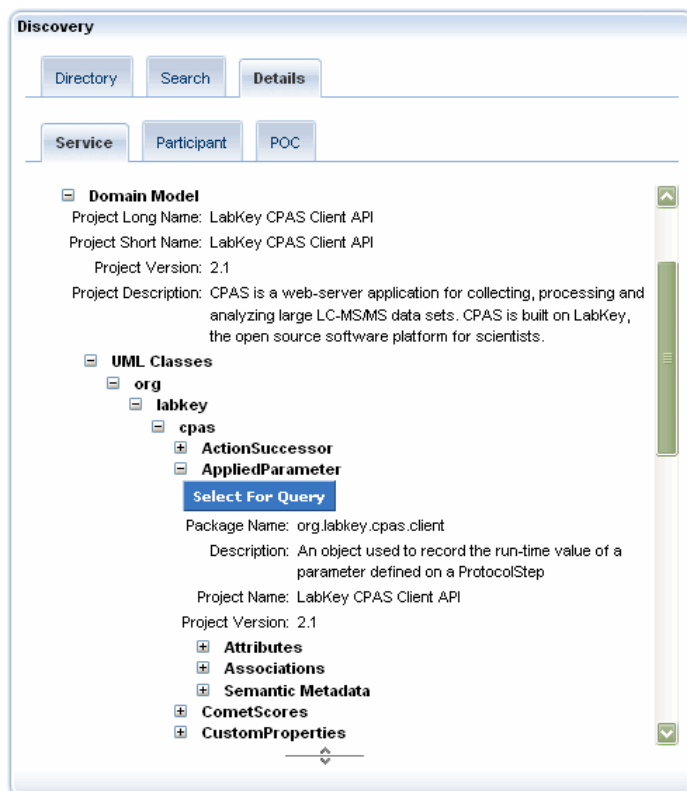


Figure 4-12. Selecting a UML class for a query

Viewing Details for an Analytical Service

To view details for an analytical service, follow these steps:

- Use the **Directory** or **Search** tabs to find the desired analytical service.

For more information, see the following topics:

- *Using the List View Subtab* on page 28
- *Searching for a Service* on page 32

- Click the **Details** tab.

Details for the selected analytical service appear on the **Service** subtab, as shown in Figure 4-13.

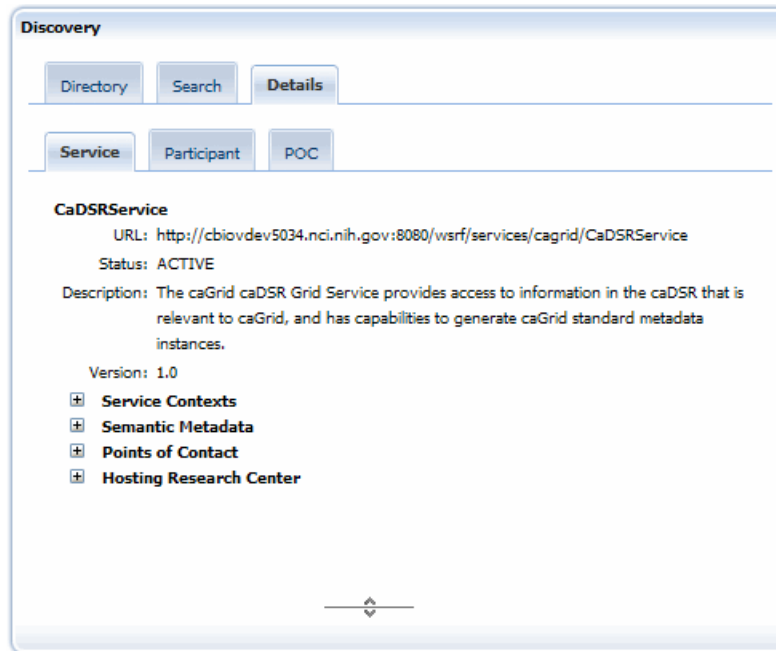


Figure 4-13. Details for a selected analytical service

3. Click the plus sign preceding each top-level of metadata to drill down to the sub-levels.

Note: Analytical services do not include a domain model.

Viewing Details for a Participant

To view details for a participant, follow these steps:

1. Use the **Directory** or **Search** tabs to find the desired participant.

For more information, see the following topics:

- *Using the List View Subtab* on page 28
- *Searching for a Participant* on page 36

2. Click the **Details** tab.

Details for the selected participant appear on the **Participant** subtab, as shown in Figure 4-14.

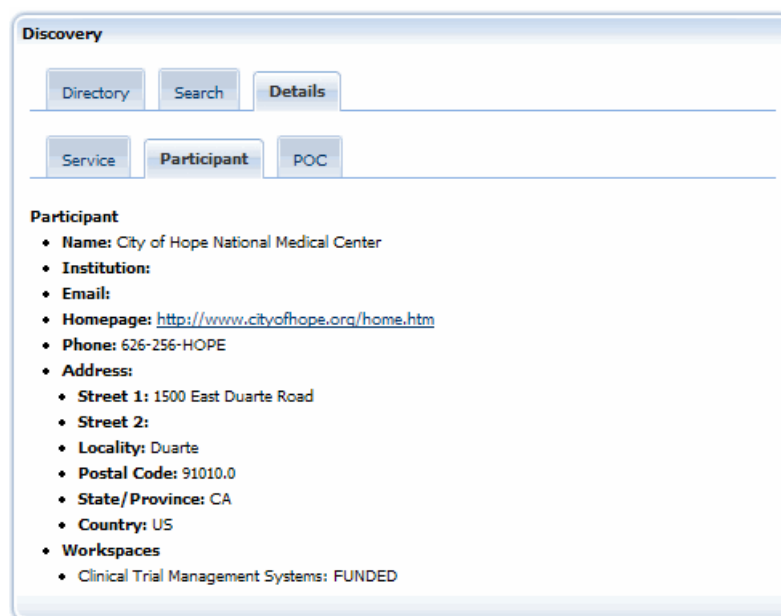


Figure 4-14. Details for a selected participant

Viewing Details for a POC

To view details for a POC, follow these steps:

1. Use the **Directory** or **Search** tabs to find the desired POC.

For more information, see the following topics:

- *Using the List View Subtab* on page 28
- *Searching for a POC* on page 37

2. Click the **Details** tab.

Details for the selected POC appear on the **POC** subtab, as shown in Figure 4-15.

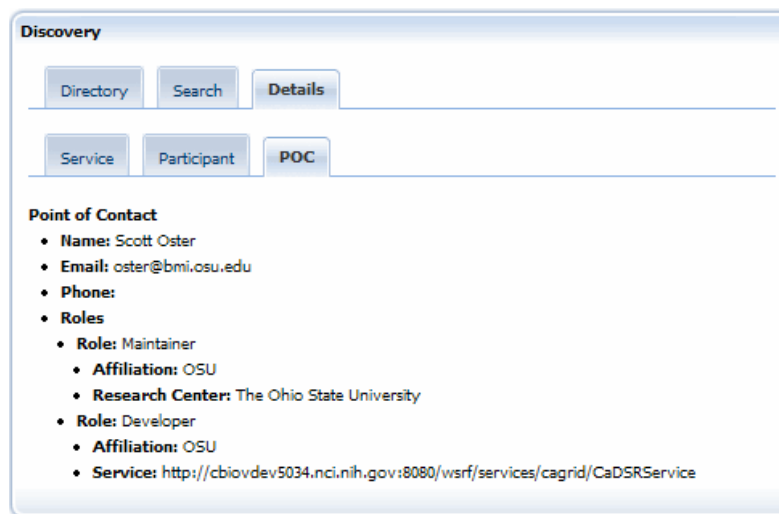


Figure 4-15. Details for a selected POC

Using the Service Diagnostics Portlet

The Service Diagnostics portlet runs basic diagnostic tests on any caGrid service, allowing service developers to check the health of their service or diagnose service advertisement issues.

About the Service Diagnostics Portlet

Access the Service Diagnostics portlet at the bottom of the Services tab.

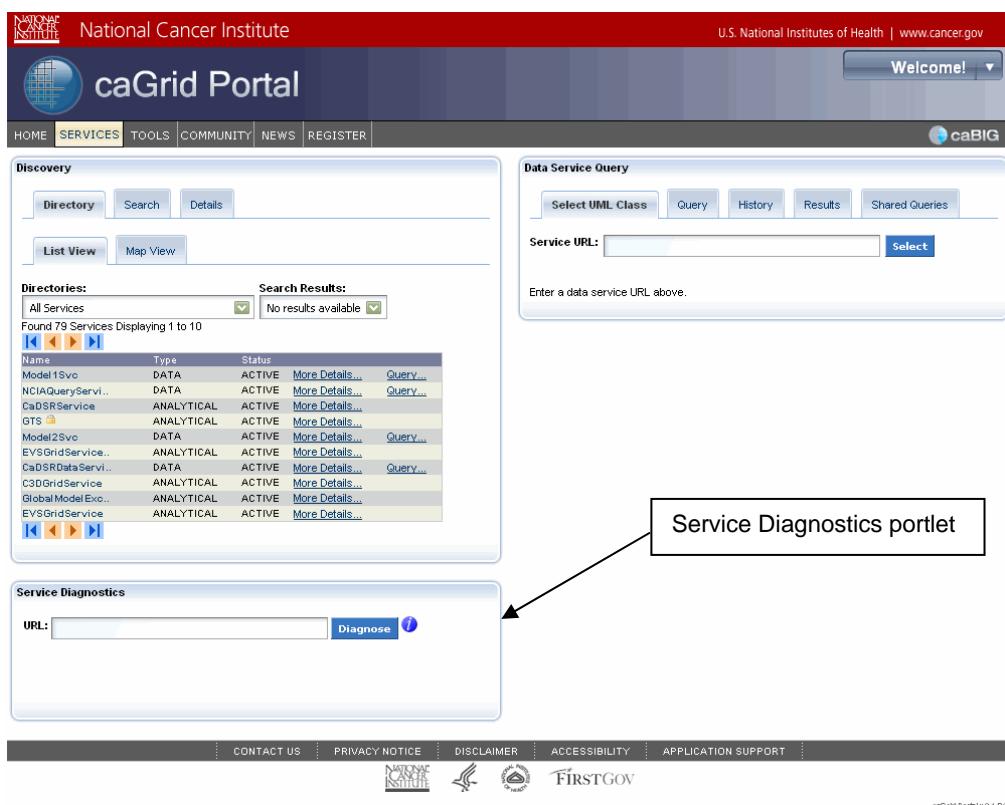


Figure 4-16. Service Diagnostics portlet on the Services tab

The Service Diagnostics portlet runs the following tests:

- Check the status of the caGrid service in the Portal. Status(s) in the Portal can be one of the following:
 - **Active** – Service is valid and responding.
 - **Inactive** – Service is not online or not advertising to the Index Service.
 - **Banned** – Service has been banned from the Portal by the Portal admin. Contact [CBIIT Application Support](#) for banning/unbanning services in the Portal.
 - **Dormant** – Service has not been active for a prolonged period of time. Dormant and banned services are not visible in the Portal.

