

# EOS User's Guide

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## I INTRODUCTION

### A. Preface

The *EOS User's Guide* provides an overview of EOS, tells you how to get a new EOS application, and describes how to begin using your application when it is hosted in the EOS environment. Other information includes operations policies (e.g., security and risk management), charging, EOS systems configuration, and the products and services available to the applications hosted on EOS (e.g., Oracle RDBMS).

Information about the EOS systems is provided in two ways. Time-critical information is e-mailed directly to the Listserv list used for your EOS application. Planned upgrades, changes in policies, and new/revised EOS services and facilities are preannounced in our publication, *Interface*.

We are here to support you in fulfilling your organization's missions and goals. Please let us know how we can better serve you. If you have comments and questions, please call CIT's Technical Assistance and Support Center (TASC) at (301) 594-6248.

### B. Overview of the EOS Systems

The EOS systems—more than 70 servers referred to as EOS—provide a stable software and data-repository environment for customer applications that run in a Unix-based environment. EOS provides hardware and software featuring powerful Compaq/Digital AlphaServers, Sun Enterprise servers, Oracle RDBMSs and related products, and complete Web capabilities. Use of the EOS is on a fee-for-service basis, with the costs charged to your CIT account.

- **CIT Services for EOS**

CIT staff provides a well-managed server environment suitable for critical Unix-based applications.

Hardware and software (e.g., secure-server platform, Oracle licenses) is acquired and maintained by CIT. The configuration is carefully tailored to the needs of the application.

CIT has long, broad experience in providing production facilities—including 365 days/year operation, physical plant maintenance, system security, disaster recovery procedures, and networking infrastructure. The CIT systems staff is expert in all aspects of operating and maintaining robust, secure system for hosting critical applications..

CIT staff can address your individual computing requirements and help tailor your applications to run efficiently in this environment. For more information, please contact the EOS team at (301) 496-5524.

- **Summary of the EOS Systems**

The NIH Computer Center's EOS platforms are Unix-based systems that provide extremely high performance with an outstanding price/performance ratio. The database servers are Compaq/Digital AlphaServer systems that are well known for their transaction processing capabilities—particularly in using its 64-bit architecture to complement Oracle database transactions. For more details, see "EOS Systems Configuration" (page 17).

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### ***Hardware***

EOS database processing is based on high-end Compaq/Digital AlphaServers with readily expandable RAID and non-RAID disk storage. Midrange Compaq/Digital AlphaServers and Sun servers are also part of the EOS configuration and are available for multi-tier applications. These midrange servers have proven especially useful for hosting Web servers and middle-tier applications that access secure Oracle databases on the large, shared AlphaServers.

### ***RDBMS***

Recent versions of Oracle RDBMSs are available on the shared database servers. CIT staff will create and maintain Oracle instances for your application and provide the necessary licenses for direct access to the database. Oracle instance installation, maintenance, monitoring, and procurement are handled by CIT.

### ***Monitoring***

CIT staff monitors disk space, memory, and processor usage on all systems. We can help you decide when it's time to increase resources needed for your application.

### ***Connectivity***

CIT provides wide bandwidth network connections to and from EOS systems via SSH, scp, ODBC, Net8 (formerly SQL\*Net), CONNECT:Direct, as well as with the Internet via http and https (SSL).

### ***Flexibility***

CIT can work with you to develop configurations of hardware and software that match your needs. As your requirements change (perhaps your development system is going production), you can add or subtract additional services and options. You only pay for what you currently use.

### ***Security***

Unix on the EOS Systems is installed and configured at the Department of Defense C2 security level (approximately equivalent to DHHS Level 3 security). The NIH Computer Center is physically secure with card-key access. Facilities in the Computer Center—including the EOS systems—are monitored 24 hours a day, seven days a week. The computing environment has controlled humidity and temperature, as well as an uninterruptible power source. System data is backed up regularly, and the backup tapes are stored in a fireproof onsite vault and at a remote site. More information is available in “Security and Risk Management” (page 14).



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## II GETTING STARTED

Owners of applications that might benefit from using EOS systems are encouraged to contact CIT to discuss their application requirements. CIT will work with application owners to identify an appropriate hosting architecture – addressing the application’s processor, memory, storage, bandwidth, software, and security requirements. The hosting architecture and service/support level that is jointly selected will determine the monthly hosting costs.

