UNIX

SECURITY TECHNICAL IMPLEMENTATION GUIDE

Version 5, Release 1

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Developed by DISA for the DOD

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SUMMARY OF CHANGES

Version 5, Release 1 of this *Security Technical Implementation Guide* (*STIG)* includes text modifications and revisions to all sections relative to the previous release, Version 4, Release 4, dated 9 September 2003. To avoid confusion over the amount of modifications to the text, a table has been included to track the status of Potential Discrepancy Items (PDI)s as well as the new Short Description Identifiers (SDID)s, new PDIs are detailed, and deletions and/or modification of appendixes have been noted. Text modifications are to be assumed for each section within this STIG. Support for SuSE, Solaris 10, and IRIX has been integrated in this release.

Table to Display Status of Old PDIs

IAVA Related PDIs are mentioned in this table, but are not included in this STIG. These PDIs are detailed in the *UNIX Checklist*. Details are provided below to allow the user community a tracking mechanism for comparison.

Old SDID	New SDID	Removed	IAVA Related
AA002		X	
AD16	GEN000860		
AD33	GEN000740		
A028	GEN003680		
G001	GEN000020		
G002	GEN000040		
G003	GEN000060		
G004	GEN000540		
G006	GEN000260		
G007	GEN000280		
G008	GEN000300		
G009	GEN000320		
G010	GEN000400		
G011	GEN000420		
G012	GEN000440		
G013	GEN000460		
G014		X	
G015	GEN000480		
G016	GEN000520		
G018	GEN000560		
G019	GEN000580, GEN000600, GEN000620, GEN000640, GEN000660, GEN000680		
G020	GEN000700, GEN000720		
G021	GEN000880		
G022	GEN000900		
G023	GEN000920		
G024	GEN000940		
G025	GEN000960		

Old SDID	New SDID	Removed	IAVA Related
G026	GEN000980		
G027	GEN001040, GEN001060		
G029	GEN000360		
G030	GEN000380		
G031	GEN006480		
G033	GEN000120		
G034	GEN001140		
G035	GEN001160		
G036	GEN001180		
G037	GEN001260		
G038	GEN001800		
G039	GEN001320		
G040	GEN001340		
G041	GEN001360		
G042	GEN001280		
G043	GEN001300		
G044	GEN001200		
G045	GEN001220		
G046	GEN001240		
G047	GEN001400		
G048	GEN001380		
G049		X	
G050	GEN001420		
G051	GEN001440		
G052	GEN001460		
G053	GEN001480		
G054	GEN001500		
G055	GEN001520		
G056	GEN001860		
G057	GEN001880		
G058	GEN001580		
G059	GEN001600		
G060	GEN001920		
G061	GEN001620		
G062	GEN001640		
G066	GEN002000		
G067	GEN001540		
G068	GEN001560		
G069	GEN002120		
G070	GEN002140		
G071	GEN000760		
G072	GEN002160		
G073	GEN002180		
G074	GEN002200		

Old SDID	New SDID	Removed	IAVA Related
G075	GEN002220		
G076	GEN002260		
G077	GEN002280		
G078	GEN002300		
G079	GEN002480		
G082	GEN002380		
G083	GEN002440		
G084	GEN002400		
G085	GEN002460		
G086	GEN002420		
G087	GEN002500		
G088	GEN002520		
G089	GEN002560		
G090	GEN002580		
G092	GEN002640		
G093	GEN002660		
G094	GEN002680		
G095	GEN002700		
G100	GEN002720		
G101	GEN002740		
G102	GEN002760		
G103	GEN002780		
G104	GEN002800		
G105	GEN002820		
G106	GEN002840		
G107	GEN003720		
G108	GEN003740		
G109	GEN003760		
G110	GEN003780		
G112	GEN001780		
G113		X	
G120	GEN003880		
G121	GEN003900		
G122	GEN003920		
G123	GEN003940		
G125		X	
G127	GEN004360		
G128	GEN004380		
G131	GEN004400		
G132	GEN004420		
G133	GEN004440		
G134	GEN004460		
G135	GEN004480		
G136	GEN004500		

Old SDID	New SDID	Removed	IAVA Related
G137	GEN004520		
G140	GEN004880		
G141	GEN004900		
G142	GEN004920		
G143	GEN004940		
G144	GEN004960		
G145	GEN004980		
G147	GEN004820		
G149	GEN005080		
G150	GEN005100		
G151	GEN005120		
G152	GEN005160		
G155		X	
G157		X	
G158		X	
G159		X	
G160		X	
G161		X	
G162		X	
G163		X	
G164		X	
G165		X	
G166		X	
G167		X	
G168		X	
G170		X	
G172		X	
G173	GEN006440		
G174	GEN006400		
G176	GEN006460		
G177	GEN005720		
G178	GEN005740		
G179	GEN005760		
G180	GEN005780		
G181	GEN005800		
G182	GEN005820		
G183	GEN005840		
G184	GEN005860		
G185	GEN005880		
G186	GEN005900		
G188	GEN006500		
G189	GEN006520		
G190	GEN006540		
G196	GEN006580		

