

5. CSS HWCI

The CSS Distributed Communications Hardware CI (CSS-DCHCI) is the hardware to host all CSS software described in Sections 1-4. The CSS-DCHCI logically includes an enterprise communications server, a local communications server, and a bulletin board server. The selection of these configurations are the culmination of requirements analysis, trades analysis, and analysis with specific focus to performance, RMA, security and evolvability considerations.

5.1 CSS DCHCI Design Drivers

Major CSS DCHCI design drivers include COTS selections, DCE cell configuration, inter-subsystem interface definition and frequency, and performance envelopes driven by IMS performance requirements.

5.1.1 Key Trade-off Studies and Prototypes

The DCE encapsulation prototype and associated benchmarking of OODCE services has provided insight into the performance of OODCE, which is a key contributor to the development of performance allocations to satisfy Level 3 requirements.

Analysis of RMA requirements and potential backup strategies drove the PDR decision to integrate the CSS and MSS servers to provide warm standby to each other. This is also a key driver to the sizing of these servers, since each server will be identically configured and driven by both CSS and MSS sizing/performance requirements.

5.1.2 Sizing and Performance Analysis

This section discusses the method of sizing the CSS hardware at the DAACs and the SMC. Specific sizing calculations, on a per-site basis, are included in the GSFC, MSFC, LaRC, and EDC design volumes. To provide for warm standby, the CSS servers and MSS servers at all DAAC sites and the SMC are cross-strapped and are configured to include the CSS Distributed Computing Software CI (including both OODCE client and server); the MSS Management Software CI; and the MSS Agent Software CI. This section only describes analysis of the CSS requirements. The complete configuration of the CSS and MSS HWCI, based on the combined requirements of the subsystems, are presented in the site-specific volumes. Additional detail on the analysis of MSS HWCI sizing and performance is contained in the MSS volume.

5.1.2.1 Processing Analysis

The processing requirements for the CSS Server are driven by the number of DCE transactions required by all of the software processes in the DAAC or SMC cell. Most frequent transactions will include DCE security information lookup (with every authentication or authorization request) and directory/naming information lookup (with authentication, authorization, or inter-process communication requests).

The DCE Server is expected to have minimal processing requirements, based on the expected number of directory and security service lookups. Directory and security information is cached at

local clients after the initial DCE cell server access. The client cache remains intact unless the amount of data exceeds a threshold (approx. 0.5% or a minimum of 512K of client memory). Given the size of directory and security entries (maximum of 1 Kbyte per entry) and the potential number of directory and/or security lookups needed by each client, we do not anticipate simultaneous accesses to the DCE server. We have therefore used vendor-suggested sizing parameters for the CSS server.

CSS DCHCI requirements were then combined with those of the MSS HWCI to develop an aggregate profile for SMC and LSM servers. Based on the combined requirements of CSS and MSS, medium to high end servers will be used at both the DAACs and the SMC.

The processing requirements for the bulletin board server, which will be primarily used as an HTML server for general ECS users, are driven by the number of simultaneous user accesses. Based on existing bulletin boards, news servers, and web servers in use by ECS, ESDIS, and VO, a low end server will adequately provide for bulletin board requirements.

5.1.2.2 Storage Analysis

CSS storage requirements are based on estimates of CSS data stores, including e-mail, the directory information base, and the security information base. Sizes of these stores are driven by the user model (technical baseline), including estimated number of ECS users, by DAAC. The CSS server at each site will be cross-strapped to a primary and a secondary RAID disk, and CSS directory and security information will be replicated on the secondary disk to ensure a high availability of CSS services.

5.1.3 Scalability and Evolvability to Release B

Sizing and performance analysis for the CSS HWCI was performed using the Release B technical baseline to ensure adequacy of the hardware solution.

5.2 HWCI Structure

The CSS DCHCI contains three components at Release B:

- Enterprise Communications Server (located at the SMC)
- Local Communications Server (located at each DAAC and the EOC)
- Bulletin Board Server (located at the SMC)

5.2.1 Connectivity

At all sites, the CSS communications servers will be equipped with DAS (dual-attached station) cards that are connected to two FDDI concentrators, providing redundancy in the event of a concentrator failure. Overall network connectivity at each site is discussed in Volume 0; specific configurations for each site are presented in the site-specific volumes.

5.2.2 HWCI Components

The key features of the CSS hardware components are summarized below. Specific COTS selections for each DAAC site and the SMC, are presented in the DAAC specific volumes.

The CSS-DCCI enterprise communications server configuration, located at the SMC, includes software for email, directory, and time servers, and maintains CSS datastores including ECS internal mail, directory information base, security information base repository. The CSS Enterprise Communications Server is cross-strapped to the MSS-MHCI enterprise monitoring server, and is populated with the CSS-DCCI client configuration, the CSS-DCCI communications server configuration, the MSS-MACI system management server configuration, and the MSS-MACI system management agent configuration.

The CSS Local Communications Server, located at each DAAC, provides the same functionality and is configured in the same way as the Enterprise Communications Server, except that it is cross-strapped to the MSS-MHCI local monitoring server.

The CSS bulletin board, located at the SMC, is populated with the CSS-DCCI client configuration and the CSS-DCCI bulletin board configuration. Major datastores of the bulletin board server include a directory information base, ECS HTML forms, and an archive/repository for software and toolkit distribution.

5.3 Failover and Recovery Strategy

Analysis of failover strategies supports the integration of the CSS and MSS servers to serve as warm standby to each other, cross-strapped to RAID devices for critical data access by either server. The DCE logical server functions will be replicated and active on the MSS server. In the event of a failure of either server, the second RAID can be mounted for use by the backup server. All data is replicated, and is also routinely safestored in the ECS data server archive.

The LSM is designed to continue to function in the event of an EMC failure, and agents at hosts will continue to monitor managed objects in the event of an LSM failure. Dual attached FDDI within the local DAAC LAN designs for critical RMA links.

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Appendix A. Requirements Trace

The Interim Release 1 (Ir1), TRMM Development (Release A) and AM-1 Development (Release B) Level 4 requirements listed in Table A-1 reflect the RTM requirements database RELB_CDR_030196. The Object Classes listed are from the CDR version of OMT and are described throughout this document., as are the CSCs , CIs and subsystem listed.

Table A-1. Requirements Trace (1 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-00010	The CSS services at the SMC shall be configured to support the SMC function of Gathering and Disseminating System Management Information's availability requirement of .998 and a Mean Down Time of < 20 minutes during times of staffed operation.	DCHCI
C-CSS-00020	The CSS services shall have no single point of failure for functions associated with network databases and configuration data.	Security Services Directory/Naming Services
C-CSS-00030	The CSS services shall be extensible in its design to provide capability for growth and enhancement.	DCHCI
C-CSS-00040	The CSS services shall be compatible with POSIX-compliant Unix platforms.	DCHCI
C-CSS-00100	The CSS Directory services shall maintain multiple copies of the namespace on different hosts to provide fault tolerance.	Directory/Naming Services
C-CSS-00200	The CSS services shall allocate 10% of development resources for IV&V activity.	DCHCI
C-CSS-00500	The CSS client services software shall be made available in the form of a CSS toolkit to the developers.	DESKT
C-CSS-00510	The CSS shall provide access to ECS data and services to the clients at the DAACs and SCFs without distinction using ECS provided software.	DCHCI
C-CSS-01000	The CSS DOF Service shall provide a standards-based Interface Definition Language (IDL) and language mappings to at least C and C++ (limited) languages.	DOF
C-CSS-01010	The CSS DOF provided IDL shall support versioning of the interface supporting minor and major versions.	DOF
C-CSS-01020	The IDL supported minor versioning shall be upward compatible that requires no changes in the client software to communicate with the new implementation.	DOF
C-CSS-01030	The CSS DOF Service shall support the passing of the general error status as a parameter in calls between the clients and servers automatically.	DOF

Table A-1. Requirements Trace (2 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-01040	The CSS DOF Service shall provide the capability to marshal and unmarshal the arguments and the returned value transparently while making a remote procedure call.	DOF
C-CSS-01050	The CSS DOF Service shall provide the capability to marshal and unmarshal standard types to/from a common standard format.	DOF
C-CSS-01060	The CSS DOF Service shall provide the capability to define marshaling and unmarshaling routines for user defined types.	DOF
C-CSS-01070	The CSS DOF Service shall provide server APIs to register/unregister services in the namespaces (in different administrative domains) under different views (server/group/profile).	DOF
C-CSS-01080	The CSS DOF Service shall provide server APIs to register/unregister different implementations of an interface in the namespace.	DOF
C-CSS-01090	The CSS DOF Service shall provide server APIs to register/unregister individual objects implementing an interface in the namespace.	DOF
C-CSS-01100	The CSS DOF Service shall provide server APIs to register their services using different protocols in the namespace.	DOF
C-CSS-01110	The CSS DOF Service shall provide server APIs to register their services with the local endpoint mapper with the proper port number.	DOF
C-CSS-01120	The CSS DOF Service shall provide mechanisms to shutdown a service gracefully, by allowing the servers to unregister the server information from the namespace.	DOF
C-CSS-01130	The CSS DOF Service shall provide server APIs to limit the maximum number of threads to use in servicing the requests concurrently.	DOF
C-CSS-01140	The CSS DOF Service shall provide client APIs to bind to services (registered in the local namespace as well as remote namespaces) by using any of the following information to achieve location transparency of services. a._a service name b._an interface name c._an object name d._a host name and communication protocol e._an object reference	DOF
C-CSS-01150	The CSS DOF Service shall return gracefully by throwing an exception or returning an error code when it can not retrieve the binding information or can not resolve a binding.	DOF
C-CSS-01160	The CSS DOF Service shall provide client APIs to specify a confidence level of the binding information as follows: a._a low confidence level indicating the use of a local cache to obtain binding information b._a medium confidence level indicating the DOF to get the binding information from any of the directory replicas. c._a high confidence level indicating the DOF to get the binding information from the master copy of the directory services.	DOF