### A. Establishing a New EOS Application

To request a new EOS application, you can help us by providing us with information about your application. Please fill in and submit the “New EOS Application Request” [<http://datacenter.cit.nih.gov/eos/newapplication.html>]. On receiving the information, an EOS consultant will contact you to discuss your needs in detail.

- **Acquiring a CIT Account**

The customer (application owner) must obtain a CIT account. The charges for using the EOS systems will be billed to this account. Details are online [<http://support.cit.nih.gov/accounts/>].

- **CIT’s Role**

Once the level of service has been agreed upon and the customer has a CIT account for billing, CIT will arrange for the following:

***Application Listserv List—“PROJ List”***

CIT will set up a list—“*application name*-PROJ@list.nih.gov”—to be used for e-mailing information on your application to all participants. We refer to this as the “PROJ list” for your application.

***CIT Contact***

CIT will assign an EOS consultant as your CIT “application coordinator.”

***ASR***

CIT will authorize you to use the Application Service Request (ASR) system for requesting changes in your level of service (see pages 8 and 11).

***Application Name***

CIT will provide the application owner with the registered name assigned to the application, along with an ID and password for use in accessing the ASR system. ASR provides a mechanism for an owner to establish IDs and passwords for other application members.

- **Application Participants**

Your application will have several kinds of participants:

<b><i>Members</i></b>	anyone on the application Listserv list (“PROJ list”)
<b><i>Authorized Members</i></b>	can submit requests to the ASR system
<b><i>Application Owners</i></b>	has authority to obligate funds, and can delegate authority to an authorized member; adds and removes members from the ASR

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- **Application Responsibilities**

All account and user management responsibilities can be accomplished online through the Application Service Request (ASR) program (see below and on page 11).

- **Terminating an Application**

If an application is found to compromise the EOS operating environment, CIT may act to terminate the application. If termination becomes necessary, CIT will make every possible effort to work with the application's owner.

When there is a need to terminate the application, certain steps should be taken to ensure that the termination occurs in an efficient, orderly manner. Notification of termination by either party should:

- be received by the other party at least 60 days in advance
- be in written form, with the signature of the appropriate official, or submitted via ASR
- contain the reason for termination
- specify arrangements for disposition of data and associated resources

## **B. Application Service Request (ASR)**

Everything related to your application is in the Application Service Request (ASR) system—including EOS resources used, people to contact, and users' names. The ASR system allows you to change, add, or subtract services. Use the ASR system for everything—for requesting new resources, updating telephone numbers, or finding a contact name and telephone number.

- **One Place to Accomplish Everything**

With just an ID and password, authorized people manage the application and communicate with CIT and others on the PROJ-list via ASR. When you access the ASR system, you will find three basic actions available:

- |                                      |   |
|--------------------------------------|---|
| <i>Initiate Request</i>              | - request service for your application<br>(owner can create a co-owner with this authority) |
| <i>Update Profile</i>                | - update the profile for this user<br>(e.g., change a password)                             |
| <i>Manage Request Authorizations</i> | - authorize other members (if authorized to do this)  |

Once the request is submitted, notification is sent to the appropriate people, and tracking of the request is monitored to ensure timely response to your requests.

See “Communicating with CIT” (page 11).

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## C. Information for New Users

- **How to Log In and Log Out Using Secure Shell**

Access to EOS systems is secured by the availability of secure shell (SSH2). Connection to EOS systems requires use of a secure shell client, such as SecureCRT (Van Dyke Technologies) or SSH Tectia Client (SSH Communications Security).

### *Important Issues to Remember*

- 1) Your password will not appear on your terminal when you type it. Remember that Unix is case sensitive, so you must enter your username and password exactly.
  - 2) The first time you log on you will be forced to change your password. Simply follow the system's prompts.
  - 3) Changing your password at specific intervals is required. For more information on passwords, see Section E, "Security and Risk Management" (page 14).
  - 4) *It is important not to leave a session unattended.* When you are finished with the session, you can log out by typing the **logout** or **exit** command.
- **Getting Online Help**

### *Unix Help*

The Unix **man** command gives on-screen information from the Unix "man" pages. These pages contain reference material designed to help you find information about a specific topic. The command **apropos** lets you search for "man" page entries based on a topic or keyword. Given a keyword, **apropos** lists all commands that are related to it. Unix manuals are available from the vendor.