See this [caGrid Wiki](#) page for more information on service status(s).

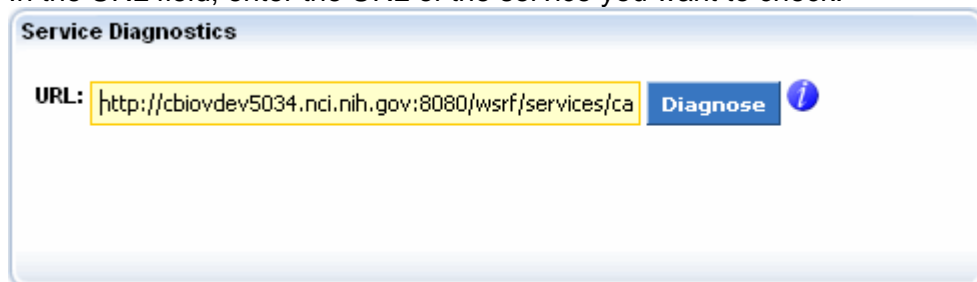
- Checks that the service that is being diagnosed is available by trying to query it for the caGrid Metadata resource property. This diagnosis will fail if any of the following is true:
 - caGrid service being diagnosed is not online or not accessible on the Internet.
 - caGrid Service being diagnosed is not configured.

- caGrid Service being diagnosed is configured with a host certificate not trusted by caGrid Portal. See the [caGrid Wiki - GAARDS](#) page for more details.
- Retrieves the caGrid service metadata and validates the service metadata against the expected XML Schema. See the [caGrid Wiki - Metadata](#) page for more information on caGrid Service Metadata.
- Checks the caGrid Index Service to ensure that the service is advertising correctly. See [caGrid Wiki - Index Service](#) for more information

Running Diagnostic Tests

To run diagnostic tests on a service, follow these steps:

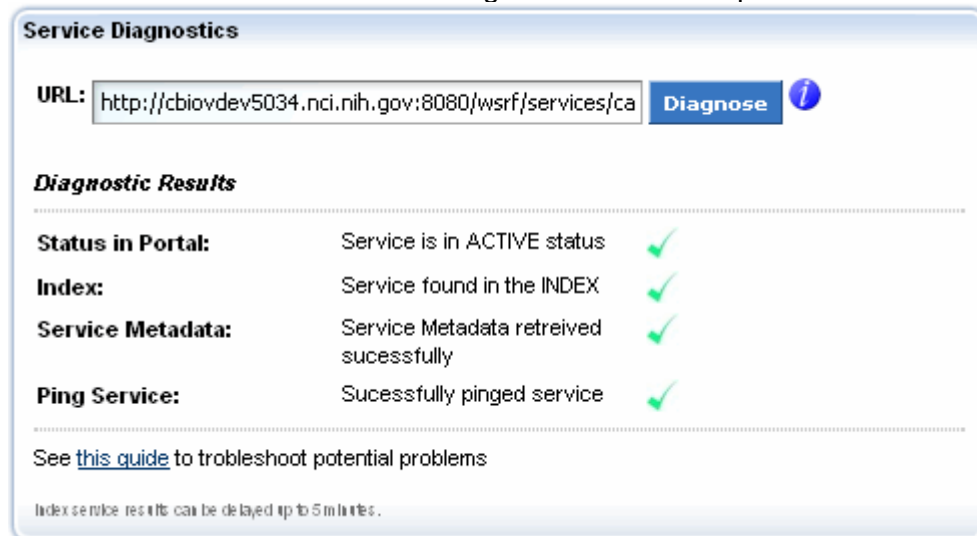
1. In the URL field, enter the URL of the service you want to check.



The screenshot shows a portlet titled "Service Diagnostics". It contains a text input field labeled "URL:" with the value "http://cbiowdev5034.nci.nih.gov:8080/wsrf/services/ca". To the right of the input field is a blue button labeled "Diagnose" and a small blue information icon (i).

Figure 4-17. URL field in the Service Diagnostics portlet

2. Click **Diagnose**. The Portal runs diagnostic tests and reports the results.




The screenshot shows the "Service Diagnostics" portlet after a successful diagnosis. The "URL:" field still contains the same URL. Below the field is a section titled "Diagnostic Results" which contains a table of test results, each with a green checkmark icon to its right.

Diagnostic Results	
Status in Portal:	Service is in ACTIVE status
Index:	Service found in the INDEX
Service Metadata:	Service Metadata retrieved successfully
Ping Service:	Successfully pinged service

Below the table, there is a link: "See [this guide](#) to troubleshoot potential problems". At the bottom, a small note states: "Index service results can be delayed up to 5 minutes."

Figure 4-18. Successful result in the Service Diagnostics portlet

Interpreting Results of Diagnostic Tests

If you enter an incorrect or malformed URL for a service, the Service Diagnostics portlet indicates this in the test results. Click  where it is available to view more information about a diagnostic result or function in the portlet.

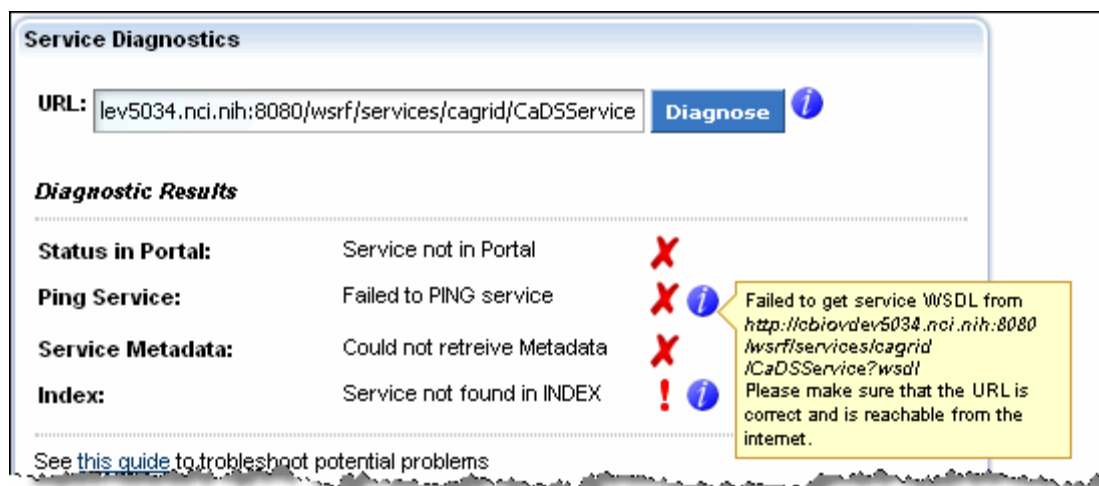


Figure 4-19. Unsuccessful result in the Service Diagnostics portlet

See <http://www.cagrid.org/wiki/CaGrid:How-To:TroubleshootIndexService> to review problems that can prevent proper advertisement and registration of a service to the Index Service.

Chapter 5 Using the Data Service Query Portlet

The Data Service Query portlet enables you to query services that support the CQL query language. This chapter explains how to build and share queries.

Topics in this chapter include:

- *About the Data Service Query Portlet* on this page
- *Query-Building Scenarios* on page 48
- *About the History Tab* on page 65
- *Working with Shared Queries* on page 67

About the Data Service Query Portlet

Using the Data Service Query portlet, you can build and execute a query (CQL or DCQL), view the results in tabular form, and export to Microsoft Excel or XML form. As long as you are a registered portal user, the portal maintains a complete history of your queries so that you can always retrieve and work with your previously executed queries.

The Data Service Query portlet interface is organized in a series of tabs. Table 5-1 describes each tab.

Tab	Description
Select UML Class	Enables you to enter a URL for a selected data service and view a list of UML classes.
Query	Provides two subtabs: <ul style="list-style-type: none">• Query Builder, which provides a graphical interface for building CQL and DCQL queries• Query XML, which enables you to enter a data service URL and query directly and then execute or share the query
History	Shows all of your stored queries.
Results	Displays query results in tabular or XML form.
Shared Queries	Provides a Find Shared Queries subtab that includes both a Keyword field and a Search Fields selection box. You can use these tools to search for shared queries.

Table 5-1. Data Service Query portlet tab descriptions

Tip: For more information about CQL and DCQL concepts, see http://www.cagrid.org/mwiki/index.php?title=Data_Services:CQL and http://www.cagrid.org/wiki/Federated_Query:DCQL.

Query-Building Scenarios

To execute a query, you need the following:

- The URL of the caGrid data service to which the query will be sent
- The query itself

The portal provides several approaches for specifying these requirements. The following scenarios explain each approach.

Scenario 1: Starting without a URL or Query

If you do not have the service URL or the query, follow these steps:

1. Locate a service using either the **Directory** or **Search** tab of the Discovery portlet.

For more information, see *Searching for a Service* on page 32.

2. If you want to view metadata for a UML class before selecting it for a query, follow substeps 2a through 2d. Otherwise, skip to step 3:
 - a. Click the **More Details** link for the desired service.
 - b. Expand the **Domain Model**.
 - c. Drill down to the metadata for a selected class.
 - d. Click **Select for Query**.
3. To select the desired service from the results list, follow these steps:
 - a. Click the **Query** link for the desired service.

On the Data Service Query portlet > **Select UML Class** tab, the **Service URL** field displays the URL for the selected service. A list of UML classes appears below the field, as shown in Figure 5-1.