Table A-1. Requirements Trace (3 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-01170	The CSS DOF Service shall provide APIs to set/get the authentication service type to be used between the server and the client.	DOF
C-CSS-01180	The CSS DOF Service shall provide APIs to set/get authorization service type to be used between the client and the server.	DOF
C-CSS-01190	The CSS DOF Service shall provide APIs to maintain the integrity of the data to be passed between the client and the server.	DOF
C-CSS-01200	The CSS DOF Service shall provide APIs to maintain the privacy of the data passed between the client and the server by encrypting and decrypting the data.	DOF
C-CSS-01210	The CSS DOF Service shall provide APIs to set the identity of a given principal to a given process.	DOF
C-CSS-01220	The CSS DOF shall support the TCP and UDP communication protocols to communicate between the servers and the clients.	DOF
C-CSS-01230	The CSS Security Service shall provide security delegation to allow an intermediary server to operate on behalf of an initiating client while preserving both client's and server's identities and access control attributes across chained operations.	Security Services
C-CSS-01240	The CSS DOF Service shall provide a daemon process service that enables secure remote administration of DCE services and enables control of service configuration parameters.	DOF
C-CSS-01250	The CSS DOF Service shall provide cell namespace aliasing for the directory service to permit administrative ease of changes.	Directory/Naming Services
C-CSS-01260	The CSS DOF Service shall provide a hierarchical cell namespace structure.	Directory/Naming Services
C-CSS-01270	The CSS Security Service shall provide for distributed file service delegation that permits a file to be passed with its corresponding directory service namespace structure.	File Access Services
C-CSS-01280	The CSS Security Service shall provide for a security service ACL manager library.	Security Services
C-CSS-02000	The CSS-DCHW CI Enterprise Communications Server shall be physically and functionally identical to the Enterprise Monitoring Server in supporting the CSMS requirements.	DCHCI
C-CSS-02010	The CSS-DCHW CI Enterprise Communications Server shall share data with the Local Communications Server in supporting the CSMS requirements.	DCHCI
C-CSS-02020	The CSS-DCHW CI Enterprise Communications Server shall preserve DAAC autonomy of operations.	DCHCI

Table A-1. Requirements Trace (4 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-02030	The CSS-DCHW CI Enterprise Communications Server shall host the CSS software configuration items to create, with the Enterprise Monitoring Server and Management Workstations, an enterprise monitoring and coordination center for the ECS.	DCHCI
C-CSS-02050	The CSS-DCHCI shall be configured to support the SDPS function of receiving science data's Availability requirement of .999 and Mean Down Time requirement of 2 hours or less during times of staffed operation.	DCHCI
C-CSS-02052	The CSS-DCHCI shall be configured to support the SDPS function of Archiving and Distributing Data's Availability requirement of .98 and Mean Down Time requirement of < 2 hours during times of staffed operation.	DCHCI
C-CSS-02054	The CSS-DCHCI shall be configured to support the SDPS function of User Interfaces to Client, Interoperability, Data Server, and Data Management (IMS) services at Individual DAAC Site's availability requirement of .993 and a mean down time requirement of < 2 hours during times of staffed operations.	DCHCI
C-CSS-02056	The CSS-DCHCI shall be configured to support the SDPS function of information searches on the ECS directory's availability requirement of .993 and a mean down time requirement of < 2 hours during times of staffed operations.	DCHCI
C-CSS-02058	The CSS-DCHCI shall be configured to support the SDPS function of Metadata Ingest and Update's availability requirement of .96 and a mean down time requirement of < 4 hours during times of staffed operations.	DCHCI
C-CSS-02060	The CSS-DCHCI shall be configured to support the SDPS function of Information Searches On Local Holding's availability requirement of .96 and mean down time requirement of < 4 hours during times of staffed operations.	DCHCI
C-CSS-02062	The CSS-DCHCI shall be configured to support the SDPS function of Local Data Order Submission's availability requirement of .96 and a mean down time requirement of < 4 hours during times of staffed operations.	DCHCI
C-CSS-02064	The CSS-DCHCI shall be configured to support the SDPS function of Data Order Submission Across DAAC's availability requirement of .96 and a mean down time requirement of < 4 hours during times of staffed operations.	DCHCI
C-CSS-02066	The CSS-DCHCI shall be configured to support the SDPS function of Client, Interoperability, Data Management and Data Server (IMS) Data Base Management and Maintenance Interface's availability requirement of .96 and a mean down time requirement of < 4 hours during times of staffed operations.	DCHCI

Table A-1. Requirements Trace (5 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-02068	The CSS-DCHCI elements and components shall include the on-line (operational mode) and off-line (test mode) fault detection and isolation capabilities required to achieve the specified operational availability requirements.	DCHCI
C-CSS-02070	The maximum down time of the CSS-DCHCI shall not exceed twice the required MDT in 99 percent of failure occurrences.	DCHCI
C-CSS-02100	The CSS-DCHW CI Enterprise Communications Server processor shall include a dedicated terminal to be used as a local systems operations console.	DCHCI
C-CSS-02110	The CSS-DCHW CI Enterprise Communications Server processor shall be capable of expansion with additional quantities and types of peripherals.	DCHCI
C-CSS-02120	The CSS-DCHW CI Enterprise Communications Server processor shall be upgradeable/replaceable within the same product family without major software modification or replacement of any peripheral or attached component.	DCHCI
C-CSS-02130	The CSS-DCHW CI Enterprise Communications Server processor shall have the capability to support a POSIX compliant IEEE 1003.1 operating system (UNIX).	DCHCI
C-CSS-02140	The CSS-DCHW CI Enterprise Communications Server processor terminal shall be compatible with the Management Workstation display device.	DCHCI
C-CSS-02200	The CSS-DCHW CI Enterprise Communications Server data storage shall be compatible with POSIX compliant operating systems from several vendors.	DCHCI
C-CSS-02210	The CSS-DCHW CI Enterprise Communications Server data storage shall be compatible with the Communications Server short-term data storage.	DCHCI
C-CSS-02220	The CSS-DCHW CI Enterprise Communications Server data storage shall support RAID level-5: striping with interleaved parity.	DCHCI
C-CSS-02230	The CSS-DCHW CI Enterprise Communications Server data storage shall have the following hot swappable components: a. Disks b. Power Supplies c. Fans d. Disk-array controllers	DCHCI
C-CSS-02240	The CSS-DCHW CI Enterprise Communications Server data storage shall be cross-strapped with the Enterprise Monitoring Server data storage in supporting the CSMS requirements.	DCHCI
C-CSS-02250	The CSS-DCHW CI Enterprise Communications Server data storage shall be capable of archiving data to the ECS Data Server archive for data archive.	DCHCI
C-CSS-02260	The CSS-DCHW CI Enterprise Communications Server data archive shall adhere to ECS data server archival requirements for data storage and retrieval.	DCHCI

Table A-1. Requirements Trace (6 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-02300	The CSS-DCHW CI Enterprise Communications Server peripheral disk drives shall be capable of retrieving data stored from both the Enterprise Communications server data storage and data archive.	DCHCI
C-CSS-02400	The CSS-DCHW CI Enterprise Communications Server peripherals shall support at least one tape drive.	DCHCI
C-CSS-02410	The CSS-DCHW CI Enterprise Communications Server peripheral tape drive shall have the following characteristics: a. 4mm Digital Audio Tape format b. Accept industry standard magnetic 4mm DAT (i.e. DDS-90)	DCHCI
C-CSS-02420	The CSS-DCHW CI Enterprise Communications Server shall provide a peripheral tape drive.	DCHCI
C-CSS-02430	The CSS-DCHW CI Enterprise Communications Server tape drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-02500	The CSS-DCHW CI Enterprise Communications Server peripherals shall support at least one CD-ROM drive.	DCHCI
C-CSS-02510	The CSS-DCHW CI Enterprise Communications Server peripheral CD-ROM drive shall have the following characteristic: a. Accept 600MB Compact Disk	DCHCI
C-CSS-02520	The CSS-DCHW CI Enterprise Communications Server peripheral CD-ROM drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-02600	The CSS-DCHW CI Local Communications Server shall be physically and functionally identical to the Local Management Server in supporting the CSMS requirements.	DCHCI
C-CSS-02610	The CSS-DCHW CI Local Communications Server shall share data with the Enterprise Communications Server in supporting the CSMS requirements.	DCHCI
C-CSS-02620	The Local Communications Server shall be configurable according to local DAAC user authentication/authorization policy and preserve other DAAC autonomy of operations.	DCHCI
C-CSS-02630	The CSS-DCHW CI Local Communications Server shall host the CSS software configuration items to create, with the Local Management Server and Management Workstations, a local system management center for each ECS DAAC.	DCHCI
C-CSS-02700	The CSS-DCHW CI Local Communications Server processor shall include a dedicated terminal to be used as a local systems operations console.	DCHCI
C-CSS-02710	The CSS-DCHW CI Local Communications Server processor shall be capable of expansion with additional quantities and types of peripherals.	DCHCI

Table A-1. Requirements Trace (7 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-02720	The CSS-DCHW CI Local Communications Server processor shall be upgradeable/replaceable within the same product family without major software modification or replacement of any peripheral or attached component.	DCHCI
C-CSS-02730	The CSS-DCHW CI Local Communications Server processor shall have the capability to support a POSIX compliant IEEE 1003.1 operating system (UNIX).	DCHCI
C-CSS-02740	The CSS-DCHW CI Local Communications Server processor terminal shall be compatible with the Management Workstation display device.	DCHCI
C-CSS-02800	The CSS-DCHW CI Local Communications Server data storage shall be compatible with POSIX compliant operating systems from several vendors.	DCHCI
C-CSS-02810	The CSS-DCHW CI Local Communications Server short-term data storage shall be compatible with the Enterprise Communications Server intermediate-term data storage.	DCHCI
C-CSS-02820	The CSS-DCHW CI Local Communications Server data storage shall support RAID level-5: striping with interleaved parity.	DCHCI
C-CSS-02830	The CSS-DCHW CI Local Communications Server data storage shall have the following hot swappable components: a. Disks b. Power Supplies c. Fans d. Disk-array controllers	DCHCI
C-CSS-02840	The CSS-DCHW CI Local Communications Server data storage shall be cross-strapped with the Local Management Server short-term data storage in supporting the CSMS requirements.	DCHCI
C-CSS-02850	The CSS-DCHW CI Local Communications Server data storage shall be capable of archiving data to the ECS Data Server archive.	DCHCI
C-CSS-02860	The CSS-DCHW CI Local Communications Server data archive shall adhere to ECS Data Server archival requirements for data storage and retrieval.	DCHCI
C-CSS-02900	The CSS-DCHW CI Local Communications Server peripheral disk drives shall be capable of retrieving data stored from both the Local Communications server data storage and data archive.	DCHCI
C-CSS-03000	The CSS-DCHW CI Local Communications Server peripherals shall support at least one tape drive.	DCHCI
C-CSS-03010	The CSS-DCHW CI Local Communications Server peripheral tape drive shall have the following characteristics: a. 4mm Digital Audio Tape format b. Accept industry standard magnetic 4mm DAT (i.e. DDS-90)	DCHCI
C-CSS-03020	The CSS-DCHW CI Local Communications Server shall provide a peripheral tape drive.	DCHCI