Useful man commands include:

<b>man man</b>	get help about the <b>man</b> command
<b>man ksh</b>	get help about the Unix shell program <b>ksh</b>

### *Oracle Help*

See "Assistance for Database Users" under Oracle RDBMS (page 19).

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- **Start Up Files**

The default user shell on the EOS systems is **ksh** or the Korn shell. This is the environment provided for interactive users. The “*.profile*” file in the user’s home directory controls most environment variables. These can be modified to create a customized user environment. Please read the shell man page (**man ksh** or **man profile**) for more information.

- **E-Mail**

When an account is initially set up, a “*.forward*” file is created in order to have your e-mail (received locally) forwarded to your preferred mail server. This file should contain a single line with your preferred e-mail address. This e-mail address may be changed to forward local mail to a different e-mail account. **Do not remove the “*.forward*” file**, as this will cause the loss of your locally generated e-mail.

- **Editors**

The **vi** and **emacs** editors are available for full screen editing over an SSH connection. If you have X windows capabilities you can also use **dtpad**, **dxnotepad**, and **xedit**. See the respective online “man” pages for more information.

- **Documentation**

The following documentation is available to CIT registered users:

*EOS User’s Guide*

*Interface*

- announces CIT’s policies and standards of service, as well as significant changes made to hardware and software on various platforms at the NIH Computer Center

*Titan User’s Guide*

- serves as an introduction to the OS/390 and other facilities offered by CIT

*Batch Processing and Utilities at the NIH Computer Center*

- includes information about CONNECT:Direct

*Learning the UNIX Operating System*

- contains general information about Unix

*A Student’s Guide to Unix*

### ***Obtaining Copies***

Copies of the *EOS User’s Guide* and the *Titan User’s Guide* are available in printed or online format from CIT via the CIT publications Web page [<http://publications.cit.nih.gov/>]. Look for the EOS guide under “General Documentation” and the Titan guide under “NIH Computer Center Users Guides.” *Interface* is available online [<http://datacenter.cit.nih.gov/interface>]. For hard copies of the Unix documentation, call the CIT help desk, TASC, at (301) 594-6248. Additional assistance is available from TASC.

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## D. Operations Policies

General information on the NIH Computer Center's major systems and development facilities (including database systems) is available in the *Titan User's Guide* (Section 7). This *EOS User's Guide* contains additional information specific to the EOS systems.

- **Communicating with CIT**

All communication between established applications and CIT is accomplished via the ASR system.

### *Change Requests and Problem Reporting via ASR*

Please report all problems and change requests to CIT via ASR. The ASR system will forward the request/report to all appropriate people (e.g., application owner and CIT). Using ASR also ensures tracking and monitoring.

The ASR system provides you with multiple dialog boxes, each containing options appropriate to your application. This ensures that you supply important information before you submit the ASR request.

Once the ASR report is submitted, e-mail is sent to the entire PROJ-list.

### *Emergencies*

ASR should be used to submit an emergency request.

If you are unable to access ASR, then call TASC's 24-hour emergency telephone support at (301) 594-6248—after hours leave a message.

- **Operating Hours and Availability**

### *Hours*

The EOS systems operate 24-hours a day, seven days a week. For information, please contact TASC at (301) 594-6248—weekdays from 7:00 A.M. until 6:00 P.M. After hours, leave a message.

### *System Maintenance*

The production systems are reserved for maintenance activities between 5 A.M. and 8 A.M. on Mondays. PROJ lists are notified of maintenance that affects their applications.

Occasionally, major system upgrades may require a longer outage. Should this occur, notice will be sent at least seven-days in advance via the Listserv (PROJ) lists. The system may become unavailable at other times due to unforeseen events (e.g., power outage). If this occurs the CIT staff will make every effort to have the system available as soon as possible.

### *Database Maintenance*

Database maintenance is coordinated with owners on an individual basis.

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## *Upgrades*

For events, such as hardware or operating system upgrades that might take longer than the scheduled maintenance hours, we will work with application contacts to lessen the effect of downtime on applications. Notification includes the date and duration of downtime, the reason for the change, and expected consequences.