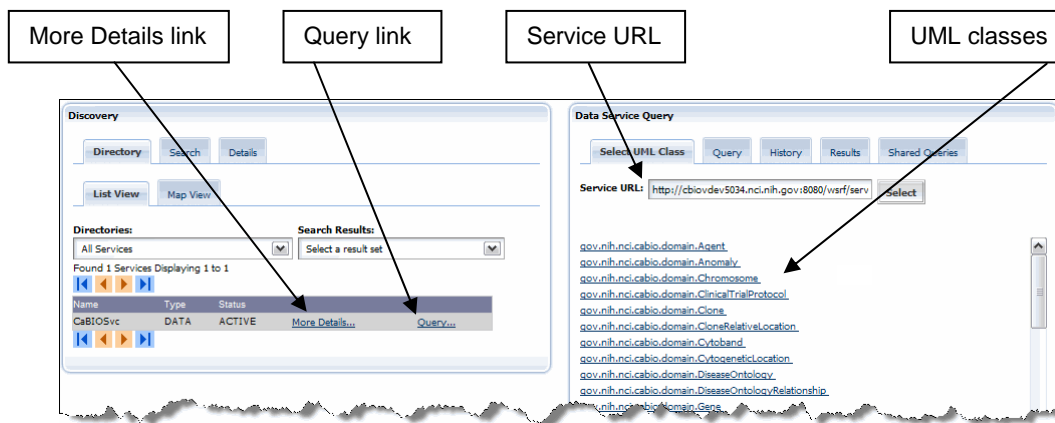


Figure 5-1. Starting a query from a selected result

- b. Click the desired UML class.

On the Data Service Query portlet, the **Query** tab > **Query Builder** subtab displays a working query, as shown in Figure 5-2.



Figure 5-2. Working query

Scenario 2: Starting with a URL but No CQL Query

If you have the service URL but no CQL query, follow these steps:

1. On the Data Service Query portlet, click the **Select UML Class** tab.
2. Enter the URL in the **Service URL** field.
3. Click **Select**.
4. Click the desired UML class from the list.

The **Query** tab > **Query Builder** subtab displays a working query.

Scenario 3: Starting with a URL and a CQL Query

If you have both the URL and the CQL query, follow these steps:

1. On the Data Service Query portlet, click the **Query** tab.
2. Click the **Query XML** subtab.
3. Enter the URL in the **URL** field.
4. Enter the CQL query in the **Query** text field.
5. Click **Submit Query**.

Building a Query Using the Query Builder Tool

caGrid data services all use a uniform query language, Common Query Language (CQL), to express queries against a data source using an object oriented language.

To express queries over a combination of caGrid data services, you must use Distributed caBIG® Query Language (DCQL) instead. DCQL queries include two types, aggregate and distributed.

You can use the Query Builder tool to create both CQL and DCQL queries.

This section includes the following topics:

- *Building CQL Queries*, below
- *Building DCQL Queries* on page 55

Building CQL Queries

The **Query** tab > **Query Builder** subtab provides a graphical interface for building queries. Although you can use this tool without knowing CQL, you can more easily use the tool if you understand CQL concepts. You can learn more at http://www.cagrid.org/mwiki/index.php?title=Data_Services:CQL.

To use the Query Builder subtab, you must first select the service and URL as explained in *Scenario 1: Starting without a URL or Query* on page 48. After you have selected a UML class for the query, the Query Builder tab resembles Figure 5-3.



Figure 5-3. Query Builder subtab with selected UML class ArrayDesign

To modify and submit the query, follow these steps:

1. Click **Edit Query Modifiers** to select one of the options described in Table 5-2.

Option	Description
Object	Returns full results from the data service.
Count Only (the default)	Returns only the count of objects that match specified criteria.
Distinct Attribute	<p>Returns the unique value of one of the following attributes of the UML class being queried:</p> <ul style="list-style-type: none"> • clusterID • fullName • id • symbol <p>You can select only one of these attributes.</p>
Selected Attributes	Displays the same four attributes offered by the Distinct Attribute option, but enables you to select multiple attributes. If you select this modifier, the results will include only these attribute values for each object in the result set.

Table 5-2. Options for editing query modifiers

2. When you have finished editing modifiers, click **Update**.
The Result Type updates to show the selected attributes.
3. To add a criterion to the query, click **Add Criterion**.
The Query Builder subtab displays a list of attributes and associations for the selected class, as shown in Figure 5-4.

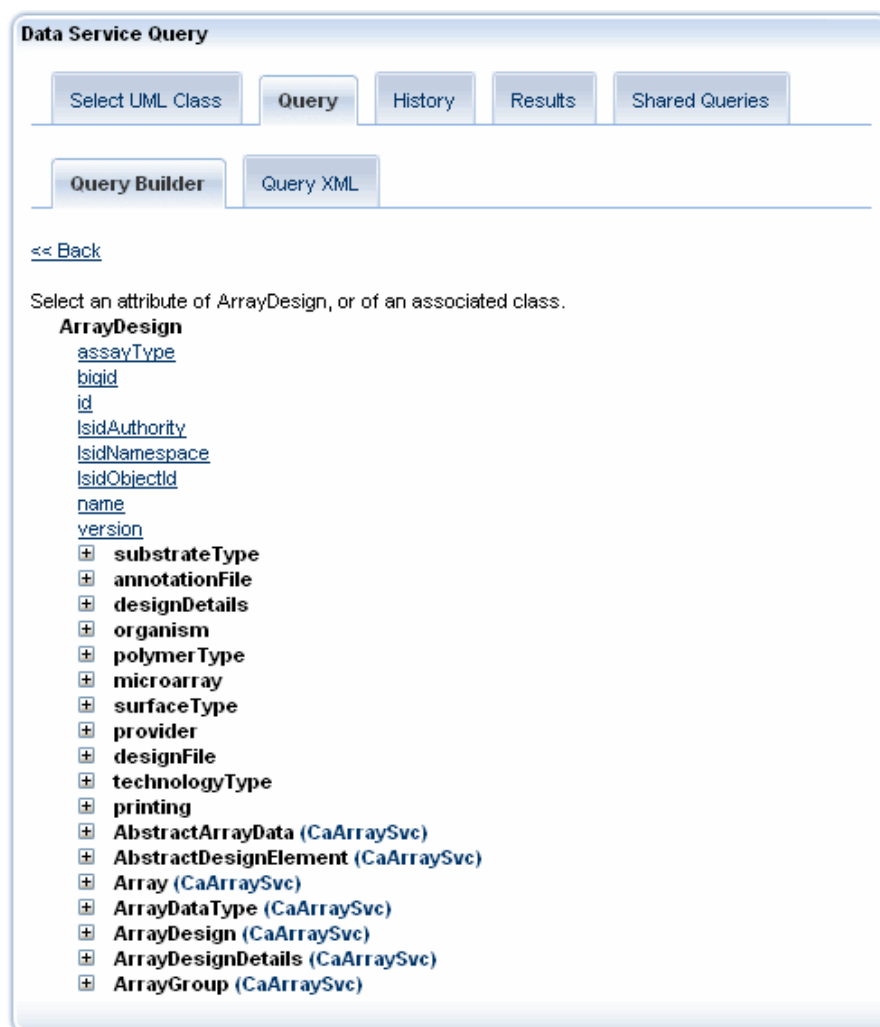


Figure 5-4. Attributes and associations for selected class

4. Select an attribute.
A form appears with the name of the selected attribute.
5. Set the predicate by selecting it from the drop-down list.
6. Enter a value.
The form should now resemble Figure 5-5.

Data Service Query

Select UML Class **Query** History Results Shared Queries

Query Builder Query XML

Attribute Name	Predicate	Value(s)
assayType	EQUAL_TO	geneExpression

Update **Delete** **Cancel**

Figure 5-5. Specifying a predicate and value for a selected attribute

7. Click **Update**.

The Query Builder subtab should now resemble Figure 5-6.

Data Service Query

Select UML Class **Query** History Results Shared Queries

Query Builder Query XML

Edit Query Modifiers **Aggregate Query** **Add Criterion** **Export To XML**

Submit Query

Querying: gov.nih.nci.caarray.domain.array.ArrayDesign
Result Type: Object
Criteria:
 assayType EQUAL_TO geneExpression

Figure 5-6. Query Builder subtab with added criterion

Although you can add multiple criteria to a query, the Query Builder does not currently support logical OR groupings other than for multiple values specified for the same criterion. Currently, the tool groups all criteria using a logical AND. If you specify multiple values for a specific criterion, the tool creates multiple criteria and groups them by OR. To further edit your query, you can export it to XML format.

Note: Once you export a CQL query to XML, you cannot edit the query and then switch back to using the Query Builder tool.

8. (Optional) To export your query to XML format, follow these steps:
 - a. Click **Export to XML**.
The **Query XML** tab appears in front. The **URL** field displays the service URL, and the **Query** field displays the XML structure for the query.
 - b. Edit the XML structure as needed.

Data Service Query

Select UML Class **Query** History Results Shared Queries

Query Builder **Query XML**

URL:

Query:

```
<ns1:CQLQuery xmlns:ns1="http://CQL.caBIG/1/gov.nih.nci.cagrid.CQLQuery">
  <ns1:Target name="gov.nih.nci.caarray.domain.array.ArrayDesign">
    <ns1:Group logicRelation="AND">
      <ns1:Attribute name="assayType" predicate="EQUAL_TO" value="geneExpression"/>
    </ns1:Group>
  </ns1:Target>
</ns1:CQLQuery>
```

Figure 5-7. Query XML tab

9. When you have finished building the query, click **Submit Query**.
The **History** tab appears in front. This tab displays the query State, Start Time, Finish Time, and Service, as shown in Figure 5-8.

Data Service Query

Select UML Class Query **History** Results Shared Queries

Operations	State	Start Time	Finish Time	Service
--- <input type="button" value="v"/>	COMPLETE	Jun 22, 2008 1:55:21 PM	Jun 22, 2008 1:55:23 PM	Service Name CaArraySvc
--- <input type="button" value="v"/>	COMPLETE	Jun 22, 2008 1:51:09 PM	Jun 22, 2008 1:51:15 PM	Service Name CaArraySvc

Figure 5-8. History tab with query information

For more information about the History tab, see *About the History Tab* on page 65.

Building DCQL Queries

caGrid supports federated queries through a infrastructure service called the Federated Query Processor (FQP) and a language known as Distributed caGrid Query Language (DCQL). FQP service supports the execution of DCQL queries.

After you build DCQL queries using the Query Builder tool, the Portal then asynchronously executes them against an available FQP service.

There are two types of DCQL queries that you can construct in the caGrid Portal: aggregate and distributed. Aggregate queries aggregate similar data from multiple services. Distributed queries have distributed joins across multiple services on the grid.

