

## 3. Client Subsystem Overview

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### 3.1 Subsystem Overview

The client subsystem provides a collection of components through which users access the services and data available in ECS and other systems interoperable with ECS. The client subsystem also includes the services needed to interface an application with ECS (e.g., for automated or custom data access). Accessed services can be remote (i.e., via wide-area network to other sites) and local (e.g., to a database manager at the user's site).

Client subsystem components fall into one of the following general categories:

- o An intuitive desktop manager, which manages desktop objects (files) in the user's local file space, and which represent applications and data in the domain of the client.
- o Application programs accessible through graphically oriented user interfaces which implement the range of functionality available in the client.

In addition, the workstations which operate an ECS client subsystem will contain infrastructure support software which is part of CSMS and platform operating support software such as the vendor Operating System and its supporting software libraries.

### 3.2 Subsystem Structure

The Client subsystem for Release B is composed of two CSCIs:

- o Desktop CSCI (DSKT) is a software component. It provides a standardized GUI framework for the user's interaction with ECS software and data.
- o Workbench CSCI (WKBCH) is a software component. It includes the initial set of ECS provided applications and libraries that provide access to ECS data and services.

There is no hardware CI for the client subsystem. The client subsystem gets installed on the science user's workstation. It also gets installed on the appropriate hardware to support operations personnel, but these workstations are not dedicated solely to the client subsystem. The client is installed at the locations where operations personnel would typically access the utilities supported by or installed in the client subsystem.

Figure 3.1-1 shows the subsystem context within ECS. For each of the context diagram flows, Table 3.1-1 contains a description of the subsystem interfaces.