Upgrades that customers wish to have installed should be requested via ASR. For more information, see “Change Requests and Problem Reporting via ASR” (page 11).

Major upgrades to facilities at the NIH Computer Center—including EOS—are announced in the periodical, *Interface*, available online [<http://datacenter.cit.nih.gov/interface>]. To receive e-mail notice of new issues, join the Listserv list, “Interface” [<http://list.nih.gov/archives/interface.html>].

- **Backup and Recovery**

### *Standard*

Nightly incremental backups are done for all non-Oracle database instance data via the NIH Backup and Recovery Service (NBARS). Weekly “cold” backups of Oracle database files and certain Oracle files (e.g., config files and logs) are done so that the database is usually down for less than 10 minutes. The first weekly backup of the month is considered a “monthly” backup and is retained within TSM longer than weekly backups. Monthly Oracle backups also include both data and executable files.

If requested by the application owner, full backups of Oracle exports can also be done nightly.

### *Non-Standard*

Non-standard backup requests should be submitted using the ASR system. CIT will contact the application owner to work out the details.

- **Importing Data to the EOS Systems**

*Please discuss all data import issues with CIT in advance*, so that precautions can be taken to protect the integrity of the system and other users’ applications. In many cases, CIT may be able to recommend alternative methods that are compatible with our computing environment.

- **System Monitoring and Resource Management**

### *What We Monitor*

The CIT staff monitors system performance and availability throughout the day to verify that the systems are operational and Oracle databases are available. If problems occur, the staff is notified through NIH automatic monitoring systems.

Whenever a potential problem is noticed, an investigation is launched. If the investigation reveals a problem that could affect Computer Center applications, the application contacts will be notified as soon as possible via the appropriate “PROJ list” or other expedient means.

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## *Acceptance of Monitoring*

The following statement applies to all use of federal IT resources, including EOS:

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THIS SYSTEM IS FOR THE USE OF AUTHORIZED USERS ONLY. INDIVIDUALS USING THIS COMPUTER SYSTEM WITHOUT AUTHORITY OR IN EXCESS OF THEIR AUTHORITY, ARE SUBJECT TO HAVING ALL OF THEIR ACTIVITIES ON THIS SYSTEM MONITORED AND RECORDED BY SYSTEMS PERSONNEL.

IN THE COURSE OF MONITORING INDIVIDUALS IMPROPERLY USING THIS SYSTEM, OR IN THE COURSE OF SYSTEM MAINTENANCE, THE ACTIVITIES OF AUTHORIZED USERS MAY ALSO BE MONITORED.

ANYONE USING THIS SYSTEM EXPRESSLY CONSENTS TO SUCH MONITORING AND IS ADVISED THAT IF SUCH MONITORING REVEALS POSSIBLE EVIDENCE OF CRIMINAL ACTIVITY, SYSTEM PERSONNEL MAY PROVIDE THE EVIDENCE OF SUCH MONITORING TO LAW ENFORCEMENT OFFICIALS.

NOTICE: U.S. Government Computer. Unauthorized Use Prohibited by Title 18, U.S.C.

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*Users acknowledge acceptance of these conditions through their continued use of the system.*

- **Increase in Resource Needs**

### *CIT Monitoring of Resources*

CIT will proactively monitor application disk space, memory and CPU usage and suggest to the application contacts when it might be appropriate to have their allocated resources adjusted.

### *Requesting New Disk Space*

Customers can request adjustments to disk space via ASR. If the request is for additional space—and that space is available—the change can be acted on within one week of receipt of the form.

Please provide at least 60 days advanced notice, when possible, since it may be necessary to acquire and install additional disk drives.

- **Application Software Installed on EOS**

If the customer wishes to have software installed on the EOS systems, the application owner should submit a change request via the ASR—see “Change Request and Problem Reporting” (page 11). The application owner should work closely with CIT on such requests. CIT is responsible for ensuring the integrity of the EOS environment, and the CIT staff must first determine the impact of such software on the EOS environment.

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If CIT determines that the software is compatible with the EOS environment, CIT will talk with the application contacts about the time required for installation and testing—which varies greatly and is dependent upon both the software and the general circumstances. The application contacts should deliver software and documentation to the CIT application coordinator.