Table A-1. Requirements Trace (8 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-03030	The CSS-DCHW CI Local Communications Server tape drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-03100	The CSS-DCHW CI Local Communications Server peripherals shall support at least one CD-ROM drive.	DCHCI
C-CSS-03110	The CSS-DCHW CI Local Communications Server peripheral CD-ROM drive shall have the following characteristic: a. Accept 600MB Compact Disk	DCHCI
C-CSS-03120	The CSS-DCHW CI Local Communications Server peripheral CD-ROM drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-03200	The CSS-DCHW CI Bulletin Board Server shall share data with the Enterprise Communications Server in supporting the CSMS requirements.	DCHCI
C-CSS-03210	The CSS-DCHW CI Bulletin Board Server shall preserve DAAC autonomy of operations and aggregate all ECS DAAC authentication/authorization policies by user type and DAAC, to provide a integrated view of ECS for user registration, account administration, and authentication/authorization to ECS services.	DCHCI
C-CSS-03220	The CSS-DCHW CI Bulletin Board Server shall host the CSS software configuration items to create a single, secure unified access to all ECS services.	DCHCI
C-CSS-03230	The CSS-DCHW CI Bulletin Board Server shall host ECS client software and toolkits for ECS-external distribution.	DCHCI
C-CSS-03300	The CSS-DCHW CI Bulletin Board Server processor shall include a dedicated terminal to be used as a local systems operations console.	DCHCI
C-CSS-03310	The CSS-DCHW CI Bulletin Board Server processor shall be upgradeable/expandable with additional quantities and types of peripherals.	DCHCI
C-CSS-03320	The CSS-DCHW CI Bulletin Board Server processor shall be upgradeable/replaceable within the same product family without the need for any perturbation of any software or replacement of any peripheral or attached component.	DCHCI
C-CSS-03330	The CSS-DCHW CI Bulletin Board Server processor shall have the capability to support a POSIX compliant IEEE 1003.1 operating system (UNIX).	DCHCI
C-CSS-03340	The CSS-DCHW CI Bulletin Board Server processor terminal shall be compatible with the Management Workstation display device.	DCHCI
C-CSS-03400	The CSS-DCHW CI Bulletin Board Server data storage shall be compatible with POSIX compliant operating systems from several vendors.	DCHCI

Table A-1. Requirements Trace (9 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-03410	The CSS-DCHW CI Bulletin Board Server data storage shall be capable of archiving data to the ECS data server archive for long-term storage and software/toolkit safestore.	DCHCI
C-CSS-03420	The CSS-DCHW CI Bulletin Board Server data archive shall adhere to ECS data server archival requirements for data storage and retrieval.	DCHCI
C-CSS-03500	The CSS-DCHW CI Bulletin Board Server peripherals shall support at least one tape drive.	DCHCI
C-CSS-03510	The CSS-DCHW CI Bulletin Board Server peripheral tape drive shall have the following characteristics: a. 4mm Digital Audio Tape format b. Accept industry standard magnetic 4mm DAT (i.e. DDS-90)	DCHCI
C-CSS-03520	The CSS-DCHW CI Bulletin Board Server shall provide a peripheral tape drive.	DCHCI
C-CSS-03530	The CSS-DCHW CI Bulletin Board Server tape drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-03600	The CSS-DCHW CI Bulletin Board Server peripherals shall support at least one CD-ROM drive.	DCHCI
C-CSS-03610	The CSS-DCHW CI Bulletin Board Server peripheral CD-ROM drive shall have the following characteristic: a. Accept 600MB Compact Disk	DCHCI
C-CSS-03620	The CSS-DCHW CI Bulletin Board Server peripheral CD-ROM drives shall be upgradeable/replaceable within the same product family.	DCHCI
C-CSS-03700	The CSS-DCHW CI Enterprise Communications Server shall be capable of 100 percent growth in the processing speed specified in Appendix A of the current version of 304-CD-005 without modifications or upgrade to software.	DCHCI
C-CSS-03710	The CSS-DCHW CI Enterprise Communications Server shall be capable of 100 percent growth in the storage capacity specified in Appendix A of the current version of 304-CD-005 without modifications or upgrade to software.	DCHCI
C-CSS-03720	The CSS-DCHW CI Local Communications Server shall be capable of 100 percent growth in the processing speed specified in Appendix A of the current version of 304-CD-005 without modifications or upgrade to software.	DCHCI
C-CSS-03730	The CSS-DCHW CI Local Communications Server shall be capable of 100 percent growth in the storage capacity specified in Appendix A of the current version of 304-CD-005 without modifications or upgrade to software.	DCHCI
C-CSS-03740	The CSS-DCHW CI Enterprise Communications Server shall be capable of meeting the capacity and performance characteristics of Appendix A of the current version of 304-CD-005.	DCHCI

Table A-1. Requirements Trace (10 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-03750	The CSS-DCHW CI Local Communications Server shall be capable of meeting the capacity and performance characteristics of Appendix A of the current version of 304-CD-005.	DCHCI
C-CSS-03760	The CSS-DCHW CI Bulletin Board Server shall be capable of meeting the capacity and performance characteristics of Appendix A of the current version of 304-CD-005.	DCHCI
C-CSS-03800	The CSS-DCHW CI hardware selection criteria shall meet overall ECS security policies and system requirements.	DCHCI
C-CSS-03810	The CSS-DCHW CI Bulletin Board Server shall provide a security perimeter for ECS.	DCHCI
C-CSS-03820	The CSS-DCHW CI Enterprise and Local Communications Servers shall be configured to provide autonomous DAAC security perimeters, FOS isolation, and an Iso-cell ECS security perimeter.	DCHCI
C-CSS-03900	The CSS-DCHW CI Enterprise Communications Server shall maintain one backup of all software and key data items in a separate physical location.	DCHCI
C-CSS-03910	The CSS-DCHW CI Local Communications Server shall maintain one backup of all software and key data items in a separate physical location.	DCHCI
C-CSS-03940	The CSS-DCHW CI Enterprise Communications Server at the SMC shall be configured to support the SMC function of Gathering and Disseminating System Management Information's Availability requirement of 0.998 and an Mean Down Time of 20 minutes during times of staffed operation.	DCHCI
C-CSS-10090	The CSS shall interface with a TBS external time source for coordinated universal time (UTC).	Time Services
C-CSS-10100	The CSS shall interface with the SDPS subsystems to exchange the data items in Table 6-1 as specified in the ECS internal ICDs, 313-DV3-003.	DCCI Services
C-CSS-10200	The CSS shall interface with the FOS subsystems to exchange the data items in Table 6-2 as specified in the ECS internal ICDs, 313-DV3-003.	DCCI Services
C-CSS-10300	The CSS shall interface with the MSS subsystems to exchange the data items in Table 6-3 as specified in the ECS internal ICDs, 313-DV3-003.	DCCI Services
C-CSS-10400	The CSS shall interface with the ISS subsystems to exchange the data items in Table 6-4 as specified in the ECS internal ICDs, 313-DV3-003.	DCCI Services
C-CSS-10500	The CSS DCCI shall accept virtual terminal service request from the User.	Virtual Terminal Services

Table A-1. Requirements Trace (11 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-10510	The CSS DCCI shall accept email service request from the User.	CsEmMailRelA Electronic Mail Services
C-CSS-10520	The CSS DCCI shall accept remote file access service request from the User.	CsFtFTPReIB File Access Services
C-CSS-10530	The CSS DCCI shall accept bulletin board service request from the User.	CsBBMailRelA Bulletin Board Services
C-CSS-10540	The CSS DCCI shall provide virtual terminal service to the User.	Virtual Terminal Services
C-CSS-10550	The CSS DCCI shall provide email service to the User.	CsEmMailRelA Electronic Mail Services
C-CSS-10560	The CSS DCCI shall provide remote file access service to the User.	CsFtFTPReIB File Access Services
C-CSS-10570	The CSS DCCI shall provide bulletin board to the User.	CsBBMailRelA Bulletin Board Services
C-CSS-10580	The CSS DCCI shall accept system administration information request from the Operator.	DOF
C-CSS-10590	The CSS DCCI shall provide system administration information to the Operator .	DOF
C-CSS-10600	The CSS DCCI shall accept User authentication request from CLS.	Security Services ECSecurity
C-CSS-10610	The CSS DCCI shall accept Common facilities request from CLS	Electronic Mail Services File Access Services Virtual Terminal Services
C-CSS-10620	The CSS DCCI shall provide User authentication response to CLS .	ECSecurity Security Services
C-CSS-10630	The CSS DCCI shall provide Common facilities to CLS.	Bulletin Board Services CsFtFTPReIB CsEmMailRelA File Access Services Virtual Terminal Services Electronic Mail Services CsBBMailRelA
C-CSS-10640	The CSS DCCI shall accept User authorization request from IOS.	ECSecurity Security Services
C-CSS-10650	The CSS DCCI shall accept Common facilities request from IOS.	Virtual Terminal Services Electronic Mail Services File Access Services CsFtFTPReIB CsEmMailRelA CsBBMailRelA Bulletin Board Services

Table A-1. Requirements Trace (12 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-10660	The CSS DCCI shall provide User authorization response to IOS .	ECSSecurity Security Services
C-CSS-10670	The CSS DCCI shall provide Common facilities to IOS.	Electronic Mail Services File Access Services Bulletin Board Services Virtual Terminal Services CsEmMailRelA CsBBMailRelA CsFtFTPReB
C-CSS-10680	The CSS DCCI shall accept User authorization request from DMS.	ECSSecurity Security Services
C-CSS-10690	The CSS DCCI shall accept Common facilities request from DMS.	Virtual Terminal Services Electronic Mail Services File Access Services CsFtFTPReB CsEmMailRelA CsBBMailRelA Bulletin Board Services
C-CSS-10700	The CSS DCCI shall provide User authorization response to DMS.	ECSSecurity Security Services
C-CSS-10710	The CSS DCCI shall provide Common facilities to DMS.	Electronic Mail Services Bulletin Board Services CsBBMailRelA CsEmMailRelA CsFtFTPReB File Access Services Virtual Terminal Services
C-CSS-10720	The CSS DCCI shall accept Common facilities request from DSS.	Bulletin Board Services CsEmMailRelA CsFtFTPReB File Access Services Virtual Terminal Services Electronic Mail Services CsBBMailRelA
C-CSS-10730	The CSS DCCI shall provide Common facilities to DSS.	CsFtFTPReB CsEmMailRelA File Access Services Virtual Terminal Services Electronic Mail Services Bulletin Board Services CsBBMailRelA