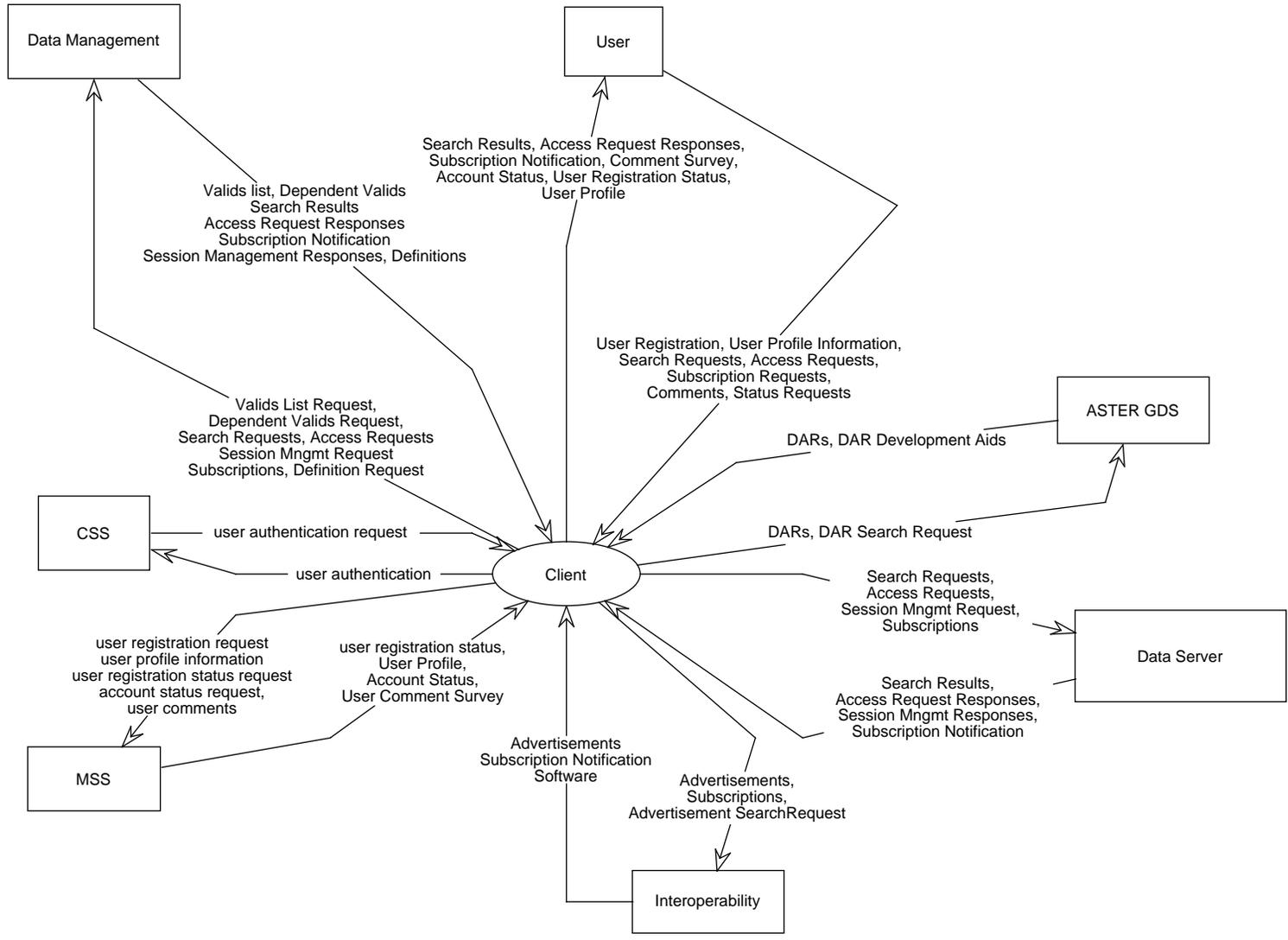


Figure 3.1-1. Client Subsystem Context Diagram

**Table 3.1-1. Subsystem Interfaces (1 of 3)**

<b>Source</b>	<b>Destination</b>	<b>Data Types</b>	<b>Data Volume</b>	<b>Frequency</b>
User	Client	User Registration Request	low	first access to the system
User	Client	User Profile Info	low	at least first order, then updates only as required
User	Client	Search Requests	low	as required
User	Client	Access Requests	low	as required
User	Client	Subscriptions	low	as required
User	Client	Comments	low	as required
User	Client	Status Requests	low	as required
Client	User	User Registration Status	low	in response to request
Client	User	User Profile	low	in response to request
Client	User	Search Results	low	in response to request
Client	User	Access Request Responses	low	in response to request
Client	User	Subscription Notification	low	in response to event
Client	User	Comment Survey	low	in response to request
Client	User	Account Status	low	in response to request
Client	Data Management	Search Requests	low	as requested
Client	Data Management	Access Requests	low	as requested
Client	Data Management	Session Management Requests	low	as requested
Client	Data Management	Subscriptions	low	as requested
Client	Data Management	Valid List Request	low	as requested for initializations
Client	Data Management	Dependent Valid Request	low	as requested for initializations
Client	Data Management	Definition Request	low	as requested
Data Management	Client	Search Results	low-high	in response to request
Data Management	Client	Access Request Responses	low	in response to request
Data Management	Client	Session Management Responses	low	as available or requested

**Table 3.1-1. Subsystem Interfaces (2 of 3)**

<b>Source</b>	<b>Destination</b>	<b>Data Types</b>	<b>Data Volume</b>	<b>Frequency</b>
Data Management	Client	Subscription Notification	low	in response to an event specified in the subscription
Data Management	Client	Valid List	low-medium	as requested
Data Management	Client	Dependent Valid	low-medium	as requested
Data Management	Client	Definitions	low	as requested
Client	Data Server	Search Requests	low	as requested
Client	Data Server	Access Requests	low	as requested
Client	Data Server	Session Management Requests	low	as requested
Client	Data Server	Subscriptions	low	as requested
Data Server	Client	Search Results	low-high	in response to request
Data Server	Client	Access Request Responses	low	in response to request
Data Server	Client	Session Management Responses	low	as available or requested
Data Server	Client	Subscription Notification	low	in response to an event specified in the subscription
Client	Interoperability	Advertisement Search Requests	low	as requested
Client	Interoperability	Subscriptions	low	as requested
Client	Interoperability	Advertisements	low	as supplied by user
Interoperability	Client	Advertisements	low	in response to request
Interoperability	Client	Subscription Notification	low	in response to subscription
Interoperability	Client	Software	low	as requested
Client	MSS	User Registration Status Requests	low	as required
Client	MSS	User Registration Requests	low	as required
Client	MSS	User Profile Information	low	as required
Client	MSS	Account Status Request	low	as requested
Client	MSS	User Comments	low	as required
MSS	Client	User registration status	low	as required