## **E. Security and Risk Management**

The NIH Computer Center computing environment contains facilities that are robust and reliable. These facilities include:

- *7 X 24 system monitoring*
  - trained staff monitor system status around the clock
  - system experts on call at all times
- *uninterruptible power supply (UPS)*
  - fully “conditioned” power with extra duty battery backup
  - motor generators to take over from batteries to provide “never ending” power
- *normal physical and system security procedures, including*
  - annual audits by an independent auditing firm
  - security level verification appropriate for critical applications and highly sensitive data
- *climate control*
  - temperature and humidity control provide non-stressed hardware environment
- *central backup and recovery system*
  - nightly data backups
- *disaster recovery*
  - regular system-level backups to magnetic tapes, which are periodically moved offsite
- *data and access security*
  - forgotten Unix and Oracle DBA application password procedures
  - security violation investigations
- *rapid response to growing requirements*
  - procurement and supply systems are in place to permit rapid response to requests for additional services and resources
- *system software is maintained at current levels*
  - recent vendor upgrades and fixes are incorporated into system products and operating system

For questions about security issues, please contact the head of the CIT’s Application Services Branch at (301) 496-5524.

### **• Security and System Access**

Due to access control policies in place for the EOS environment, CIT requires a static IP address for all users connecting via SSH and scp. This information is used to derive allowed-access lists. If an IP address needs to be added to the access list or if an address is no longer valid, these changes should be requested via ASR.

### **• EOS System Security**

The EOS systems operate under Compaq Tru64 enhanced security, which is designed to meet or exceed C-2 level security (defined by the Department of Defense) and DHHS Level 3. The EOS



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systems provide password expiration and security checks, shadowed passwords, file access security, auditing and account resource limits.

In the interest of system security, the NIH Computer Center security officers reserve the right to check user passwords. If a password is “crackable,” the user and application contacts will be notified to change the password. If the password is not changed within the designated time period, the account will be locked.

- **Individual Unix Accounts and Role-Based Unix Accounts**

A unique, individual Unix ID must be obtained for each person requiring access to any of the EOS systems directly. This ID is to be restricted to the registered user and should never be shared with others. If there is a need for a Role Based Unix account or accounts, which perform a specific function requiring the effort of many individuals, each person should logon to the respective system with their unique ID and then change to the Role Based ID using the ‘su’ command.

*It is mandatory for the security of an application that this policy be followed.* This maintains the user-recognition chain of the security integrity requirements of the EOS C2 security environment by keeping the audit trail intact for each user accessing the system.

If there is any indication that the EOS security integrity is being compromised by the actions of a user or application (e.g., by ID sharing), CIT will take immediate action to terminate the suspect activity. Severe or repeated violations of security policy may require removal of an application or user from use of the EOS environment.

- **Security Data Administration**

Historical security data is backed up “forever” for auditing purposes.

- **Passwords**

Passwords form the basis of account usage security.

*Expiration and Resetting*

- Passwords expire automatically after being in use for six months. They can be changed by using the Unix **passwd** command.
- You will not be able to reuse the same password for at least five generations.
- Any account that receives more than five consecutive login failures will be locked automatically by the system.

If your Unix account has been locked, or if you forget your password, please contact your application owner to request that your password be reset. The application owner must submit a password change request via ASR.

Checking for expiration of passwords is done weekly. At login, users will receive notice of expiration of their password during each of the 14 days prior to the expiration date.

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## Good Passwords

These guidelines will make your password more difficult to crack. Most of these tips apply to other multi-user systems as well, and they are worth repeating here. Your password should:

- contain 6 to 10 characters
- contain at least one non-alphanumeric character. Any alphanumeric string, not just dictionary words, can be cracked
- differ from your previous password in at least 3 positions
- **not** have a digit at the end of the string of alphanumerics (e.g., acbdef8)
- **not** substitute 1 for I, 0 for o, or \$ for S in a word, without making other changes as well

To create a safe, easy-to-remember password, consider using a short phrase that is meaningful to you and includes punctuation (e.g., “home-again” or “home again”) or take the first letters and punctuation of a common phrase. For example, the phrase “I love work. I love Fridays” as a password would be **Ilw.IlF**. Examples of good passwords are

\$L1mERz      G0ld;karD      paS\$w3rD

Passwords should be easy to remember but hard to guess. They should not be your userid, social security number, birthday, spouse’s name, or other personal information that is easily obtainable. They should also never be written down or stored on line.