Table A-1. Requirements Trace (13 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-10740	The CSS DCCI shall accept Common facilities request from INS.	Virtual Terminal Services Bulletin Board Services CsFtFTPReIB Electronic Mail Services File Access Services CsBBMailRelA CsEmMailRelA
C-CSS-10750	The CSS DCCI shall provide Common facilities to INS.	CsBBMailRelA CsEmMailRelA CsFtFTPReIB File Access Services Virtual Terminal Services Electronic Mail Services Bulletin Board Services
C-CSS-10760	The CSS DCCI shall accept Common facilities request from DPS.	File Access Services Electronic Mail Services Virtual Terminal Services Bulletin Board Services CsEmMailRelA CsBBMailRelA CsFtFTPReIB
C-CSS-10770	The CSS DCCI shall provide Common facilities to DPS.	Bulletin Board Services CsEmMailRelA CsFtFTPReIB File Access Services Virtual Terminal Services Electronic Mail Services CsBBMailRelA
C-CSS-10780	The CSS DCCI shall accept Common facilities request from PLS.	Bulletin Board Services Electronic Mail Services Virtual Terminal Services File Access Services CsFtFTPReIB CsBBMailRelA CsEmMailRelA
C-CSS-10790	The CSS DCCI shall provide Common facilities to PLS.	CsBBMailRelA Bulletin Board Services File Access Services Electronic Mail Services Virtual Terminal Services CsFtFTPReIB CsEmMailRelA

Table A-1. Requirements Trace (14 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-10800	The CSS DCCI shall accept Common facilities request from MSS.	Virtual Terminal Services Electronic Mail Services File Access Services CsFtFTPReIB CsEmMailRelA CsBBMailRelA Bulletin Board Services
C-CSS-10810	The CSS DCCI shall accept lifecycle commands request from MSS.	Lifecycle Services
C-CSS-10820	The CSS DCCI shall accept mode request from MSS.	EcPfGenProcess
C-CSS-10830	The CSS DCCI shall provide Common facilities to MSS.	Electronic Mail Services Bulletin Board Services CsFtFTPReIB File Access Services CsBBMailRelA CsEmMailRelA Virtual Terminal Services
C-CSS-10840	The CSS DCCI shall have the capability to send processing status to MSS.	EcPfGenProcess
C-CSS-10850	The CSS DCCI shall have the capability to send current mode to MSS.	EcPfGenProcess
C-CSS-10860	The CSS DCCI shall have the capability to send detected hardware and software fault information to MSS.	Event Logger Services
C-CSS-10870	The CSS DCCI shall have the capability to send event notification to MSS.	Event Logger Services
C-CSS-10880	The CSS DCCI shall have the capability to send resource utilization data to MSS.	EcPfGenProcess EcPfManagedServer
C-CSS-20000	The CSS Directory service shall provide the basic functionality to save and retrieve information into the local namespace: a._Create/Delete/Get context (key) b._List context. c._Set/Get attributes. d._Create/Delete attributes. e._List attributes. f._Set/Get attribute information.	EcDnCompositeName EcDnValue EcDnContext EcDnAttribute EcDnElement
C-CSS-20010	The CSS shall provide implementations of the DNS and X.500 namespaces.	Directory/Naming Services CsDcXds
C-CSS-20020	The CSS Directory service shall provide a mechanism to periodically update copies of the namespace from the namespace designated as the master.	Directory/Naming Services
C-CSS-20025	The updating of the namespace shall be done a._automatically b._manually by the administrator.	Directory/Naming Services
C-CSS-20030	The CSS Directory Service shall provide the capability to partition the namespace and distribute and maintain them at different hosts on the network.	Directory/Naming Services

Table A-1. Requirements Trace (15 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-20040	The CSS Directory Service shall provide the capability to replicate partitions of the namespace on different hosts.	Directory/Naming Services
C-CSS-20050	The CSS Directory service shall provide multiple directory agents which cooperate among themselves through referral and chaining to perform directory operations.	Directory/Naming Services
C-CSS-20060	The CSS Directory service shall provide a way to denote the relative root of the namespace.	Directory/Naming Services
C-CSS-20070	The CSS Directory Service client shall maintain local cache to keep recently lookup information from the namespace for more efficient further lookups.	Directory/Naming Services
C-CSS-20080	The CSS Directory Service shall interact with the Security Service to provide host based security to the entries in the namespace.	Directory/Naming Services
C-CSS-20085	The CSS Directory Service shall interact with the Security Service to provide principal based security to the entries in the CDS namespace and an enhanced host based security for the entries in the GDS namespace.	Directory/Naming Services
C-CSS-20090	The CSS Directory service shall define a minimum of 20 user defined attribute types for application users to store/retrieve attribute information.	EcDnAttribute
C-CSS-20110	The CSS Directory service shall determine which naming service to use from a given context.	EcDnCompositeName EcDnContext
C-CSS-20120	The CSS Directory service shall provide a mechanism to communicate with both X.500 and DNS naming services in resolving lookups.	Directory/Naming Services
C-CSS-20130	The CSS Directory Service shall provide namespaces that are compatible with the existing NASA X.500 and DNS directory services.	Directory/Naming Services
C-CSS-21000	The CSS Security service shall provide an API to verify the identity of users.	Security Services
C-CSS-21005	The CSS Security service shall provide a unique session key for each client session.	Security Services
C-CSS-21010	The CSS Security service shall not transmit passwords in clear text across networks.	EcSeServerKeyMgmt
C-CSS-21020	The CSS Security service shall provide the capability to create/modify/delete user accounts and privileges in the security registry.	rgy_edit Security Services
C-CSS-21030	The CSS Security service shall provide the capability to define/modify/delete group information in the security registry.	Security Services rgy_edit
C-CSS-21040	The CSS Security service shall provide an API to limit the time after which a login context will expire.	Security Services

Table A-1. Requirements Trace (16 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-21050	The CSS Security Service shall provide an API to refresh login contexts before they expire.	Security Services
C-CSS-21060	The CSS Security Service shall provide an API to accept server keys associated with services interactively at the startup of a service.	EcSeServerKeyMgmt
C-CSS-21070	The CSS Security Service shall provide an API to store server keys associated with servers to a disk file.	EcSeServerKeyMgmt
C-CSS-21080	The CSS Security Service shall provide an API to retrieve the server keys associated with services from a disk file at startup time to authenticate the service.	EcSeServerKeyMgmt
C-CSS-21090	The CSS Security Service shall provide an API to change the identity of an application process through server keys.	EcSeServerKeyMgmt
C-CSS-21100	The CSS Security service shall provide an API to challenge the client/server to authenticate itself at the following three levels.a._connect levelb._request levelc._packet level	EcSeSecurity
C-CSS-21105	The CSS Security Service shall notify the MSS Management Agent Service upon a predetermined number of unsuccessful login attempts.	EcUtLoggerRelA
C-CSS-21110	The CSS Security service shall authenticate the principal before checking whether the principal is authorized to access a service/resources.	EcSeSecurity
C-CSS-21120	The CSS Security service shall provide an API to check the authorization privileges of principals to access/control services/resources.	EcSeSecurity
C-CSS-21130	The CSS Security Service shall provide an API to define the permission schema associated with a server/resource.	EcSeSecurity
C-CSS-21140	The CSS Security Service shall provide an API to create and maintain the ACLs associated with the server/resource in a database.	EcSeSecurity
C-CSS-21150	The CSS Security Service shall provide an API to save/retrieve the ACL database onto persistent store.	EcSeSecurity
C-CSS-21160	The CSS Security service shall provide the following APIs to MSS security management applications to retrieve/modify the access control lists associated with the ECS services/resources. a._to identify the permissions available to a principal b._to identify all the ACL managers protecting an object c._to get the printable representation of the permissions d._to locate the server with the writable copy of the ACL e._to read an ACL f._to write an ACL g._to test if the calling principal has some permissions h._to test if another principal has some permissions.	EcSeSecurity

Table A-1. Requirements Trace (17 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-21170	The CSS Security service shall provide an API to maintain the integrity of the data passing between processes by using checksums at the following three levels: a._connect level b._request level c._packet level	DCERefMon Security Services
C-CSS-21180	The CSS Security service shall provide an API to encrypt and send the data passing between processes at the following three levels: a._connect level b._request level c._packet level	DCERefMon Security Services
C-CSS-21190	The CSS Security service shall provide an API to receive and decrypt the data passing between processes at the following three levels: a._connect level b._request level c._packet level	Security Services DCERefMon
C-CSS-21200	The CSS Security service shall support the Data Encryption Standard (DES) to encrypt and decrypt data.	Security Services DCERefMon
C-CSS-21210	The CSS Security service shall provide the capability to log audit information into security logs whenever authentication and authorization services are used. The audit information will contain the following: a._Date and time of the event b._User name c._Type of event d._Success or failure of the event e._Origin of the request	EcUtLoggerRelAMgmt
C-CSS-21220	The CSS Security Service shall provide a mechanism to authenticate client/server applications using the socket protocol for inter-process communications.	EcSeGSSTCPB EcSeGSSB
C-CSS-22000	The CSS Message service shall provide an API for senders to send messages to receivers asynchronously without waiting for the receivers to receive it.	Message Passing Services
C-CSS-22010	The CSS Message service shall provide an API for senders to send messages to receivers in a deferred synchronously manner through an intermediary where by they can contact the intermediary at a latter time to receive the result.	EcDcDSyncCom EcDcDSyncComList Message Passing Services
C-CSS-22040	The CSS Message Service shall provide an API for the sender to designate multiple receivers for asynchronous messages.	Message Passing Services
C-CSS-22050	The CSS Message Service shall support multiple message queues so different groups of processes can use different message queues.	EcMpQueue EcMpQueueCbln EcMpQueueIn EcMpQueueOut Message Passing Services
C-CSS-22060	The CSS Message Service shall purge a message from the message queue after a user specified time irrespective of its delivery to the receivers.	EcMpQueueOut Message Passing Services EcMpQueueIn EcMpQueueCbln EcMpQueue