**Table 3.1-1. Subsystem Interfaces (3 of 3)**

<b>Source</b>	<b>Destination</b>	<b>Data Types</b>	<b>Data Volume</b>	<b>Frequency</b>
MSS	Client	User Profile	low	as requested
MSS	Client	account status	low	as requested
MSS	Client	user comment survey	low	as requested
Client	CSS	user authentication request	low	as required
CSS	Client	user authentication response	low	as required
Client	ASTER GDS	DARs	low	as requested
Client	ASTER GDS	DAR Search Request	low	as requested
ASTER GDS	Client	DARs	low	in response to search request
ASTER GDS	Client	DAR Development Aids	low	at initialization

In the table, where an exact number is unavailable, the data volume is estimated as low (less than 1 MB), medium (between 1 MB and 1 GB), or high (greater than 1 GB) per use defined in the frequency column. The frequency information will be updated as the interfaces are fully defined.

Table 3.1-2 provides descriptions of the flows found in Table 3.1-1.

**Table 3.1-2. Client Subsystem Flow Definitions (1 of 2)**

Data Type	Data Type Description
Advertisements	There are three types of advertisements, service advertisements, product advertisements, and provider advertisements. These are submitted by other subsystems and are returned as the result of a search as part of the Interoperability subsystem.
Advertisement Search Request	The calling subsystem creates a search request to retrieve an advertisement. In Release B this is expressed in an Earth Science Query Language.
Subscription	Subsystems can subscribe to events that occur in ECS components. For example, a user can ask to be notified every time a granule is inserted into a specific data collection.
Subscription Notification	A notification is sent upon a specific event occurring. The notification can be either a process to process notification or an electronic mail message. An example of an event is a new advertisement being defined. The notification would include the universal reference (UR) to the advertisement.
Software	The software flow is a software component that must get installed on the client in order to run a particular service. For example, if the user is attempting to install a search service, they can "drag-and-drop" that service onto their local desktop. The advertising service installer program will install this software on the user's workstation for later use.
Valid List Request	The client requests valid value information from the Data Management Subsystem in order to initialize the screens. An example of a valid list request is: select all the values for the attribute "Instrument Name".
Dependent Valid Request	The client requests dependent valids information from the Data Management Subsystem. This provides a list of valid values that are relevant given another value. For example, select all values for the attribute "Instrument Name" given that "Satellite Name" = NOAA6.
Valid List	A list of valid values for one or more attributes.
Dependent Valid	A list of valid values for a group of attributes and their relationship to each other.
Search Request	Any search request for Earth Science or related data.
Search Results	The results that are returned for a search request.
Access Requests	Any request for a service on Earth Science or related data. Examples of access requests are: Browse requests, Data Orders, and other available pre-order data services.
Access Request Responses	Messages that are returned in response to an access request. For example, on a browse request, the client will inform the user when the data has been pushed to the user's workstation.
Session Management Request	A session management request is a request to suspend, terminate, resume, or a makeBatch a session. These are all supported by ECS components such as Distributed Information Managers (DIMGRs) and Local Information Managers (LIMGRs).
Session Management Responses	These are responses confirming that the requested action has or has not taken place.
User Registration Request	A user submits a request to be a registered user of ECS. This allows for special privileges not awarded to guests, such as the ability to order data that could cost money (such as ordering data on media that comes at a cost).