The following sections explain how to create aggregate (below) and distributed join queries using DCQL (on page 57).

Building Aggregate DCQL Queries

Aggregate queries run against two or more data services and return an aggregated result set.

General steps for building an aggregate DCQL query in the caGrid Portal are as follows:

1. Discover caGrid Data Services providing a UML Class name.
2. Constrain the query using some query criteria.
3. Determine possible aggregation scenarios.
4. Execute the aggregate query.

For example, an aggregate query might involve retrieving all `ArrayDesigns` from the caArray data service hosted at Georgetown University **and** the caArray data service hosted at NCICB.

To build this aggregate DCQL query, follow these steps:

1. Select the service and URL for the query as explained in *Scenario 1: Starting without a URL or Query* on page 48.

The screenshot shows the 'Data Service Query' interface. At the top, there are five tabs: 'Select UML Class', 'Query' (which is active), 'History', 'Results', and 'Shared Queries'. Below these tabs, there are two more tabs: 'Query Builder' (active) and 'Query XML'. Under the 'Query Builder' tab, there are five buttons: 'Edit Query Modifiers', 'Aggregate Query', 'Add Criterion', 'Export To XML', and 'Submit Query'. At the bottom of the interface, the text reads: 'Querying: gov.nih.nci.caarray.domain.array.ArrayDesign' and 'Result Type: Object'.

Figure 5-9. Query Builder specifying a service and URL

2. Click **Aggregate Query**. All services with the chosen UML class, in this case ArrayDesign, appear.

The screenshot shows the 'Data Service Query' interface. At the top, there is a link '<< Back'. Below this, the text reads: 'Following Services have the chosen UML Class. Select services to aggregate data from.' There are two checkboxes with corresponding URLs: the first checkbox is checked and the URL is 'http://array.nci.nih.gov:80/wsrf/services/cagrid/CaArraySvc'; the second checkbox is unchecked and the URL is 'http://129.22.245.168:18080/wsrf/services/cagrid/CaArraySvc'. At the bottom of the interface, there is a button labeled 'Add Targets'.

Figure 5-10. Services with the same UML class to aggregate from

3. Select the checkboxes for all of the services from which to aggregate the chosen UML class.
4. Click **Add Targets**. A summary of the data services you selected for the aggregate query appears.



Figure 5-11. Summary of data services selected for aggregation

5. Click **Submit Query**. The **History** tab appears in front. As shown in Figure 5-12, this tab displays the query state, start time, finish time, and service. The service in this case is the Federated Query Processor.



Figure 5-12. History tab with query information

For more information about the History tab, see *About the History Tab* on page 65.

Building Distributed DCQL Queries

Distributed queries link semantically equivalent domain objects across multiple data services. You can construct DCQL queries manually and execute them through a command line. The caGrid Portal helps in visualizing the possible joins and then providing the tool to build DCQL queries that contain cross-service joins.

The following text describes how the caGrid portal can be used to query a grid service in a federated fashion. See [here](#) for a video that covers most of the same information.

The steps involved are:

1. Select a caGrid data service.
2. Select a UML class from the selected data service to query on.
3. Specify query criteria on the selected UML class by specifying join conditions based on a UML class from a second caGrid data service.

4. Execute the distributed join query and view the results.

We can correlate data between services by doing a distributed join. For example, we can retrieve all `NucleicAcidSequence` objects from the caBIO32 grid service hosted at NCI/CBIIT where they are related to the proteins that we retrieve from the GridPIR grid service hosted at Georgetown University.

When building a query against the model of one service, the portal automatically displays UML classes in other models if they have at least one concept code in common. The service name next to the UML class name indicates the source of the UML class. Classes that share a concept code are most likely to also contain attributes that can be used as a join condition.

To build this aggregate DCQL query, follow these steps:

1. Select the service and URL for the query as explained in *Scenario 1: Starting without a URL or Query* on page 48.

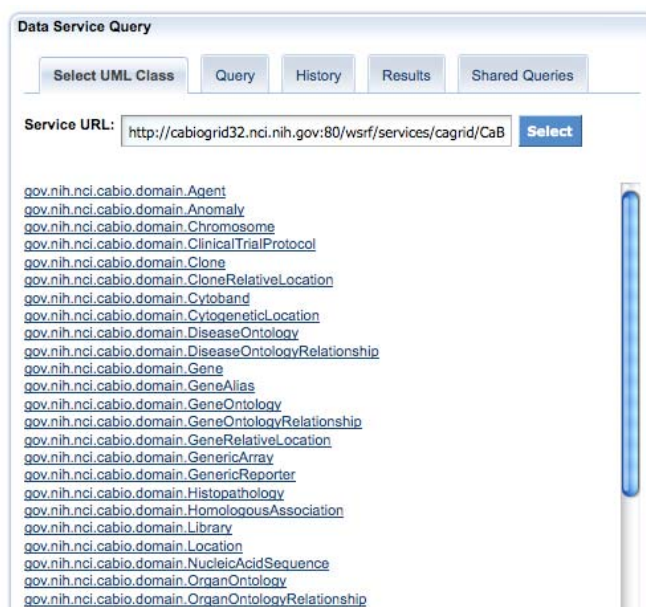


Figure 5-13. Query Builder specifying a service and URL

2. Select the `gov.nih.nci.cabio.domain.NucleicAcidSequence` class.

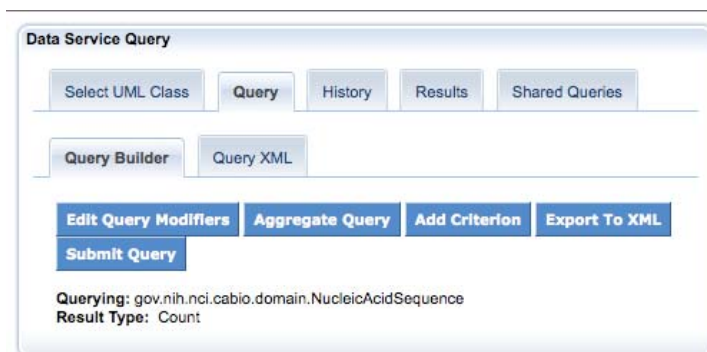


Figure 5-14 Query Builder tool with selected `NucleicAcidSequence` class

- Click the **Add Criterion** button. All of the possible criteria (class attributes and associations) appear as shown in Figure 5-16.

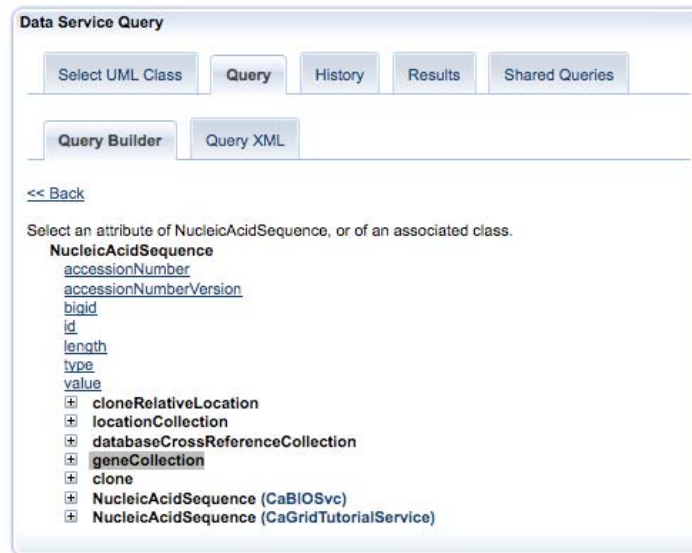


Figure 5-15 Tree view of attributes and associations for the *NucleicAcidSequence* class

- Expand the **NucleicAcidSequence** class tree node by selecting the **geneCollection** association. Further expand the tree by selecting the **proteinCollection** association as shown in Figure 5-16.

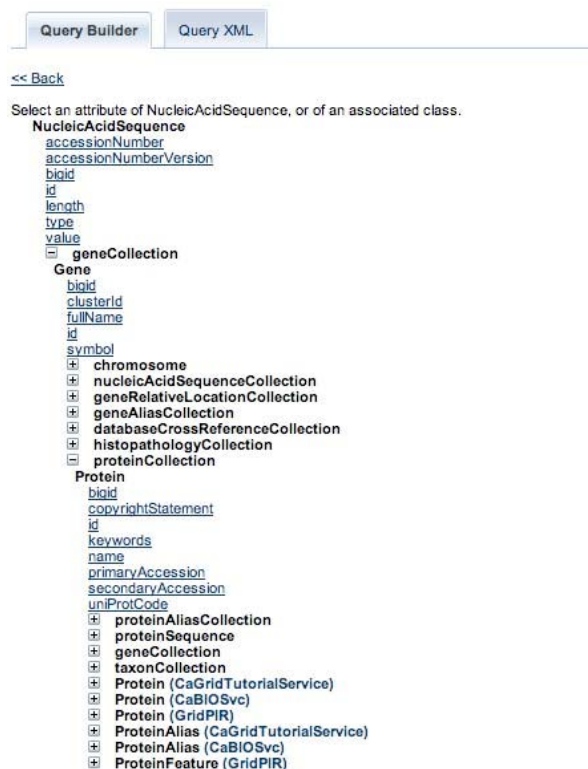


Figure 5-16 Query criterion tree view for caBIO NucleicAcidSequence class

Hovering the mouse over any service name that is next to a UML class provides further information about the service.

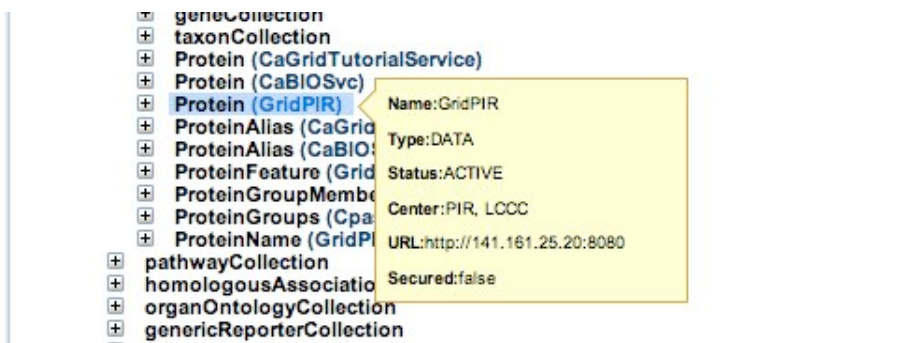


Figure 5-17 Service information for semantically equivalent UML class

6. Select the **Protein** class from the **GridPIR** service. The **Protein** class belongs to an external service (**GridPIR**) and is considered a foreign association in DCQL.
7. Expand the “foreign” UML class node. The Join Condition dialog box appears.
8. Select the Local Attribute as **uniProtCode** and the Foreign Attribute as **uniprotkbEntryName** as shown in Figure 5-18.