Table A-1. Requirements Trace (18 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-22065	The CSS Message Service shall log event messages to the MSS management agents whenever the message service could not deliver a message to any receiver in the time period set by the sender of the message.	EcUtLoggerRelA
C-CSS-22070	The CSS Message Service shall store undeliverable messages and retrieve and transmit them later.	EcMpQueueOut Message Passing Services
C-CSS-22080	The CSS Message Service shall provide an API for the receiver to register interest in receiving messages from a certain sender.	Message Passing Services EcMpQueueCbIn
C-CSS-22090	The CSS Message Service shall provide the capability to locate and send (push model) the messages to receivers.	EcMpQueueOut Message Passing Services
C-CSS-22100	The CSS Message Service shall provide a non blocking API for the receiver to contact the message queue and get (pull model) the message.	EcMpMsgPngCtrl Message Passing Services
C-CSS-22110	The CSS Message service shall support guaranteed delivery of the message to the receiver.	EcMpMsgCb Message Passing Services
C-CSS-22120	The CSS Message service shall provide an API for the sender of the message to get the acknowledgment information the message service receives from the receivers.	Message Passing Services EcMpMsgCb
C-CSS-22130	The CSS Message service shall associate the receiver to a returned value and maintain that information locally until the sender requests that information.	Message Passing Services
C-CSS-22140	The CSS Message Service shall provide an API for the sender of the message to receive return information stored at the message queue.	Message Passing Services
C-CSS-22150	The CSS Message Service shall defer sending a message to a receiver, if the receiver is not active, and should try sending the message periodically with a set interval of time until the receiver is active.	Message Passing Services EcMpQueueOut
C-CSS-22180	The CSS Message Service shall provide an API that will allow thread processes to be scheduled.	EcDcDSyncCom
C-CSS-22190	In deferred synchronous mode, the CSS Message Service shall provide an API that will allow a user to retrieve the results of the execution of a thread.	EcDcDSyncCom
C-CSS-22200	The CSS Message Service shall provide an API that will supply the status of a thread process.	EcDcDSyncCom
C-CSS-22210	The CSS Message Service shall provide an API that will inform the user when a thread process has finished executing.	EcDcDSyncCom

Table A-1. Requirements Trace (19 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-24010	The CSS Lifecycle Service shall provide a generic instantiation capability that creates a new object for a client.	Lifecycle Services
C-CSS-24020	The CSS Lifecycle Service shall provide an API that accepts state initialization information.	Lifecycle Services
C-CSS-24030	The CSS Lifecycle Service shall provide an API that accepts resource preference information.	
C-CSS-24040	The CSS Lifecycle Service shall provide an API that returns an object invocation handle.	Lifecycle Services
C-CSS-24050	The CSS Lifecycle Service shall ensure that a server is available to service a user request.	
C-CSS-24060	The CSS Lifecycle Service shall act as an intermediary during the client server connection phase.	Lifecycle Services
C-CSS-24070	The CSS Lifecycle Service shall provide a way to shutdown an application process.	Lifecycle Services DCEActivation
C-CSS-24080	The CSS Lifecycle Service shall provide a way to suspend an application process.	Lifecycle Services DCEActivation
C-CSS-24090	The CSS Lifecycle Service shall provide a way to resume a suspend application process.	Lifecycle Services DCEActivation
C-CSS-24100	The CSS Lifecycle Service shall provide a way for server applications to construct an object (if it is not already running) and dispatch the incoming call to the object.	Lifecycle Services DCEActivation
C-CSS-25010	The CSS Time Service shall adjust the time kept by the operating system at every node.	Time Services
C-CSS-25020	The CSS Time Service shall be used to obtain timestamps that are based on Coordinated Universal Time (UTC).	EcTiTimeService
C-CSS-25030	The CSS Time Service shall provide an API to retrieve timestamp information.	EcTiTimeService
C-CSS-25040	The CSS Time Service shall provide an API for converting between binary timestamps that use different time structures.	EcTiTimeService
C-CSS-25050	The CSS Time Service shall provide an API for converting between binary timestamps and ASCII representations.	EcTiTimeService
C-CSS-25060	The CSS Time Service shall provide an API for converting between UTC time and local time.	EcTiTimeService
C-CSS-25070	The CSS Time Service shall provide an API for manipulating binary timestamps.	EcTiTimeService
C-CSS-25080	The CSS Time Service shall provide an API for comparing two binary time values.	EcTiTimeService

Table A-1. Requirements Trace (20 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-25090	The CSS Time Service shall provide an API for calculating binary time values.	EcTiTimeService
C-CSS-25100	The CSS Time Service shall provide an API for obtaining time zone information.	EcTiTimeService
C-CSS-25110	The CSS Time Service shall utilize a UTC based time provider.	EcTiTimeService
C-CSS-25120	The CSS Time Service shall provide the utilities required to synchronize system time across all components.	Time Services
C-CSS-25130	The CSS Time Service shall have the capability to synchronize it's time to one or more external time sources.	Time Services
C-CSS-25140	The CSS Time Service shall maintain an accuracy of 500 milliseconds within all ECS distributed components.	Time Services
C-CSS-25150	The CSS Time Service shall be interoperable with the time service provided within DCE environment	Time Services
C-CSS-25160	The CSS Time Service shall support remote time access	EcFosTimeProviderB Time Services
C-CSS-26010	The CSS Thread Service shall allow the option that each invocation of a server operation to run as a distinct thread.	Thread Services
C-CSS-26020	The CSS Thread Service shall protect against conflicts between different threads accessing the same data.	PthreadCond PthreadMutex
C-CSS-26030	The CSS Thread Service shall take into account the possibility that other threads may change shared data at any point. Code that will function correctly when executed by multiple concurrent threads is called thread-safe.	PthreadMutex PthreadCond
C-CSS-26040	The CSS Thread Service shall provide an API that synchronizes the access of shared data between concurrent threads.	PThreadInterval PthreadCond PthreadMutex
C-CSS-26050	The CSS Thread Service shall provide a synchronizing object that is in one of two states: locked or unlocked.	PthreadMutex
C-CSS-26060	The CSS Thread Service shall provide an API that allows each thread to lock the synchronizing object before it accesses the shared data.	PthreadMutex
C-CSS-26065	The CSS Thread Service shall provide an API to release locks associated with resources.	PthreadMutex
C-CSS-26070	The CSS Thread Service shall provide an API that allows each thread to unlock the synchronizing object when it is finished accessing that data.	PthreadMutex
C-CSS-26080	The CSS Thread Service shall if the synchronizing object is locked by another thread, block the thread requesting the lock.	PthreadMutex

Table A-1. Requirements Trace (21 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-28000	CSS Event Logger Service shall provide capability to record event and history data to a application specific log file.	EcUtLoggerRelA
C-CSS-28010	CSS Event Logger Service shall accept and record event time (when the event was generated, obtained from the Time Service) information.	EcUtLoggerRelA
C-CSS-28020	CSS Event Logger Service shall accept and record the application information (name and version of the calling application).	EcUtLoggerRelA
C-CSS-28025	CSS Event Logger Service shall support predetermined logging levels that provide different levels of information.	EcUtLoggerRelA
C-CSS-28030	CSS Event Logger Service shall accept and record event message information.	EcUtLoggerRelA
C-CSS-28040	CSS Event Logger Service shall accept and record the event type information. (Type of the event: fault, performance)	EcUtLoggerRelAMgmt
C-CSS-28060	CSS Event Logger Service shall inform M&O staff if the event disposition narrative by the application demands so.	EcUtLoggerRelAMgmt
C-CSS-28070	CSS Event Logger Service shall record the operator/principle information that is relevant for the generated event.	EcUtLoggerRelAMgmt
C-CSS-28080	CSS Event Logger Service shall record the environment information for the generated event.	EcUtLoggerRelAMgmt
C-CSS-29000	The CSS Transaction Processing Service shall be object oriented.	Transaction Processing Services
C-CSS-29010	The CSS Transaction Processing Service shall use the CSS Security services.	Transaction Processing Services
C-CSS-29020	The CSS Transaction Processing Service shall support the management of OODCE-based servers.	EcsTpAdminB Transaction Processing Services
C-CSS-29030	The CSS Transaction Processing Service shall provide to the client and server the following features: a. Atomicity - All components of the transaction shall succeed or fail as a unit. b. Consistency - The actions performed by a transaction shall take data from one consistent state to another consistent state. c. Isolation - Transactions performed simultaneously shall not interfere with each other. d. Durability - The effect of committed transactions shall be permanent. Subsequent system failures shall not cause the unrecoverable loss of data.	Transaction Processing Services
C-CSS-29040	The CSS Transaction Processing Service shall provide load balancing for OODCE-based servers.	Transaction Processing Services EcsTpAdminB
C-CSS-29050	The CSS Transaction Processing Service shall provide for the integrity of data by means of component rollback in the event of system failure.	Transaction Processing Services

Table A-1. Requirements Trace (22 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-29060	The CSS Transaction Processing Service shall provide client request queuing during data server unavailability.	EcsTpQueueB EcsTpRQSB Transaction Processing Services
C-CSS-29070	The CSS Transaction Processing Service shall provide client request dequeuing of queued requests when data server has rebooted.	EcsTpQueueB EcsTpRQSB Transaction Processing Services
C-CSS-29080	The CSS Transaction Processing Service shall provide the capability of recovering from multiple failures without loss of data.	Transaction Processing Services
C-CSS-60300	The CSS File Access Service shall provide transparent access to remote files.	File Access Services
C-CSS-60310	The CSS File Access Service shall support access control for the remote files.	File Access Services
C-CSS-60320	The CSS File Access Service shall provide location independent naming for the remote files.	File Access Services
C-CSS-60330	The CSS File Access Service shall provide uninterrupted file access in the event of single failure of the server.	File Access Services
C-CSS-60340	The CSS File Access Service shall guarantee the accessed file to be in its most recent version.	File Access Services
C-CSS-60350	The CSS File Access Service shall provide capability to change directory (cd) on the remote host.	File Access Services
C-CSS-60500	The CSS File Access Service shall provide functionality for interactive and non-interactive transfer of files (send and receive) between two host systems.	CsFtFTPReIB
C-CSS-60510	The CSS File Access Service shall be capable of transferring ASCII and binary files.	CsFtFTPReIB
C-CSS-60520	The CSS File Access Service shall support the File Transfer Protocol (FTP).	CsFtFTPReIB
C-CSS-60530	The CSS File Access Service shall support the kerberized version of File Transfer Protocol for secured file transfers.	CsFtFTPReIB
C-CSS-60600	The CSS File Access Service shall provide connection oriented operation for file transfers.	File Access Services
C-CSS-60610	The CSS File Access Service shall allow selection of the file type (ASCII or binary).	File Access Services
C-CSS-60620	The CSS File Access Service shall support proxy mode of operation which enables transfer of files between two remote hosts.	File Access Services
C-CSS-60630	The CSS File Access Service shall provide capability to list remote files	File Access Services