Old SDID	New SDID	Removed	IAVA Related
G197	GEN006600		
G198	GEN003800		
G200	GEN002960		
G201	GEN002980		
G203	GEN003000		
G204	GEN003020		
G205	GEN003080		
G206	GEN003100		
G207	GEN003120		
G208	GEN003140		
G209	GEN003160		
G210	GEN003180		
G211	GEN003280		
G212	GEN003300		
G213	GEN003320		
G214	GEN003340		
G215	GEN003360		
G216	GEN003380		
G220		X	
G221		X	
G222		X	
G224	GEN005300		
G225	GEN005320		
G226	GEN005340		
G229	GEN001080		
G234	GEN000080		
G345	IAVA0005		X
G357	IAVA0010		X
G361	IAVA0015		X
G363	IAVA0020		X
G365	IAVA0025		X
G371	IAVA0030		X
G373	IAVA0035		X
G499	GEN001100		
G500	GEN001120		
G501	GEN002320		
G502	GEN002340		
G503		X	
G504	GEN002360		
G505	IAVA0040		X
G507	IAVA0045		X
G508	IAVA0050		X
G509	IAVA0055		X
G510	IAVA0060		X

Old SDID	New SDID	Removed	IAVA Related
G511	GEN000780		
G513	IAVA0065		X
G514	IAVA0070		X
G515	IAVA0075		X
G517	IAVA0080		X
G518	IAVA0085		X
G519	IAVA0090		X
G521	IAVA0095		X
G522	IAVA0100		X
G523	IAVA0105		X
G524	IAVA0110		X
G525	IAVA0115		X
G526	IAVA0120		X
G527	IAVA0125		X
G528	IAVA0130		X
G529	IAVA0135		X
G530	IAVA0140		X
G531	IAVA0145		X
G532	IAVA0150		X
G533	IAVA0155		X
G534	IAVA0160		X
G535	IAVA0165		X
G536	IAVA0170		X
G537	IAVA0175		X
G538	IAVA0180		X
G539	IAVA0185		X
G540	IAVA0190		X
G541	IAVA0195		X
G542	IAVA0200		X
G543	IAVA0205		X
G544	IAVA0210		X
G545	IAVA0215		X
G546	IAVA0220		X
G547	IAVA0225		X
G548	IAVA0230		X
G549	IAVA0235		X
G550	IAVA0240		X
G551	IAVA0245		X
G552	IAVA0250		X
G553	IAVA0255		X
G554	IAVA0260		X
G555	IAVA0265		X
G556	IAVA0270		X
G557	IAVA0275		X

Old SDID	New SDID	Removed	IAVA Related
G558	IAVA0280		X
G559	IAVA0285		X
G560	IAVA0290		X
G561	IAVA0295		X
G562	IAVA0300		X
G563	IAVA0305		X
G564	IAVA0310		X
G567	IAVA0315		X
G569	IAVA0320		X
G573	IAVA0325		X
G575	IAVA0330		X
G577	IAVA0335		X
G578	IAVA0340		X
G579	IAVA0345		X
G580	IAVA0350		X
G581	IAVA0355		X
G582	IAVA0360		X
G583	IAVA0365		X
G584	IAVA0370		X
G585	IAVA0375		X
G586	IAVA0380		X
G587	IAVA0385		X
G588	IAVA0390		X
G589	IAVA0395		X
G590	IAVA0400		X
G591	IAVA0405		X
G592	IAVA0410		X
G593	IAVA0415		X
G594	IAVA0420		X
G595	IAVA0425		X
G596	IAVA0430		X
G597	IAVA0435		X
G598	IAVA0440		X
G599	IAVA0445		X
G605	GEN000500		
G606	GEN000800		
G609	GEN001940		
G610	GEN001960		
G611	GEN001660		
G612	GEN001680		
G613	GEN001700		
G614	GEN002020		
G615	GEN002060		
G616	GEN002080		

Old SDID	New SDID	Removed	IAVA Related
G617		X	
G618		X	
G620	GEN003200		
G621	GEN003220		
G622	GEN003240		
G623	GEN003260		
G625	GEN003400		
G626	GEN003420		
G627	GEN003440		
G629	GEN003460		
G630	GEN003480		
G631	GEN003960		
G632	GEN003980		
G633	GEN004000		
G634	GEN004020		
G635	GEN004040		
G636	GEN004060		
G637	GEN004080		
G638	GEN004100		
G639	GEN004120		
G640	GEN004140		
G641	GEN004160		
G642	GEN004180		
G643	GEN004200		
G644	GEN004220		
G645		X	
G646	GEN004560		
G647	GEN004580		
G648		X	
G649	GEN005000		
G650	GEN005020		
G653		X	
G655	GEN005380		
G656	GEN005400		
G657	GEN005420		
G658	GEN005460		
G661	GEN005560		
G662	GEN005580		
G663	GEN006380		
G666		X	
G670		X	
G671		X	
G673		X	
G674	GEN002860		