The screenshot shows a tree view on the left with the following structure:

- Protein (CaBIOSvc)
 - Protein (GridPIR)
 - Protein
 - Join Condition

Local Attribute:	uniProtCode
Predicate:	EQUAL_TO
Foreign Attribute:	uniprotkbEntryName
 - id
 - proteinType
 - uniprotkbEntryName
 - uniprotkbPrimaryAccession
 - databaseCrossReferenceCollection
 - uniprotkbAccessionCollection
 - proteinSequence
 - organelleCollection
 - geneCollection
 - organismCollection
 - keywordCollection
 - componentNameCollection
 - domainNameCollection
 - proteinNameCollection
 - proteinFeatureCollection
 - Protein (CaBIOSvc)

Figure 5-18 Selecting the join condition

- Expand the tree by selecting the **organismCollection** association tree node on the **Protein** class. Click the **scientificName** attribute of the **Organism** class. This lets you specify a value on the **scientificName** criterion for the **Protein** class as shown in Figure 5-19.

The screenshot shows the "Data Service Query" portlet with the following interface:

- Buttons: Select UML Class, Query, History, Results, Shared Queries
- Buttons: Query Builder, Query XML
- Table:

Attribute Name	Predicate	Value(s)
scientificName	EQUAL_TO	homo sapiens
- Buttons: Update, Delete, Cancel

Figure 5-19 Entering criterion value for Organism scientificName attribute

- Repeat steps 3-5. Select the **geneCollection** association tree node on the **Protein** class from **GridPIR**. Click the **name** attribute and enter **brca1** for the criterion as shown in Figure 5-20.

Attribute Name	Predicate	Value(s)
name	EQUAL_TO	brca1

Figure 5-20 Enter criterion value for Gene name attribute

The complete query is shown in Figure 5-21.

Querying: gov.nih.nci.cabio.domain.NucleicAcidSequence
Query Type: DCQL Query

Criteria:

- [-] geneCollection
 - [-] proteinCollection
 - [-] Protein (GridPIR)
 - [-] organismCollection
 - scientificName EQUAL_TO homo sapiens
 - geneCollection
 - name EQUAL_TO brca1

Figure 5-21 Complete federated query for caBIO NucleicAcidSequence class

11. Click the **Export To XML** button. The DCQL query appears in XML format, as shown in Figure 5-22.

Data Service Query

Select UML Class Query History Results Shared Queries

Query Builder Query XML

Query:

```
<ns1:DCQLQuery xmlns:ns1="http://caGrid.caBIG/1.0/gov.nih.nci.cagrid.dcql">
  <ns1:TargetObject name="gov.nih.nci.cabio.domain.NucleicAcidSequence">
    <ns1:Association name="gov.nih.nci.cabio.domain.Gene" roleName="geneCollection">
      <ns1:Association name="gov.nih.nci.cabio.domain.Protein" roleName="proteinCollection">
        <ns1:ForeignAssociation
          targetServiceURL="http://141.161.25.20:8080/wsrf/services/cagrid/GridPIR">
          <ns1:JoinCondition foreignAttributeName="uniprotkbEntryName"
            localAttributeName="uniProtCode" predicate="EQUAL_TO"/>
          <ns1:ForeignObject name="edu.georgetown.pir.domain.Protein">
            <ns1:Group logicRelation="AND">
              <ns1:Association name="edu.georgetown.pir.domain.Gene" roleName="geneCollection">
                <ns1:Attribute name="name" predicate="EQUAL_TO" value="brca1"/>
              </ns1:Association>
            </ns1:Group>
          </ns1:ForeignObject>
        </ns1:Association>
      </ns1:Association>
    </ns1:Association>
  </ns1:TargetObject>
</ns1:DCQLQuery>
```

Submit Query

Figure 5-22 XML federated query for *caBIO NucleicAcidSequence* class

12. Click **Submit Query**. The query starts executing asynchronously. The **History** tab shows the running query as shown below.

Data Service Query

Select UML Class Query History Results Shared Queries

Operations	State	Start Time	Finish Time	Service
---		RUNNING Jun 22, 2008 2:27:19 PM		Service Name FQP

Figure 5-23 History Tab with the running DCQL query

After the query completes, the State text field automatically updates from *Running* to *Complete*.

13. In the Operations list, select **View Results**. The **Results** tab appears where you see the results of the distributed join query as shown in Figure 5-24.

Data Service Query

Select UML Class Query History **Results** Shared Queries

Displaying 1 to 10 of 210 results. [Export to Excel](#) [Export to XML](#)

type	length	accessionNumberVersion	value
2	665	1	TTTGCTCAGCGGTTTCGGTGGCAACAGTAAGCGTGGGAATTACAGA
2	234	1	CGGCCGCATcttttttcttttttcttttttGTTCCACATTCAAAGTGACTTTGG
2	654	1	ttttttttttttGTGAGCAATAGTTTTTAACTCACCTGGAGTCAGCAAAAAGC see full results]
2	909	1	AGTTTGCCAGAAAAACCACATCATCTTAACTAATCTAATTACTGAAGA see full results]
2	554	1	gagacggacctgtctgtcgccaggcgggaatgcagtggcatgatctggctcactgcaa GCACGAGGATTCTTCTGAAGATACCGTTAAATAAGGCAACTTATTGCAG see full results]
2	496	1	ttttttttGATAACTGTAACTTGCTATAAAGCACTTGACTCTATTGCATAA' CTAGCGGTAGCCCCCTGTGTTCCGTGGCAACGGAAAAAGCGCGGGA to see full results]
1	3642	2	TGCTCTCGCACGCTCCTTTAtccggggctgaagtattctctgcttagcacacty TGTTGGAACCCCCTTCTCGGCTGCCGCAAGGTGTTCTGGTCTCTCCG

Figure 5-24 Results of federated query for caBIO NucleicAcidSequence class

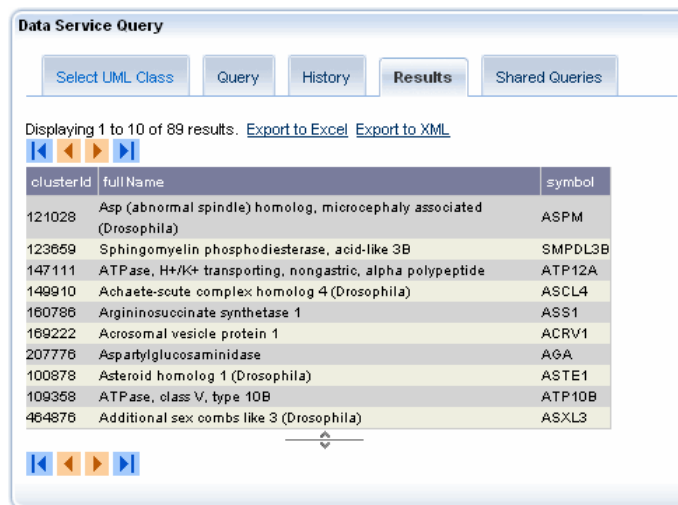
About the History Tab

As noted in the last section, when you run a query from the Query Builder or Query XML subtabs, the **History** tab becomes the active tab. This tab displays information about all of the queries you have executed.

If are a registered caGrid Portal user, the History list displays all queries that you have executed since you registered. If you are not registered, then you will see only queries that you have executed during the current browser session. The most recent query appears first.

The History tab also includes an **Operations** list, which includes the following operations:

- **View Results** – Displays the query results in the **Results** tab in tabular format as shown in Figure 5-25. The result list shows ten results at a time and includes buttons for browsing by page, skipping to the end of the list, or skipping to the beginning of the list. The **Export to Excel** link allows you to open or save the query in an Excel (*.xls) workbook and the **Export to XML** link allows you to open or save the query in XML format.



The screenshot shows the 'Data Service Query' interface with the 'Results' tab selected. It displays a table of query results with columns for 'clusterId', 'full Name', and 'symbol'. The table lists 10 results, including genes like ASPM, SMPDL3B, ATP12A, ASCL4, ASS1, ACRV1, AGA, ASTE1, ATP10B, and ASXL3. Navigation buttons and links for 'Export to Excel' and 'Export to XML' are visible above the table.

clusterId	full Name	symbol
121028	Asp (abnormal spindle) homolog, microcephaly associated (Drosophila)	ASPM
123659	Sphingomyelin phosphodiesterase, acid-like 3B	SMPDL3B
147111	ATPase, H+/K+ transporting, nongastric, alpha polypeptide	ATP12A
149910	Achaete-scute complex homolog 4 (Drosophila)	ASCL4
160786	Argininosuccinate synthetase 1	ASS1
169222	Acrosomal vesicle protein 1	ACRV1
207776	Aspartylglucosaminidase	AGA
100878	Asteroid homolog 1 (Drosophila)	ASTE1
109358	ATPase, class V, type 10B	ATP10B
464876	Additional sex combs like 3 (Drosophila)	ASXL3

Figure 5-25. Results tab showing query results

- **Reload** – Reloads the query into the **Query XML** subtab, where you can edit the query or run it again.
- **Delete** – Removes the query from the query history.

Table 5-3 describes the remaining information displayed on the History tab.

Option	Description
State	The current state of the query. The next five rows list each status and explain what operations you can perform while each status is in effect.
RUNNING	Indicates that the query is still running. You can cancel or delete the query.

Option	Description
COMPLETE	Indicates that the query completed successfully. You can view results, reload, or delete the query.
ERROR	Indicates that the query failed. You can view the error, reload the query, or delete the query.
CANCELED	Indicates that you canceled the query. You can reload or delete the query
TIMED OUT	Indicates that the system canceled the query. You can reload or delete the query
Start Time	The time that the query started running, displayed in hours, minutes, and seconds.
Finish Time	The time that the query finished running, displayed in hours, minutes, and seconds.
Service	The name of the target service.