Table A-1. Requirements Trace (23 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-60640	The CSS File Access Service shall support wildcards in files on the remote host.	File Access Services
C-CSS-60650	The CSS File Access service shall support anonymous FTP which allows read access to all users.	OS
C-CSS-60800	The CSS File Access Service shall provide an option for scheduling file transfers in a batch mode.	CsFtFTPReIB
C-CSS-60810	The CSS File Access Service shall log results of the non-interactive operations to operator specified log files.	CsFtFTPReIB
C-CSS-60820	The CSS File Access Service shall provide an option to send alarms and generate events if a scheduled operation fails.	EcUtLoggerRelA
C-CSS-60900	The CSS File Access Service shall provide an API which allows applications to transfer files.	CsFtFTPReIB
C-CSS-60910	The CSS File Access Service shall allow for file type selection (ASCII or Binary).	CsFtFTPReIB
C-CSS-60920	The CSS File Access Service shall accept authentication information for file transfers.	CsFtFTPReIB
C-CSS-61010	The CSS Electronic Mail Service shall interoperate and exchange messages with external mail systems based on SMTP and X.400 protocols.	OS
C-CSS-61020	The CSS Electronic Mail Service shall be capable of sending and receiving the Multi-purpose Internet Mail Extensions (MIME) messages.	Electronic Mail Services
C-CSS-61030	The CSS Electronic Mail Service shall use the existing X.400 gateway available at GSFC to support X.400 operations.	
C-CSS-61040	The CSS Electronic Mail Service shall provide translation between SMTP and X.400 protocol.	
C-CSS-61050	The CSS Electronic Mail Service shall be accessible in interactive mode.	Electronic Mail Services
C-CSS-61060	The CSS Electronic Mail Service shall be accessible in non-interactive mode via API.	CsEmMailRelA
C-CSS-61070	The CSS Electronic Mail Service shall support the Post Office Protocol (POP).	Electronic Mail Services
C-CSS-61290	The CSS Electronic Mail Service shall provide functionality to send reply for a received message to a._the author b._to all destinations addressed in the incoming message MailTool	OS
C-CSS-61310	The CSS Electronic Mail Service shall provide a MAILBOX where all incoming messages for operators will be stored.	OS
C-CSS-61320	The CSS Electronic Mail Service shall provide operator defined folders to store messages for long term archive.	OS

Table A-1. Requirements Trace (24 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-61330	The CSS Electronic Mail Service shall allow copying and/or moving messages from the MAILBOX to the operator specified folders.	OS
C-CSS-61360	The CSS Electronic Mail Service shall be capable of showing a summary of all messages in the MAILBOX or in a folder which minimally contains: a._title/subject of the message b._name of the author c._date/time of the message origination	OS
C-CSS-61370	The CSS Electronic Mail Service shall provide an editor to compose a message.	OS
C-CSS-61380	The CSS Electronic Mail Service shall provide a title/subject field for a message.	OS
C-CSS-61390	The CSS Electronic Mail Service shall allow a message to be sent to multiple destinations.	OS
C-CSS-61397	The CSS Electronic Mail Service shall provide on-line help functionality.	Electronic Mail Services
C-CSS-61400	The CSS Electronic Mail Service shall allow destinations of the following types: a._a single user b._a position which may be managed by one or many operators c._a site which may consists of several operators.	OS
C-CSS-61410	The CSS Electronic Mail Service shall provide a capability to maintain public mailing lists (each list may contain multiple destination) which are accessible to all operators.	OS
C-CSS-61420	The CSS Electronic Mail Service shall provide a capability to maintain private mailing lists (each list may contain multiple destination) for individual operators.	OS
C-CSS-61430	The CSS Electronic Mail Service shall allow attaching either text or binary files to a message.	OS
C-CSS-61440	The CSS Electronic Mail Service shall allow discarding message(s) from the MAILBOX without saving.	OS
C-CSS-61450	The CSS Electronic Mail Service shall have the capability to forward a message.	OS
C-CSS-61460	The CSS Electronic Mail Service shall allow cut/copy/paste/delete/undo operations in the editor.	OS
C-CSS-61470	The CSS Electronic Mail Service shall provide navigation methods to go the next or previous message in the MAILBOX or selected folder.	OS
C-CSS-61490	The CSS Electronic Mail Service shall provide the capability to search for keywords in messages.	OS
C-CSS-61500	The CSS Electronic Mail Service shall provide the capability to search the MAILBOX or a folder for keywords in title text.	OS

Table A-1. Requirements Trace (25 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-61510	The CSS Electronic Mail Service shall provide the capability to search the MAILBOX or folders for a specific author.	OS
C-CSS-61520	The CSS Electronic Mail Service shall accept mailing lists as valid destinations.	OS
C-CSS-61800	The CSS Electronic Mail Service shall provide the capability to send an electronic mail message non-interactively from an application.	CsEmMailRelA
C-CSS-61810	The CSS Electronic Mail Service shall allow attaching multiple text or binary files to the mail message.	CsEmMailRelA
C-CSS-61820	The CSS Electronic Mail Service shall accept a file name as input for the message text.	CsEmMailRelA
C-CSS-61840	The CSS Electronic Mail Service shall be capable of sending a message to multiple destinations.	CsEmMailRelA
C-CSS-61850	The CSS Electronic Mail Service shall accept mailing lists as valid destinations.	CsEmMailRelA
C-CSS-62000	The CSS Bulletin Board Service shall be based on the following standards:a._TCP/IPb._NNTPc._SMTPd._Usenet message standard (RFC 850)	OS
C-CSS-62010	The CSS Bulletin Board Service shall support multiple (configurable) bulletin boards (newsgroups).	Bulletin Board Services
C-CSS-62030	The CSS Bulletin Board Service shall provide concurrent access to multiple users (registered or non-registered).	Bulletin Board Services
C-CSS-62040	The CSS Bulletin Board Service shall allow multiple messages for each bulletin board.	Bulletin Board Services
C-CSS-62050	The CSS Bulletin Board Service shall host the user registration service.	Bulletin Board Services
C-CSS-62060	The CSS Bulletin Board Service shall provide the capability for copying files.	Bulletin Board Services
C-CSS-62070	The CSS Bulletin Board Service shall support download of ECS toolkits.	Bulletin Board Services
C-CSS-62080	The CSS Bulletin Board Service shall collect and maintain access history and statistical information for the service.	Bulletin Board Services
C-CSS-62100	The CSS Bulletin Board Service shall provide capabilities to authorized users (M&O staff) for:a._creating new bulletin boardb._deleting existing bulletin boardc._deleting message(s) from a bulletin boardd._backing up bulletin boardse._forcing users off a bulletin board or the entire bulletin board service for backupf._collecting access history and/or statistical information.g._backing up bulletin boards.	Bulletin Board Services

Table A-1. Requirements Trace (26 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-62120	The CSS Bulletin Board Service shall provide the capability to respond to a posted message on a bulletin board by sending the response message to:a._the bulletin board (follow up)b._author of the original message (respond to author)c._named destinations (forward).	Bulletin Board Services
C-CSS-62130	The CSS Bulletin Board Service shall provide a "What's new" feature which informs the user of the new information available on the bulletin boards.	Bulletin Board Services
C-CSS-62300	The CSS Bulletin Board Service shall be available to the users in interactive mode.	Bulletin Board Services
C-CSS-62305	The CSS Bulletin Board Service shall allow user to subscribe to bulletin boards.	Bulletin Board Services
C-CSS-62310	The CSS Bulletin Board Service shall allow user to unsubscribe bulletin boards.	Bulletin Board Services
C-CSS-62314	The CSS Bulletin Board Service shall allow the user to withdraw a message from bulletin board after posting.	Bulletin Board Services
C-CSS-62317	The CSS Bulletin Board Service shall provide on-line help functionality.	Bulletin Board Services
C-CSS-62320	The CSS Bulletin Board Service shall allow user to select a subscribed bulletin board for viewing summary of all messages in it.	Bulletin Board Services
C-CSS-62330	The CSS Bulletin Board Service shall provide the capability to respond to a message by sending the response to the bulletin board and/or to the author of the message and/or any other operator specified destination.	Bulletin Board Services
C-CSS-62340	The CSS Bulletin Board Service shall provide capability:a._to search for a string in message headers or in message text.b._to search by authorc._to search by subject.	Bulletin Board Services
C-CSS-62350	The CSS Bulletin Board Service shall provide a catch-up feature which excludes user specified messages from appearing in the bulletin board when it is viewed next time.	Bulletin Board Services
C-CSS-62360	The CSS Bulletin Board Service shall allow the users to post messages to bulletin board(s).	Bulletin Board Services
C-CSS-62380	The CSS Bulletin Board Service shall allow users to copy/save a message to their local system.	Bulletin Board Services
C-CSS-62390	The CSS Bulletin Board Service shall allow attaching ASCII or binary files to a message.	Bulletin Board Services
C-CSS-62800	The CSS Bulletin Board Service shall interface for the applications to post a message to bulletin boards.	CsBBMailRelA
C-CSS-62810	The CSS Bulletin Board Service shall allow attaching ASCII and binary files to a message.	CsBBMailRelA

Table A-1. Requirements Trace (27 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-62820	The CSS Bulletin Board Service shall allow a message to be posted to multiple bulletin boards.	CsBBMailRelA
C-CSS-63000	The CSS Virtual Terminal shall provide a virtual device which hides the physical terminal characteristics and handling conventions from both the operator and the server host.	Virtual Terminal Services
C-CSS-63010	The CSS Virtual Terminal shall provide means to enhance characteristics of the basic virtual device by mutual agreement between the two communicating parties (option negotiations).	Virtual Terminal Services
C-CSS-63020	The CSS Virtual Terminal shall be based on industry standard and accepted protocols (telnet and ktelnet).	Virtual Terminal Services
C-CSS-63040	The CSS Virtual Terminal shall provide guest access to non-registered users to log into the ECS guest server.	Virtual Terminal Services
C-CSS-63050	The CSS Virtual Terminal shall support kerberized version of the telnet protocol for secure authentication of users.	Virtual Terminal Services
C-CSS-63060	The CSS Virtual Terminal shall support X applications.	Virtual Terminal Services
C-CSS-64000	The CSS Dial-Up Access Service shall provide remote Internet access.	Virtual Terminal Services
C-CSS-65000	The CSS Secure Web service shall support the Kerberos standard.	Secure Web Services
C-CSS-65010	The CSS Secure Web service shall support POSIX compliant Access Control List (ACL).	Secure Web Services
C-CSS-65020	The CSS Secure Web service shall support at a minimum the GET and POST HTTP methods.	Secure Web Services
C-CSS-65030	The CSS Secure Web service shall provide a registration interface for the user to register documents to the web server.	
C-CSS-65040	Documents ACL on the web server shall be editable with any standard ACL editor.	Secure Web Services
C-CSS-65050	The CSS Secure service Web shall use DCE RPC's that will allow the server to use DCE provided services.	Secure Web Services
C-CSS-65060	The CSS Secure Web service shall support the Data Encryption Standard (DES) to encrypt and decrypt data.	Secure Web Services
C-CSS-65070	The CSS Secure Web service shall support encryption of the HTTP protocol.	Secure Web Services
C-CSS-65080	The CSS Secure Web service shall support private keys.	Secure Web Services
C-CSS-65090	The CSS Secure Web service shall provide an interface for the administration of the web server.	Secure Web Services
C-CSS-65100	The CSS Secure Web service shall provide an API that will support the porting of existing applications to the DCE environment.	ECSTunnelB Secure Web Services