- **Unix File Access Controls**

The Unix file system defines permissions for the user of a file, members of the group, and everyone else. In a long directory listing (**ls -l**) the first column should appear something like

```
-rwxr-xr-x
```

This indicates read/write/execute permissions for the user, as well as read/execute for the groups and others. To eliminate general access to this file, use the **chmod** command as follows:

```
chmod go-rx filename
```

This will eliminate read/execute commands for the group and others, and the first column will look like

```
-rwx-----
```

## F. Charging on the EOS Systems

The fees for the EOS systems can be composed of an initial start up cost, as well as monthly fees for service and storage at the NIH Computer Center. If you have questions about EOS systems charging, please call TASC at (301) 594-6248. Rates are available online [<http://datacenter.cit.nih.gov/rates>].

- **Billing**

Use of the EOS facilities is charged to the account specified for billing when the EOS application established. CIT bills the account monthly for use of the EOS systems.

- **Responsibilities of CIT and the Customer**

The conditions, responsibilities and costs governing the use of the EOS facility are mutually determined by CIT and the customer.

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### III EOS SYSTEMS CONFIGURATION

The EOS systems are constantly changing, as we upgrade facilities and adopt emerging technologies that will benefit our users. All major changes are announced in our technical newsletter, *Interface*, available on the Web at <http://datacenter.cit.nih.gov/interface>.

#### A. Hardware and Software

- **Servers**

- ***Compaq/Digital AlphaServer***

- Multiple Compaq/Digital AlphaServers—ranging in size from high performance GS series database servers to midrange application servers—all provide the processing power of 64-bit Alpha CPUs.

- ***Sun Servers***

- Multiple Sun midrange enterprise servers offering excellent performance for Web-enabled applications.

- **Storage**

The EOS systems have multiple, high capacity SCSI disks and are easily expandable. Most systems offer Redundant Arrays of Inexpensive Disks (RAID), a method of increasing the reliability of disk storage by mirroring, striping or storing parity information on the disks. This reduces the available storage space, but also decreases the likelihood of a catastrophic failure.

- **Software**

- ***Operating Systems***

- Tru64 UNIX  
Sun Solaris

- ***Database***

- Oracle

- ***Connectivity***

- SSH Secure Shell  
scp  
Net8 (formerly SQL\*NET)  
CONNECT:Direct

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- ***Programming Languages***

- C and C++
  - Perl
  - Standard Unix programming tools (e.g., sed, awk)

- ***Scripting Languages***

- Korn Shell (ksh)
  - Bourne Shell (sh)
  - Perl
  - Tcl/Tk

- ***Web Servers***

- Oracle Application Server
  - Netscape Enterprise Server
  - Apache HTTP Server

- **Software Supplied by the Customer**

If the customer has supplied software for the EOS systems, the customer is responsible for supplying CIT with all updates to software, licenses and documentation. CIT staff will do the installation of all such software

## **B. Applications**

The following applications are available on the EOS platform. Use of these applications should be discussed with CIT. In general, registration of users for these applications is handled by the application owner via submission of requests through the ASR system. Requests for other applications should be discussed with CIT.

- **CONNECT:Direct**

CONNECT:Direct is a product for transferring data—especially financial transactions—between different computer systems. CONNECT:Direct monitors the progress of the file transfer, similar to SENDFILE and RCVFILE programs (described in the CIT manual, *Batch Processing and Utilities at the NIH Computer Center*) but is easier to use. CONNECT:Direct monitors the progress of the file transfer.

CIT will work with the application owner to determine whether CONNECT:Direct can benefit your application.

- **Web Servers**

Netscape Enterprise Server (NES) and Apache HTTP Server are powerful Web servers for enterprises with large scale Web sites. These servers also enable rapid development of Web-based applications that can enhance communication, streamline processes and reduce costs.

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- **Oracle Application Server**

Oracle Application Server allows for developing and deploying applications for the Web. Its scalable, distributed architecture and database integration provide a foundation for supporting business-critical applications accessed from Web browsers. This server is also a strategic platform for network application deployment that brings substantial savings over client/server-based applications through reduced complexity, better manageability, and simplified deployment.