Table 5-3. History tab information

Working with Shared Queries

If you are currently logged in, you can share new or previously executed queries with other caGrid Portal users. This section explains how to share a query and how to search for shared queries.

Note: Only CQL queries can be shared. DCQL queries cannot be shared at this time.

Sharing a Query

To share a query, follow these steps:

1. If you are not currently using the Data Service Query portlet, click the **Services** tab on the main navigation bar.
2. To share a *new* query, follow these steps:
 - a. Build the query as explained in *Building a Query Using the Query Builder Tool* on page 50.
 - b. Skip to step 4.
3. To share a *previously executed* query, follow these steps:
 - a. Click the **History** tab.
 - b. Select the **Re-load** command from the **Operations** drop-down list.
 - c. Continue to the next step.
4. On the **Query** tab > **Query Builder** or **Query XML** subtab, click **Share Query**.
The **Shared Queries** tab > **My Queries** subtab becomes the active tab.
5. Enter a name and description for the query using the **My Queries** form shown in Figure 5-26.

Note: The name and description are required.

Figure 5-26. Form for adding a query name and description

6. Click **Save**.

A message confirms that the shared query has been successfully saved.

7. Click the **<< To shared queries list** link.

The **Shared Queries** tab > **My Queries** subtab becomes the active tab. Your saved, shared query is summarized at the bottom of the form.

Operations	Name	Target Service	Target UML Class	Share Date
-- [v]	Gene Domain - Mouse	CaBIOSvc	Gene	Dec 21, 2007 8:49:43 AM

Figure 5-27. Saved query

The query summary shows the following information:

- A slightly different version of **Operations** drop-down list (see step 8)
- Name
- Target Service
- Target UML Class
- Shared Date

8. (Optional) Select any of the following options from the **Operations** drop-down list:
 - **Edit** – Returns to the **Shared Queries** tab > **My Queries** subtab, where you can edit the query name and description.
 - **Load** – Runs the query and displays the **Query** tab > **Query XML** subtab.
 - **View** – Activates the **Shared Queries** tab > **My Queries** subtab and shows the query in XML format.

Searching for a Shared Query

You can search for shared queries using a keyword search and selected constraints, including the target service, target UML class, and query creator.

To search for a shared query, follow these steps:

1. If you are not currently using the Data Service Query portlet, click the **Services** tab on the main navigation bar.
2. Click the **Shared Queries** tab.
3. Click the **Find Shared Queries** subtab.

The screenshot shows the 'Data Service Query' portlet interface. At the top, there are five tabs: 'Select UML Class', 'Query', 'History', 'Results', and 'Shared Queries'. The 'Shared Queries' tab is selected. Below this, there are two subtabs: 'My Queries' and 'Find Shared Queries'. The 'Find Shared Queries' subtab is active. In this subtab, there is a 'Keyword:' text input field. Below it is a 'Search Fields:' section with a list box containing the following options: 'Query Name', 'Query Description', 'Target Service URL', 'Target Service Name', 'Target UML Class Name', 'Query Creator First Name', 'Query Creator Last Name', and 'Query Creator Email'. A 'Search' button is located at the bottom left of the form.

Figure 5-28. Shared Queries tab > Find Shared Queries subtab – Search form

4. Enter one or more keywords in the **Keyword** field.
5. Select desired search constraints in the **Search Fields** selection box.

Note: If you do not select search fields, all of the fields are included in the search.
6. Click **Search**.

The query results appear in a paginated list.
7. (Optional) To edit, load, or view a found query, select an option from the **Operations** list.

Chapter 6 Using the Community Portlet

Developers in the caBIG® community may create Java Specification Request 168 (JSR 168) compliant portlets and then deploy them to the caGrid Portal. This chapter provides references to community developers who may want to develop such a portlet.

Topics in this chapter include:

- *About JSR 168 and the Liferay Portal* on this page
- *Accessing the Community Portlet* on this page
- *Deploying a Community Portlet* on page 72

About JSR 168 and the Liferay Portal

The Java Community Process (JCP), an open, international, community-based organization, created the JSR 168 in 2003 to enable interoperability between portlets and portals.

The caGrid Portal was built on the Liferay Portal, an open-source portal designed to deploy portlets that adhere to JSR 168. The caGrid Portal can therefore host any JSR 168 compliant portlet application.

For more information about JSR 168, see <http://jcp.org/en/jsr/detail?id=168/>. For more information about Liferay, see <http://www.liferay.com/>.

Accessing the Community Portlet

You can access all available community portlets on the Community tab.



Figure 6-1. Community Portlet, caBIO Portlet example

At this time, only one portlet has been deployed within caGrid. The number of community portlets will expand over time.

Get online help for each community portlet by clicking the question mark icon in the portlet window.

Deploying a Community Portlet

More information about developing and deploying a JSR 168 portlet in the caGrid Portal are available in the Community Portlet Guide at <http://www.cagrid.org/wiki/Portal:2.1:CommunityPortlets>.

Before submitting your portlet to the caGrid team, be sure to test it locally. Instructions for deploying a JSR 168 compliant portlet into a local installation of caGrid Portal are located in the Community Portlet Guide.

Chapter 7 Using Other Portal Features

The previous chapters covered the main caGrid Portal features used for discovering and querying caGrid services, caBIG® participants, and caGrid POCs. The portal includes other useful portlets: *News*, *caGrid Links*, *caGrid Status*, and *Calendar*. This chapter provides an overview of the portlets.

Topics in this chapter include:

- *Using the News Portlet* on this page
- *Using the caGrid Status Portlet* on page 76
- *About the Calendar Portlet* on page 78

Using the News Portlet

The caGrid Portal gives you the latest caGrid-related news through an RSS news feed. You can view the latest news on the portal site using two links:

- The **News** portlet on the home page
The portlet displays news headlines as links. The posting date and time, as well as a portion of the text follow each headline from the article. Clicking a link opens the News page, where you can read the full article.
- The **News** link on the main navigation bar
This link takes you directly to the News page, shown in Figure 7-2 on page 75.

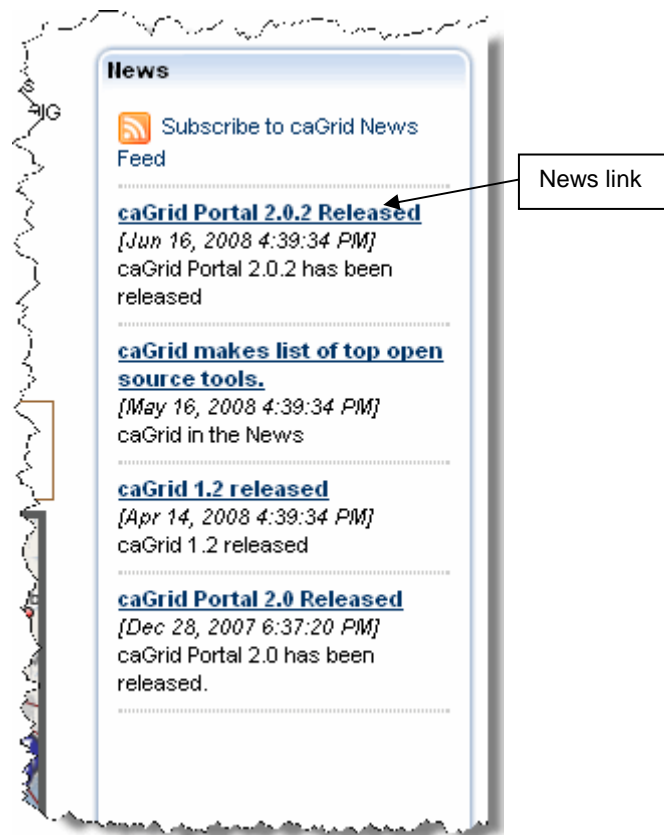


Figure 7-1. News links

On the News page, the main article appears in the middle area of the page. Other article links are listed in the **Other News** section at the bottom of the page.

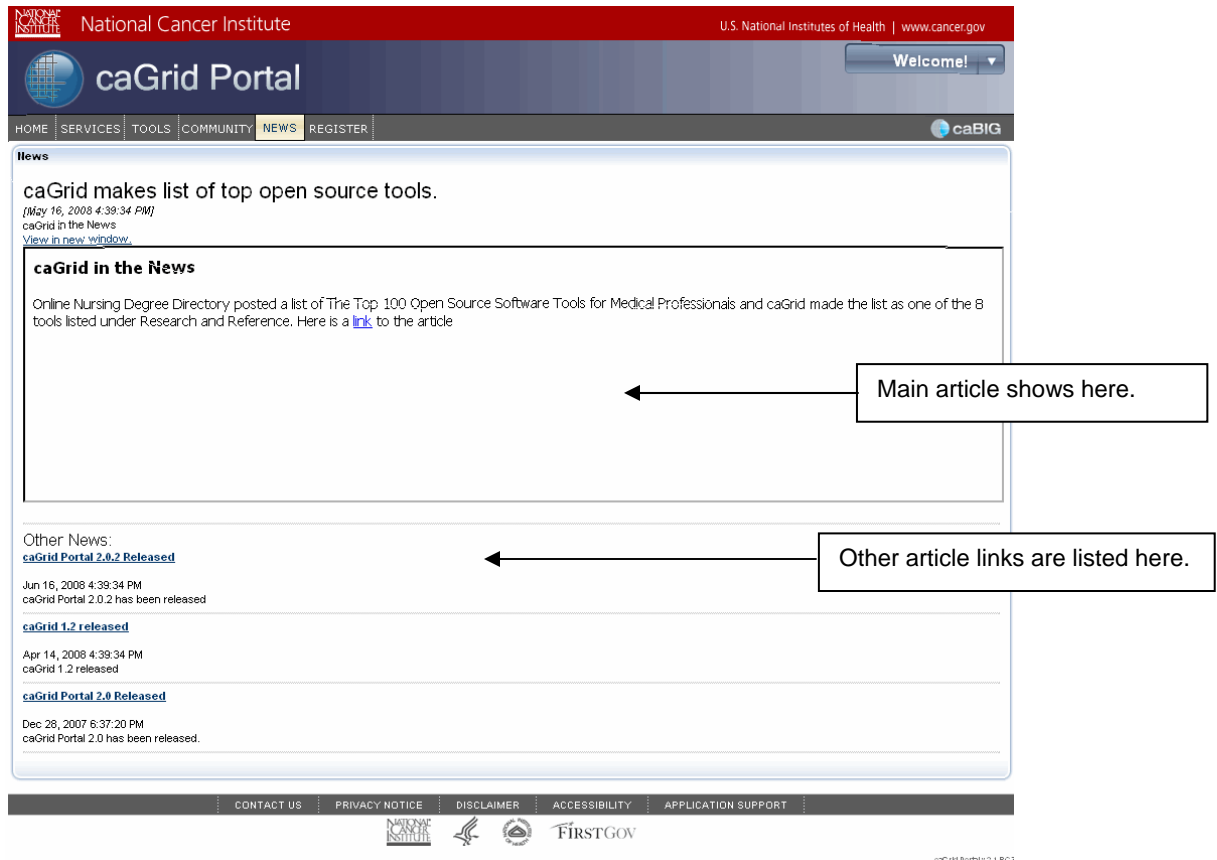


Figure 7-2. News page

Note: You can subscribe to the portal news feed directly from your browser or using any RSS 2.0-compliant news reader.