Table A-1. Requirements Trace (28 of 28)

L4 Rqmt ID	L4 Requirement Text	Object Class, CSC, or CI
C-CSS-65110	The CSS Secure Web service shall support a two-way authentication and authorization for the use by the web server.	Secure Web Services
C-CSS-65120	The CSS Secure Web service shall authenticate and authorize DCE users using the web server.	Secure Web Services
C-CSS-65130	The CSS Secure Web service must provide HTML formatted error messages to the web browser.	Secure Web Services
C-CSS-65140	The CSS Secure Web service shall provide a mechanism for non-DCE browsers to view non- secured documents on the web server.	Secure Web Services ECSGatewayB
C-CSS-65150	The CSS Secure Web service shall provide a mechanism or DCE capable browser to view non- secured and secured documents on the web server.	Secure Web Services
C-CSS-65160	The CSS Secure Web service shall support the X.500 standard for naming and locating DCE cells.	Secure Web Services
C-CSS-65170	The CSS Secure Web service shall support the Domain Name Service specification.	Secure Web Services
C-CSS-65180	The CSS Secure Web service shall provide the capability to support encryption to keep data exchange between the browser and the server confidential.	Secure Web Services
C-CSS-65190	All requests from a client shall provide the web server with the individual user name.	Secure Web Services
C-CSS-65200	The CSS Secure Web service shall use DCE's ACLs to protect all documents on the web server.	Secure Web Services
C-CSS-65210	The CSS Secure Web service shall use the Extended Generic Security Service API for message passing applications to use DCE security .	Secure Web Services
C-CSS-65220	The CSS Secure Web service shall be based on the HTTP protocol for message passing.	Secure Web Services
C-CSS-65230	The CSS Secure Web service shall support the browser used by the Client subsystem.	Secure Web Services
C-CSS-65240	The CSS Secure Web service shall provide attributes to the browser indicating documents with special security restrictions.	Secure Web Services

Table A-2 identifies proposed/pending requirements changes which have not been approved and/or were not yet in the RELB_CDR_030196 version of the requirements database.

Table A-2 Intended Changes to CDR Requirements Baseline (1 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-30010	The Process Framework shall accept basic process information that is needed while starting up client and server applications using a set of variables defined in a configuration file.	New	EcPfGenProcess EcPfGenServer EcPfConfigFile
C-CSS-30020	The Process Framework shall also accept the above variables from the command line.	New	EcPfGenProcess EcPfGenServer
C-CSS-30030	The Process Framework shall always provide a higher precedence to the variables defined on the on the command line.	New	EcPfGenProcess
C-CSS-30040	The Process Framework shall exit with an error status if the mode of operation and the configuration file name are not provided on the command line.	New	EcPfGenProcess EcPfGenServer
C-CSS-30050	The Process Framework shall provide the ability for a process to get the following information: a. Mode of operation b. Delta Time c. Executable name d. Process ID e. Application ID f. Program ID g. Major Version h. Minor Version	New	EcPfGenProcess
C-CSS-30060	The Process Framework shall provide interfaces to the underlying distributed architecture to set the following naming parameters: a. Short name for server b. Profile name c. Group name	New	EcPfGenServer EcPfManagedServer
C-CSS-30070	The Process Framework shall provide interfaces to the underlying distributed architecture to establish the server identity.	New	EcPfGenServer EcPfManagedServer
C-CSS-30080	The Process Framework shall provide interfaces to the underlying distributed infrastructure to set the following security parameters: a. Server principal name b. Keytab file name c. ACL database filename	New	EcPfGenServer

Table A-2 Intended Changes to CDR Requirements Baseline (2 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-30090	The Process Framework shall provide an interface to the underlying distributed architecture to set the protocol policy	New	EcPfGenServer
C-CSS-30100	The Process Framework shall provide an interface to the underlying distributed architecture to set the host policy	New	EcPfGenServer
C-CSS-30110	The Process Framework shall provide the ability to log errors and events for both client and server processes	New	EcPfGenProcess EcPfGenServer EcPfClient
C-CSS-30120	The Process Framework shall provide interfaces to the FTP batch processing facility.	New	EcPfGenServer
C-CSS-30130	The Process Framework shall provide interfaces to the Server Request Framework.	New	EcPfGenServer
C-CSS-30140	The Process Framework shall provide interfaces to the Asynchronous Message Passing service.	New	EcPfGenServer
C-CSS-30150	The Process Framework shall interface with the Management Agent framework to shutdown an application	New	EcPfGenServer EcPfManagedServer
C-CSS-30160	The Process Framework shall interface with the Management Agent framework to suspend an application	New	EcPfGenServer EcPfManagedServer
C-CSS-30170	The Process Framework shall interface with the Management Agent framework to resume an application	New	EcPfGenServer EcPfManagedServer
C-CSS-40010	The Subscription Service shall accept Subscription Requests that specify an action to be taken and an event to initiate the action	New	EcSbSubscriptionServer
C-CSS-40040	The Subscription Service shall validate Subscription Requests for time interval events. Time intervals will be limited to daily, weekly, or monthly	New	EcCISubscription
C-CSS-40060	The Subscription Service shall validate Subscription Requests for send notification actions	New	EcSbSubscriptionServer
C-CSS-40090	The Subscription Service shall process Subscription Requests at the the occurrence of the specified event	New	EcSbSubscriptionHandler
C-CSS-40100	In the event that more than one Subscription linked to a single event, the Subscription Service shall process the actions defined in the Subscriptions on a first-come, first-serve basis	New	EcSbEvent

Table A-2 Intended Changes to CDR Requirements Baseline (3 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-40110	The Subscription Service shall provide the capability to notify users when data has been archived and is available for access	New	EcSbSubscription
C-CSS-40120	The Subscription Service shall provide the capability to notify a user that a new version of the data has been archived	New	EcCISubscription
C-CSS-40140	The Subscription Service shall provide the capability for Subscriptions to notify users via email or directly to a program interface	New	EcSbSubscription
C-CSS-40150	The Subscription Service shall provide the capability to bundle notification of discrete events into a single notice to the subscriber	New	EcSbSubscription
C-CSS-40160	The Subscription Service shall provide the capability for a user to request notification of data arrival	New	EcSbSubscription
C-CSS-40170	The Subscription Service shall accept Subscription Update Requests to update stored Subscriptions by changing the event or the action	New	EcCISubscription
C-CSS-40180	The Subscription Service shall provide the capability for operations staff to view the stored Subscriptions	New	EcCISubscriptionCollector
C-CSS-40190	The Subscription Service shall provide the capability for operations staff to update the stored Subscriptions by changing the event and/or action	New	EcCISubscription
C-CSS-40200	The Subscription Service shall provide the capability for a user client to update their stored Subscriptions by changing the action and/or event	New	EcCISubscription
C-CSS-40210	The Subscription Service shall provide the capability for operations staff to delete any stored Subscription	New	EcCISubscriptionCollector
C-CSS-40220	The Subscription Service shall provide the capability for a user to delete their own stored subscription	New	EcCISubscriptionCollector
C-CSS-40230	The Subscription Service shall validate that Subscription Update requests specify a valid Subscription Identifier and a valid replacement Subscription	New	EcSbEventHandler

Table A-2 Intended Changes to CDR Requirements Baseline (4 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-40260	The Subscription Service shall periodically report on new events for timer-based Subscriptions and will not repeat notification of old events	New	EcSbEventHandler
C-CSS-46000	The UR mechanism shall allow clients to access ECS object instances, without actually having the instance by providing each object instance with it's own UR.	New	EcUrURProvider
C-CSS-46010	The UR mechanism shall support location independence of the object instance	New	EcUrUR EcUrURProvider
C-CSS-46020	The UR mechanism shall support protocol/technology independence.	New	EcUrUR EcUrURProvider
C-CSS-46030	The UR mechanism shall support multiple redundant instances for a UR.	New	EcUrUR EcUrURProvider
C-CSS-46040	The UR mechanism shall provide a way for an external entity, like a person, or an office automation package, to transport the mechanism.	New	EcUrUR
C-CSS-46050	The UR mechanism shall provide some human readable information about the object in the external representation.	New	EcUrUR
C-CSS-46060	The UR mechanism shall make sure that the external representation is validated so that erroneous ECS object instance are not created.	New	EcUrURMaker EcUrUR
C-CSS-46070	The UR mechanism shall support clients knowing UR type and clients learning UR type.	New	EcUrURMaker EcUrUR
C-CSS-46080	The UR mechanism shall allow a client to have a UR for an encapsulated abstract base class.	New	EcUrUR EcUrURProviderMaker EcUrURProvider
C-CSS-46090	The UR mechanism shall allow additional concrete specializations of abstract base class to be added without client modification.	New	EcUrUR EcUrURProviderMaker EcUrURProvider
C-CSS-61010	The CSS Electronic Mail Service shall interoperate and exchange messages with external mail systems based on SMTP and X.400 protocols.	Modified	OS
C-CSS-61030	The CSS Electronic Mail Service shall use the existing X.400 gateway available at GSFC to support X.400 operations.	Delete	

Table A-2 Intended Changes to CDR Requirements Baseline (5 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-61040	The CSS Electronic Mail Service shall provide translation between SMTP and X.400 protocol.	Delete	
C-CSS-24030	The CSS Lifecycle Service shall provide an API that accepts resource preference information.	Delete	
C-CSS-24050	The CSS Lifecycle Service shall ensure that a server is available to service a user request.	Delete	
C-CSS-29000	The CSS Transaction Processing Service shall be object oriented.	Delete	Transaction Processing Services
C-CSS-29010	The CSS Transaction Processing Service shall use the CSS Security services.	Delete	Transaction Processing Services
C-CSS-29020	The CSS Transaction Processing Service shall support the management of OODCE-based servers.	Delete	EcsTpAdminB Transaction Processing Services
C-CSS-29030	The CSS Transaction Processing Service shall provide to the client and server the following features: a. Atomicity - All components of the transaction shall succeed or fail as a unit. b. Consistency - The actions performed by a transaction shall take data from one consistent state to another consistent state. c. Isolation - Transactions performed simultaneously shall not interfere with each other. d. Durability - The effect of committed transactions shall be permanent. Subsequent system failures shall not cause the unrecoverable loss of data.	Delete	Transaction Processing Services
C-CSS-29040	The CSS Transaction Processing Service shall provide load balancing for OODCE-based servers.	Delete	Transaction Processing Services EcsTpAdminB
C-CSS-29050	The CSS Transaction Processing Service shall provide for the integrity of data by means of component rollback in the event of system failure.	Delete	Transaction Processing Services
C-CSS-29060	The CSS Transaction Processing Service shall provide client request queuing during data server unavailability.	Delete	EcsTpQueueB EcsTpRQSB Transaction Processing Services
C-CSS-29070	The CSS Transaction Processing Service shall provide client request dequeuing of queued requests when data server has rebooted.	Delete	EcsTpQueueB EcsTpRQSB Transaction Processing Services