Oracle Application Server should be part of the service negotiated with CIT. Users need a Unix account to store application documents. The application owner can request a Unix account via ASR. Oracle userids and passwords are also obtained via ASR. For information on obtaining an oracle account, see “Oracle RDBMS: Getting Started” below.

### **C. Oracle RDBMS Server**

Oracle is a relational database management system (RDBMS). The Oracle server is a high-performance database engine capable of handling large amounts of data, images and many concurrent users. It offers backup and recovery facilities and excellent security. The Oracle instances are installed, upgraded and maintained by the NIH Computer Center.

Oracle data is accessible interactively via client/server and Web connectivity or online connection. It can also be accessed by batch jobs. Online and batch application programming facilities allow programmers to embed SQL statements in C/C++. Client/server access allows an almost unlimited application development environment, including 4GL and Web environments. This capability allows users to create custom-tailored interfaces to Oracle data for their applications and to perform sophisticated data validation as it is entered.

An Oracle userid is required for the application’s database administrator (DBA), who can create and maintain additional userids. To register for individual userids, contact the application owner via ASR

- **Basic Oracle Set Up**

An Oracle userid will be set up with the Oracle DBA role for the application’s database administrator (DBA), who can then create and maintain additional userids.

The basic service fee for Oracle RDBMS servers on the EOS systems includes installation and maintenance, upgrades and database systems support, as well as backups of Oracle system software and database files.

The basic fee also includes two dedicated Oracle instances—one for production and one for development/testing—and full public internet access for the application if desired.

- **Assistance for Database Users**

CIT provides a stable software and data-repository environment for enterprise-wide database and information systems at the NIH Computer Center. CIT assists organizations in implementing appropriate technologies to meet their centralized database and information processing needs, as well as keeps abreast of promising database and information processing technologies.

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- **Support**

You can obtain information about Oracle documents and facilities at <http://silk.nih.gov/dbtech>. See also “Getting Online Help” and “Documentation” (pages 9 and 10). Additional information and support can be obtained from TASC at (301) 594-6248.

- **Training**

CIT’s computer training program offers database, Oracle, and Unix courses at no charge for CIT registered users. Information on these courses appears in the *NIH Computer Training* brochures. The list of courses and online registration are available at <http://training.cit.nih.gov>.

- **Sizing Considerations**

The application contacts should work with our staff to determine sizing requirements—including optimal memory utilization, system global area and disk utilization—for their database and application.

- **Server Options**

- **Replication**

Replication is a mechanism for supplying updated information across servers. Basic replication uses “read-only snapshots” to enforce a form of primary site replication. Such a “snapshot” is a full copy (or a subset) of a table that reflects a recent state of the master table. Replication is done to speed local queries and provide a degree of redundancy.

- **Intermedia**

This Oracle option is a text management solution that enables you to manage unstructured text information resources with the same security, scalability, and integrity as structured data that is stored in columns. With this option, you are able to build and deploy text-based applications with an SQL-like interface.

- **Version and Patch Levels**

CIT’s Oracle support staff will work with application contacts to coordinate changes to the database version levels and patches.

- **Backups and Exports**

One weekly cold backup and full export is included in the price of the your contract. Additional types and numbers of backups and exports can be negotiated with CIT. We encourage users to backup their data as needed.

- **Documentation**

Oracle manuals can be purchased from the vendor.

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- **Definitions**

- ***Database Instance***

A database instance is a collection of data files, as well as the software that manipulates it, and the memory associated with it. The system identifier (SID) is the name given to an instance.

- ***Executable Code***

Executable code is a statement that performs actions specified by a program or a portion of a program.

- ***Relational Database Management System (RDBMS)***

An RDBMS is a computer program for general-purpose data storage and retrieval that organizes data into tables consisting of one or more units of information (rows), each containing the same set of data items (columns). SQL (Structured Query Language) is used to manipulate data in an RDBMS. Oracle is an RDBMS.

- ***System Global Area (SGA)***

The SGA is the memory used to store database information.

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# *EOS User's Guide*

## **Document Evaluation**

### **Is the Manual:**

	<b>Yes</b>	<b>No</b>
Clear?		
Well Organized?		
Complete?		
Accurate?		
Suitable for the beginner?		
Suitable for the advanced user?		

### **Comments:**

Please give page references where appropriate.

If you wish a reply, include your name and mailing address.

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