About the caGrid Links Portlet

The caGrid Links portlet includes links to the following sites:

- The caGrid Portal User's Guide at https://gforge.nci.nih.gov/plugins/scm cvs/cvsweb.php/~checkout~/cagrid-1-0/Documentation/docs/portal/portal2/guides/caGrid-Portal_2.0.2_UsersGuide.pdf?rev=HEAD;content-type=text%2Fplain;cv sroot=cagrid-1-0 is the latest version of this guide.
- caGrid Portal Wiki Pages at <http://www.cagrid.org/mwiki/index.php?title=Portal:Portal>. caGrid developers maintain these pages and use them to document all of the features of the caGrid Portal.
- The caBIG® Community Website at <https://caBIG.nci.nih.gov/>. This site provides a comprehensive overview of caBIG®.
- The caGrid Website at <https://cabig.nci.nih.gov/workspaces/Architecture/caGrid>. This site provides an overview of the caGrid.

- The caGrid Wiki at <http://www.cagrid.org/mwiki/index.php?title=CaGrid>. This site provides a collaborative environment for caGrid users.

Using the caGrid Status Portlet

The caGrid Status portlet provides a quick, visual description of the scale and activity of caGrid.

As shown in Figure 7-3, the Status portlet is located on the right side of the home page, just below the **Login** and **Register** links.

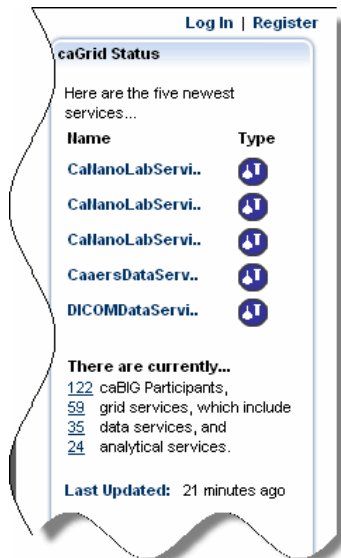


Figure 7-3. Status portlet

The following table explains the information that the portlet provides.

Status Item	Description
Service links	Click the links to the five most recently registered services. Links open the Services page where you can use the Discovery portlet to view details for a specific service or select from a list view.
Service info popup window	Hover your mouse over any service to quickly see the service's name, type, status, hosting center, hosting center URL, and secured status.
Type icons	Icons that denote the service type. See <i>Selecting a Service, Participant, or POC</i> on page 19 for a table explaining each icon.
Counts	Up-to-date counts of all participants, services, data services, and analytical services.
Timestamp	Indicates the last time at which the portal aggregated data from the index service.

Viewing Details for a Recently Registered Service or Participant

The upper half of the Status portlet lists the five most recently registered services or participants with an identifying icon to the right of each listed item.

To view details for an item, click the name of the item. The Services page appears with the **Details** tab and **Service** subtab of the Discovery portlet selected. From there you can drill down to more detail as discussed in Chapter 4, *Using the Discovery Portlet*, on page 27.

Viewing a List of Participants or Services

The lower half of the Status portlet shows current counts for caGrid participants and services. Here you can view totals for all participants, all services, all data services, and all analytical services.

To view a list of services or participants, click the underlined number preceding each item. The Services page appears with the **Directory** tab and **List View** subtab of the Discovery portlet selected. The list display varies according to whether you selected a participant or service. You can select a list item and drill down to more detail as discussed in *Using the List View Subtab* on page 28.

About the Calendar Portlet

Appearing at the bottom of the caGrid Portal home page, the Calendar portlet provides dates of important caGrid-related events. Figure 7-4 shows this portlet as it appears on the home page.

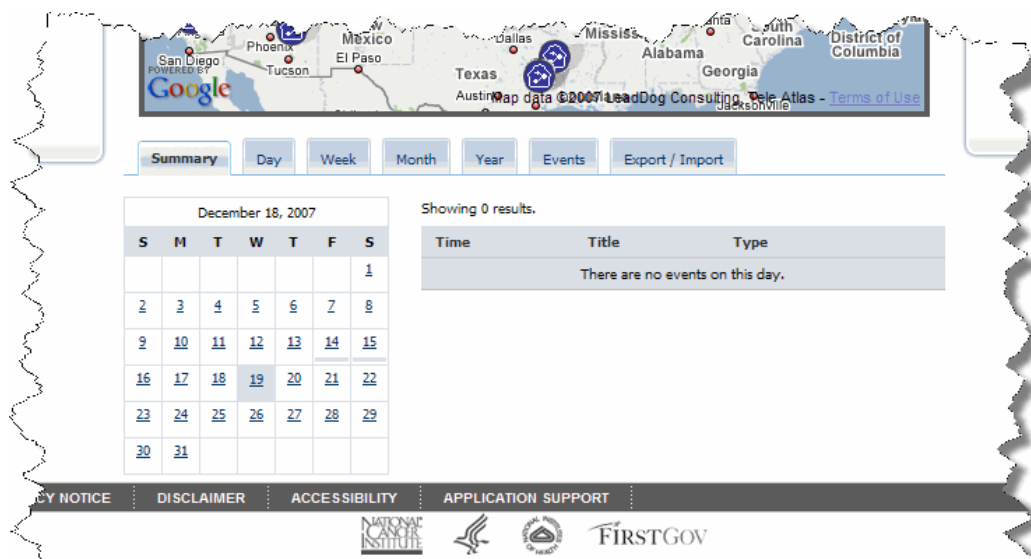


Figure 7-4. Calendar portlet

You can change the view of the calendar by clicking the various tabs described in Table 7-1.

Tab	Description
Summary	Shows a calendar on the left and a list of events on the right.
Day	Shows events for the selected day and enables you to browse forward or backward in one-day increments.
Week	Shows a seven-day view starting with the selected day and enables you to browse forward or backward in seven-day increments.
Month	Shows the current month as a full-sized calendar.
Year	Shows a calendar for each day of the current year.
Events	Shows a listing of events, including the date, time, title, and type. Click the event title to view details for the event.
Export/Import	Enables you to import a file and add an event to your calendar.

Table 7-1. Description of Calendar portlet tabs

Chapter 8 Using the caBIG® Tools Portlet

The caBIG® Tools portlet allows you to access the same inventory of tools that are available on the [caBIG® Community Website](https://cabig.nci.nih.gov/inventory). This chapter explains how to browse those tools.

Topics in this chapter include:

- *About the caBIG® Tools Portlet* on this page
- *Sorting caBIG® Tools* on page 82
- *Viewing caBIG® Tool Details* on page 65

About the caBIG® Tools Portlet

To expedite the cancer research community's access to key bioinformatics tools, platforms, and data, the caBIG® Community Website (<https://cabig.nci.nih.gov/inventory>) lists applications (tools) and their documentation, as well as infrastructure and datasets used to support the caBIG® initiative. The inventory is updated as new items are released.

The caGrid Portal provides another entry point into the tools component of that inventory. When you click the caGrid **Tools** tab, the most current list of caBIG® tools appears.

The caBIG® tools inventory includes over 40 software tools, database technologies, and Web-based applications in the areas of clinical trials management, biospecimens, imaging, genome annotation, proteomics, microarrays, pathways, data analysis and statistical tools, data sharing, infrastructure, vocabularies, and translational research. They are based on open-source software and free. Download packages include installation elements and documentation. In many cases training is also offered.

As on the caBIG® website, caGrid users can search for these tools based on name, compatibility level, keyword, area of focus, workspace, and technical specifications.

The features of the caGrid Tools portlet are illustrated in Figure 8-1.

The screenshot shows the caGrid Portal interface. At the top, the National Cancer Institute logo and 'U.S. National Institutes of Health | www.cancer.gov' are visible. The main navigation bar includes 'HOME', 'SERVICES', 'TOOLS' (highlighted), 'COMMUNITY', 'NEWS', and 'REGISTER'. A 'Welcome!' button is on the right. Below the navigation bar, the 'Tools' portlet is displayed. It features a search results section for 'caBIG™ Tools'. The 'Sort by:' dropdown is set to 'Title'. Other sort options include 'Area of Focus', 'Primary Workspace', 'Maturity Level', 'Compatibility Level', 'caGrid Enabled', and 'Installation Level'. A callout box labeled 'Tools' points to the 'TOOLS' tab in the navigation bar. Another callout box labeled 'Sort options' points to the 'Sort by:' dropdown. A third callout box labeled 'Number of caBIG tools currently in the caBIG tool inventory' points to the text '45 results returned'. The search results list two tools: 'Bioconductor' and 'caAdapter'. Each tool entry includes its 'Primary Workspace', 'Maturity Level', 'Installation Level', 'Area of Focus', 'caGRID Enabled' status, and 'Compatibility Level'. The 'Bioconductor' tool is currently selected, and its details are expanded. The 'caAdapter' tool is listed below it. At the bottom of the page, there is a footer with links for 'CONTACT US', 'PRIVACY NOTICE', 'DISCLAIMER', 'ACCESSIBILITY', and 'APPLICATION SUPPORT', along with logos for the National Cancer Institute, the U.S. Department of Health and Human Services, and 'FIRSTGOV'.

Figure 8-1. Tools portlet

Sorting caBIG® Tools

While the caBIG® tools are sorted alphabetically by title by default, you can change the sort order to more easily find and understand each tool.

To sort caBIG® tools, follow these steps:

1. If you are not currently using the Tools portlet, click the **Tools** tab on the main navigation bar. The Tools page appears.
2. Click one of the sort headers at the top of the page. See Table 8-1 for a description of each header.