Table A-2 Intended Changes to CDR Requirements Baseline (6 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-29080	The CSS Transaction Processing Service shall provide the capability of recovering from multiple failures without loss of data.	Delete	Transaction Processing Services
C-CSS-65000	The CSS Secure Web service shall support the Kerberos standard.	Delete	Secure Web Services
C-CSS-65010	The CSS Secure Web service shall support POSIX compliant Access Control List (ACL).	Delete	Secure Web Services
C-CSS-65020	The CSS Secure Web service shall support at a minimum the GET and POST HTTP methods.	Delete	Secure Web Services
C-CSS-65030	The CSS Secure Web service shall provide a registration interface for the user to register documents to the web server.	Delete	
C-CSS-65040	Documents ACL on the web server shall be editable with any standard ACL editor.	Delete	Secure Web Services
C-CSS-65050	The CSS Secure service Web shall use DCE RPC's that will allow the server to use DCE provided services.	Delete	Secure Web Services
C-CSS-65060	The CSS Secure Web service shall support the Data Encryption Standard (DES) to encrypt and decrypt data.	Delete	Secure Web Services
C-CSS-65070	The CSS Secure Web service shall support encryption of the HTTP protocol.	Delete	Secure Web Services
C-CSS-65080	The CSS Secure Web service shall support private keys.	Delete	Secure Web Services
C-CSS-65090	The CSS Secure Web service shall provide an interface for the administration of the web server.	Delete	Secure Web Services
C-CSS-65100	The CSS Secure Web service shall provide an API that will support the porting of existing applications to the DCE environment.	Delete	ECSTunnelB Secure Web Services
C-CSS-65110	The CSS Secure Web service shall support a two-way authentication and authorization for the use by the web server.	Delete	Secure Web Services
C-CSS-65120	The CSS Secure Web service shall authenticate and authorize DCE users using the web server.	Delete	Secure Web Services
C-CSS-65130	The CSS Secure Web service must provide HTML formatted error messages to the web browser.	Delete	Secure Web Services

Table A-2 Intended Changes to CDR Requirements Baseline (7 of 7)

L4 Rqmt ID	L4 Requirement Text Intended Change	Reason for Change	Object Class, CSC, or CI
C-CSS-65140	The CSS Secure Web service shall provide a mechanism for non- DCE browsers to view non- secured documents on the web server.	Delete	Secure Web Services ECSGatewayB
C-CSS-65150	The CSS Secure Web service shall provide a mechanism or DCE capable browser to view non- secured and secured documents on the web server.	Delete	Secure Web Services
C-CSS-65160	The CSS Secure Web service shall support the X.500 standard for naming and locating DCE cells.	Delete	Secure Web Services
C-CSS-65170	The CSS Secure Web service shall support the Domain Name Service specification.	Delete	Secure Web Services
C-CSS-65180	The CSS Secure Web service shall provide the capability to support encryption to keep data exchange between the browser and the server confidential.	Delete	Secure Web Services
C-CSS-65190	All requests from a client shall provide the web server with the individual user name.	Delete	Secure Web Services
C-CSS-65200	The CSS Secure Web service shall use DCE's ACLs to protect all documents on the web server.	Delete	Secure Web Services
C-CSS-65210	The CSS Secure Web service shall use the Extended Generic Security Service API for message passing applications to use DCE security .	Delete	Secure Web Services
C-CSS-65220	The CSS Secure Web service shall be based on the HTTP protocol for message passing.	Delete	Secure Web Services
C-CSS-65230	The CSS Secure Web service shall support the browser used by the Client subsystem.	Delete	Secure Web Services
C-CSS-65240	The CSS Secure Web service shall provide attributes to the browser indicating documents with special security restrictions.	Delete	Secure Web Services

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Abbreviations and Acronyms

ACL	Access Control List
AFS	Andrews File System
AI&T	Algorithm Integration and Test
AIT	Algorithm Integration Team
ANSI	American National Standards Institute
API	Application program (or programming) interface
ASCII	American Standard Code for Information Exchange
ATM	Asynchronous Transfer Mode
ARP	Address Resolution Protocol
ASTER	Advanced Spaceborne Thermal Emission and Reflection Radiometer
BB	Bulletin Board
BBS	Bulletin Board Service
BDS	Bulk Data Service
BIND	Berkeley Internet Name Domain
BGP	Border Gateway Protocol
BOA	Basic Object Adapter
CAC	Command and Activity Controller
CCB	Change Control Board (Hughes Convention)
CCB	Configuration Control Board (NASA Convention)
CCR	Configuration Change Request
CDS	Cell Directory Service
CDR	Critical Design Review
CDRL	Contract data requirements list
CERES	Clouds and Earth's Radiant Energy System
CIDR	Classless Interdomain Routing
CM	Configuration management
CMAS	Configuration Management Application Service
CMIP	Common Management Information Protocol
CNE	Campus Network Environment
CORBA	Common object request broker architecture
COTS	Commercial off-the-shelf (hardware or software)
CPU	Central processing unit

CSMS	Communications and System Management Subsystem
CSS	Communication Subsystem
DAAC	Distributed Active Archive Center
DADS	Data Archive and Distribution System
DB	Database
DBMS	Database management system
DCE	Distributed computing environment (OSF)
DEC	Digital Equipment Corporation
DECOM	FOS Decommutation Process
DFS	Distributed File System
DID	Data item description
DME	Distributed Management Environment
DNS	Directory Name Service
DOF	Distributed Object Framework
DPR	December Progress Review
DS	Data Server (FOS)
DTS	Distributed Time Server (part of DCE)
ECS	EOSDIS Core System
EDOS	EOS Data and Operations Center
EDF	ECS Development Facility
E-Mail	Electronic Mail
EMC	Enterprise Monitoring and Coordination
EOC	EOS Operations Center (ECS)
EOS	Earth Observing System
EOSDIS	Earth Observing System Data and Information System
EP	Evaluation Prototype
ESN	EOSDIS Science Network
EPV	Endpoint Vector
FDDI	Fiber distributed data interface
FDF	Flight Dynamics Facility
FOS	Flight Operations Segment
Ftp	File Transfer Protocol
GB	Gigabyte
GCDIS	GDS Global Directory Service
GDS	Global Directory Service
GSFC	Goddard Space Flight Center

GUI	Graphic user interface
HAIS	Hughes Applied Information Systems (ECS)
HiPPI	High Performance Parallel Interface
HP	Hewlett Packard
Http	Hyper Text Transfer Protocol
I/F	Interface
I&T	Integration & Test
IBM	International Business Machines, Inc.
ICD	Interface control document
ICMP	Internet Control Messaging Protocol
IDL	Interface Definition Language
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IP	Internet Protocol
IR-1	Interim Release 1
ISO	International Standards Organization
ISO+	IsoCELL (Isolation Cell)
ISS	Internetworking Subsystem of CSMS
IST	Instrument Support Toolkit
IST	Instrument Support Terminal
Kerberos	Security protocol developed by MIT; base for DCE security
Kftp	Kerberized file transfer protocol
KLOC	Kilolines of code
Ktelnet	Kerberized telnet
LAN	Local area network
LaRC	Langley Research Center
LLC	Logical Link Control
LOC	Lines of code
LSM	Local System Management
M&O	Maintenance and operations
MBONE	Multicast Backbone
MIB	Management Information Base
MIME	Multimedia Internet Mail
MLM	Mid-Level Manager
MOPITT	Measurement of pollution in the troposphere
MOSPF	Multicast Open Shortest Path First

MR-AFS	Multi-Resident Andrew File System
MSFC	Marshall Space Flight Center
MSS	Systems Management Subsystem
MUI	Management User Interface
NCR	Non-conformance Report
NFS	Network file system
NIC	Network Interface Card
NNTP	Network New Transfer Protocol
NOAA	National Oceanic and Atmospheric Administration
NOLAN	Nascom Operational Local Area Network
NSI	NASA Science Internet
NTP	Network Time Protocol
OA	Off-Line Analysis Process
OLAP	On-Line Analytical Processing
OLTP	On-Line Transaction Processing
OMG	Object Management Group
OMT	Object Modelling Technique
OO	Object-oriented
OODCE	Object-oriented DCE
OODBMS	Object-oriented database management system
ORB	Object Request Broker
OS	Object Services (CSS building blocks)
OSF	Open Software Foundation
OSI	Open System Interconnect
OSI-RM	OSI Reference Model
OSPF	Open Shortest Path First
PAC	Privilege Attribute Certificate
PDR	Preliminary Design Review PDR-A
PDU	Protocol Data Unit
PF	Process Framework
PPP	Point-to-Point Protocol
POSIX	Portable Operating System Interface for Computer Environments
PSC	Pittsburgh Supercomputing Center
PTGT	Privilege Ticket Granting Ticket
RDBMS	Relational database management system
RFA	Remote File Access

RFC	Request for comments
RIP	Routing Information Protocol
RMA	Reliability, Maintainability, Availability
RMON	Remote Monitoring
RMP	Reliable Multicast Protocol
RPC	Remote procedure call
RTS	Real-Time Server (FOS)
SCF	Science Computing Facility
SDPF	Sensor Data Processing Facility
SDR	Software/System Design Review
SDR	Sensor data record
SIG	Silicon graphics
SLOC	Source lines of code
SMC	System Monitoring and Control
SMDS	Switched Multi-megabit Data Service
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network
SQL	Simple Query Language
SRF	Server Request Framework
TCP/IP	Transmission Control Protocol/Internet Protocol
TGT	Ticket Granting Ticket
TMN	Telecommunications Management Network
TRMM	Tropical Rainfall Measurement Mission
TSDIS	TRMM Science Data Information System
UDP	User Datagram Protocol
UIOAR	User Interface Off-Line Analysis Request Window
UR	Universal Reference
URL	Universal Resource Locator
US	User Station (FOS)
UUID	Universal Unique Identifier
UTC	Universal time code
V0	Version 0
VT	Virtual Terminal
WAN	Wide area network
WWW	World Wide Web
X	X Protocol

X.500	OSI standard for directory services (207)
XDS	X/Open Directory Service
XFN	X/Open Federated Naming
XOM	X/Open OSI-Abstract-Data Manipulation