**Table 3.1-2. Client Subsystem Flow Definitions (2 of 2)**

<b>Data Type</b>	<b>Data Type Description</b>
User Registration Status Request	The registration does not occur immediately so a user can ask for the status of the registration request.
User Profile	The user profile is the important information about a user that must be maintained. This includes mailing, billing, and shipping addresses, phone number, electronic mail address, etc.
Account Status Request	The user can ask for the status of orders and the costs of these orders.
Account Status	The data that is returned for an account status request.
User Comments Survey	A list of qualitative questions that are asked about the client subsystem to assess the usability of the system.
User Comments	The answers to the survey as well as free text comments on the usability of the client subsystem.
User Authentication Request	A request to authenticate the user name and password of the user, if guest access is not requested.
User Authentication Response	A success or failure response to the authentication request. In case of failure to authenticate a message back to the user will indicate the reason (i.e., invalid user name or password).
Definition Request	The client uses the Data Dictionary Service in the Data Management Subsystem to provide definitions of terms, such as attribute names, valid values, etc.
Definition	The Data Dictionary Service provides definitions of terms back to the client.
DARs	Data Acquisition Requests as specified in the ASTER GDS IRD/ICD.
DAR Search Request	A search for existing DARs already in the ASTER GDS system.
DAR Development Aids	All the data needed by the client in order to allow the user to specify a DAR, for example, the instrument plans and schedules, the planning aids (in order to show ground tracks), etc.

### 3.3 Subsystem Design Rationale

The client design drivers are a set of requirements for creating a software system which is supported on HP, Sun, SGI, DEC, and IBM UNIX workstations and which users can either install on their local workstation or access remotely. Required capabilities include obtaining data and services from ECS and non-ECS entities external to the client, as well as submitting data, software, and documentation into the ECS. To meet the challenge of creating a friendly, easy to use interface to the broad range of ECS capabilities, the client desktop paradigm was developed. This consists of a desktop manager which manages a set of desktop objects, which are represented iconically. Desktop objects represent files on the user's workstation. The set of core client application programs is collectively called "the Workbench". The need to manage the desktop and objects under its control was the main driver for the desktop's design. Further, the specific requirements for the client to send and receive ECS and non-ECS data, software, and advertisements, access services, provide user feedback, create hypertext-based documents, track client activities, visualize ECS data, obtain definitions of terms and acronyms, and register as an ECS user, drove the design of the Workbench applications.

The Release B user interface (Version 1) will replace the Release A deployed Version 0 interface. Classes from the Release A Desktop CSCI will be reused in the Release B implementation. The Release B workbench applications are currently under development on the incremental track and will be reviewed in Evaluation Packages (EPs) 6, and 7 as well as the Prototype Workshops (PW2 and PW3). During the PW3 timeframe the final Release B Client subsystem design and requirements will be presented in a formal review. For further detail on the migration of the Client subsystem from incremental to formal track please refer to the "Road to AM-1" CDR presentation material.

The current workbench design for Release B includes a mixture of X-Windows and Motif clients and HTML-based Web browser interfaces. The reason for this mixture of paradigms is that the current Web technology (while it is attractive in terms of ease of use and availability) cannot support the full requirements of the workbench applications. For example, there are requirements to support specification of polygonal spatial searches. This can be done with the current Web browsers, but very inefficiently by communicating back to the server on each point clicked on the polygon. HotJava is a Web browser prototype which allows for programming applications that get transferred from the server to the client. The language of these applications, called Java, is a C++-like language that would allow ECS to provide some of the functionality necessary to provide a fully Web based implementation. The current problem with Java is that it is only supported by the HotJava browser. This provides unacceptable restrictions to the user in that he or she cannot use their favorite Web browser. A HotJava implementation of the workbench applications has been prototyped for PW2, but until the Java language or some other implementation becomes accepted by the Web community and implemented in multiple browsers, it is not a viable solution to become the ECS workbench implementation selection. Further Java prototyping as a workbench solution is currently underway in EP7. Feedback from this activity will affect follow-on incremental efforts. It is a possibility that the Release B workbench applications will be supplied in a reduced functionality mode with current Web technology in addition to the fully functional X11/Motif implementation. Section 5 defines the workbench applications and those that are currently HTML-based and those that are X11/Motif.