The tools in the list are sorted by the selected header. The sort header currently in effect is highlighted in red.

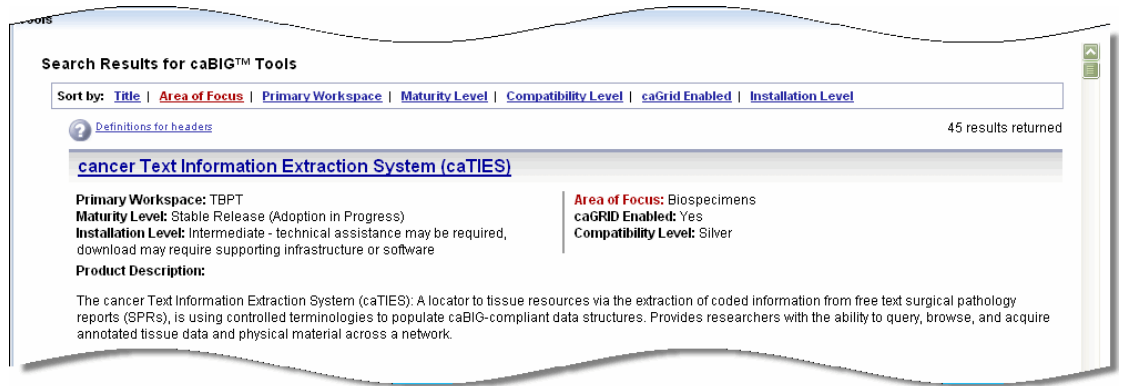


Figure 8-2. caBIG® tools sorted by Area of Focus

The following table explains each of the sort headers available in the caBIG® Tools portlet.

Sort Header	Description
Title	This is the name of the tool as chosen by the development team and the caBIG® Workspace who fostered the development. Tool titles are sorted alphabetically.
Area of Focus	<p>The Area of Focus is the primary domain-specific audience or technical area that the tool serves. Only one area is specified from the following choices:</p> <ul style="list-style-type: none"> • Biospecimens • Data Analysis and Statistical Tools • Clinical Trials Management • Genome Annotation • Data Sharing • Infrastructure • Imaging • Pathways • Microarrays • Translational Research • Proteomics • Other • Vocabularies

Sort Header	Description
Primary Workspace	<p>The caBIG® Workspace where the tool was originally developed and maintained. Only one area is specified from the following choices:</p> <ul style="list-style-type: none"> • ARCH (Architecture Workspace) • CTMS (Clinical Trials Management Systems Workspace) • DSIC (Data Sharing and Intellectual Capital Workspace) • DT (Documentation and Training Workspace) • ICR (Integrative Cancer Research Workspace) • IMAG (Imaging Workspace) • SP (Strategic Planning Workspace) • TBPT (Tissue Banks and Pathology Tools Workspace) • VCDE (Vocabulary and Common Data Elements Workspace)
Maturity Level	<p>Developers of the tool are required to assign a maturity level assessment to the version of the tool. The tool maturity level must be classified as one of the following:</p> <ul style="list-style-type: none"> • Development Phase • Beta-Test or Pilot Release Available (Pre-Adoption) • Stable Release (Adoption in Progress) • Mature Product (Successfully Adopted)
Compatibility Level	<p>To aid in the creation of software that will be able to interoperate within the caBIG® program, a set of compatibility guidelines was developed that spells out requirements for interoperability in areas of Interface Integration, Vocabularies/Terminologies and Ontologies, Information Models and Data Elements. Systems that meet the requirements are said to be caBIG® Compatible</p> <p>The levels of compatibility are:</p> <ul style="list-style-type: none"> • Gold Level Compatibility • Silver Level Compatibility • Bronze Level Certification • Legacy <p>Learn more about compatibility at https://cabig.nci.nih.gov/guidelines_documentation.</p>
caGrid Enabled	<p>caGrid is the distributed infrastructure built upon established standards and technologies that provides the concrete implementation for this interoperability to happen seamlessly. When systems are built following the caGrid specifications, these systems are able to discover, access and use other similarly built services programmatically. These software systems are then called "caBIG® Grid Enabled".</p> <p>In terms of compatibility guidelines, "caBIG® Grid Enabled" applications would become the "Gold" compatible systems once the caBIG® Cross cutting work spaces start performing "Gold" compatibility reviews.</p>

Sort Header	Description
Installation Level	<ul style="list-style-type: none">• Basic - Wizard or web browser application; minimal technical assistance required• Intermediate - technical assistance may be required, download may require supporting infrastructure or software• Advanced - technical team required for installation

Table 8-1. Sort header options

Viewing caBIG® Tool Details

Click any tool in the list to view details about that tool. Details about each tool are structured similarly and include the following information next to the tool logo:

- Product Summary
- Demo Files & Exercises
- Documentation & Training
- Tool Download Files
- End User Support Resources
- Related caBIG® Tools.
- Developer Institution(s) & Adopter Institution(s)
- Related Articles

Figure 8-3 shows the home page for one caBIG® tool.

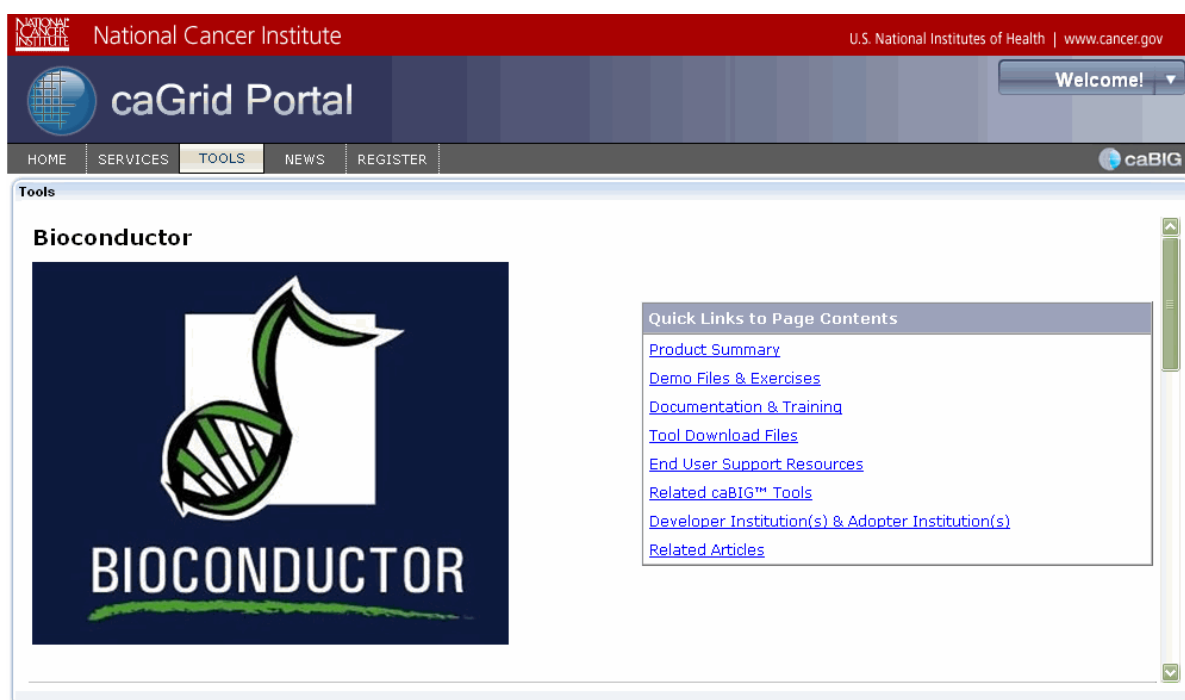


Figure 8-3. caBIG® tool details

Index

A

analytical service
 selecting (Map portlet), 21
 viewing details for, 40

C

caBIG® tools
 sorting, 82
 viewing details, 85
caBIG® Tools portlet, 81
Calendar portlet, about, 8, 78
Categories list (Map portlet), 18
Community portlet, about, 71

D

data service
 query, about, 6
 selecting (Map portlet), 19
 viewing details for, 39
Data Service Query Portlet, about, 47
DCQL queries
 aggregate, 55
 building, 55
 distributed, 57
Details tab
 Participant subtab, 42
 POC subtab, 43
 Service subtab, 39
details, viewing
 for caBIG® tools, 85
 for data service, 39
 for new participant, 77
 for participant, 42
 for POC, 43
diagnostics, service, 43
Directory tab
 List View subtab, 28
 Map View subtab, 31
Discovery portlet, about, 27
discovery, about, 4–5

E

events. See Calendar portlet

H

History tab, about, 65
home page, about, 9
hosting research center, selecting (Map portlet), 24

I

icons for Map portlet, 19

J

JSR 168, 71

L

Links portlet, about, 75
List View subtab, using, 28
logging in
 as NIH user, 16
 as registered user, 14

M

Map portlet
 about, 17
 analytical service, selecting, 21
 Categories list, 18
 data service, selecting, 19
 hosting research center, selecting, 24
 icons for, 19
 participant institute, selecting, 22
 POC, selecting, 25
Map View, using, 31
metadata
 for analytical service, 40
 for data service, 39
 for participant, 42
 for POC, 43
 for services, 5

N

News portlet, about, 8, 73

P

participant
 searching for, 36
 viewing details for, 42
participant institute, selecting (Map portlet), 22
POC
 searching for, 37
 selecting (Map portlet), 25
 viewing details for, 43
portlet
 Calendar, 78
 Community, 71
 Data Service Query, 47
 Discovery, 27
 Links, 75
 Map, 17

- News, 73
- Status, 76
- Tools, 81

Q

query

- building, 50
- building a CQL, 50
- building a distributed DCQL, 57
- building an aggregate DCQL, 55
- for data service, 6
- portlet overview, 47
- scenarios for building, 48
- shared, searching for, 69
- sharing
 - about, 6
 - procedure for, 67

R

registration

- about, 11
- procedure for, 12
- technical details for, 7

S

Search tab

- Participant subtab, 36
- POC subtab, 37
- Services subtab, 32

searching

- for participant, 36
- for POC, 37
- for service, 32
- for shared query, 69

service

- analytical, viewing details for, 40
- data, viewing details for, 39
- searching for, 32
- viewing details for, 39

service diagnostics, 43

Status portlet

- about, 8
- using, 76

W

Welcome menu, about, 16