Old SDID	New SDID	Removed	IAVA Related
G677	SOL00040		
G678	SOL00060		
G679	SOL00080		
G680	SOL00100		
G681	SOL00120		
G682	SOL00140		
G685	SOL00160		
G687	SOL00280		
G689		X	
G690	GEN003640		
G691	GEN000840		
G692		X	
G695	GEN000240		
G696	SOL00400		
G698	GEN001000		
G699		X	
G700		X	
G701	GEN005500		
L001	IAVA0450		X
L003	LNX00020		
L007	LNX00040		
L010	IAVA0455		X
L013		X	
L017	LNX00240		
L022	LNX00280		
L026		X	
L032	LNX00360		
L034	LNX00380		
L040	GEN006240		
L042		X	
L044	LNX00400		
L045	LNX00420		
L046	LNX00440		
L048	GEN006080		
L050	GEN006100		
L051	GEN006120		
L052	GEN006140		
L053		X	
L054	GEN006160		
L055	GEN006180		
L056	GEN006220		
L057	GEN006200		
L058		X	
L060		X	

Old SDID	New SDID	Removed	IAVA Related
L064	LNX00060		
L066	LNX00080		
L068	LNX00100		
L072	LNX00140		
L074	LNX00160		
L076		X	
L078	LNX00180		
L080	LNX00220		
L082		X	
L084	LNX00120		
L088	LNX00260		
L106		X	
L110		X	
L126		X	
L128	LNX00300		
L138		X	
L140	LNX00320		
L142	LNX00340		
L144		X	
L152		X	
L154	GEN006260		
L156	GEN006280		
L158	GEN006300		
L160	GEN006320		
L162	GEN006340		
L164	GEN006360		
L168	LNX00460		
L170	GEN006060		
L174		X	
L184		X	
L188		X	
L190		X	
L192		X	
L194		X	
L196		X	
L198		X	
L200		X	
L202		X	
L204	LNX00480		
L206	LNX00500		
L208	LNX00520		
L210		X	
L212		X	
L214	LNX00560		

Old SDID	New SDID	Removed	IAVA Related
L216		X	
L220		X	
L222	LNX00580		
L224		X	
L230	LNX00600		
MQ01		X	
MQ02		X	
MQ03		X	
MQ04		X	
MQ05		X	
MQ06		X	
MQ07		X	
MQ08		X	
MQ09		X	
MQ10		X	
MQ11		X	
MQ12		X	
MQ13		X	
MQ14		X	
MQ15		X	
MQ16		X	
MQ17		X	
MQ18		X	
MQ19		X	
MQ20		X	
MQ21		X	
MQ22		X	
MQ23		X	
MQ24		X	
MQ25		X	
MQ26		X	
MQ27		X	
MQ28		X	
MQ30		X	
MQ31		X	
MQ32		X	
MQ33		X	
NS01		X	
NS03		X	
SC01		X	
SC02		X	
SC03		X	
SC04		X	
SC05		X	

Old SDID	New SDID	Removed	IAVA Related
SC06		X	
SC07		X	
SC08		X	
SC09		X	
SC10		X	
SG01	IAVA0460		X
SG03	IAVA0465		X
SG05	IAVA0470		X
SO01		X	
SO05	SOL00180		
SO06	SOL00200		
SO07	SOL00220		
SO08	SOL00240		
SO09	SOL00260		
SO10	SOL00300		
SO25	IAVA0475		X
SO26	IAVA0480		X
SO27	IAVA0485		X
SO28	IAVA0490		X
SO29	IAVA0495		X
HP01		X	
HP02	HPUX0020		
HP03		X	
HP04		X	
HP05		X	
HP06		X	
HP07	HPUX0080		
HP08	HPUX0060		
HP09	HPUX0100		
HP10		X	
HP11		X	
HP12		X	
HP13		X	
HP14	HPUX0040		
AIX01		X	
AIX02	AIX00020		
AIX03		X	
AIX04		X	
AIX05		X	
AIX06		X	
AIX07	AIX00040		
AIX08		X	
AIX09		X	
AIX10	AIX00060		

Old SDID	New SDID	Removed	IAVA Related
T01		X	
T02		X	
T03		X	
T05		X	
T06		X	
T07		X	
V042	GEN003820		
V046	GEN003860		
V052	GEN004840		
V064	IAVA0500		X
V102	GEN003840		
V124	GEN004600		
V125	GEN004620		
V126	GEN004640		
V128	GEN004660		
V130	GEN004680		
V131	GEN004700		
V141	GEN005140		
V145	GEN005280		
V155	GEN005200		
V2345	IAVA0505		X
V324	IAVA0510		X
V3375	IAVA0515		X
V5899	GEN005620		
V9402	IRIX0020		
V9478	GEN005640		
V9482	GEN005660		
V9517	GEN005700		
V9730	GEN005680		
V9756	SOL00360		
V9758	SOL00380		
W01	GEN004240		
W03	GEN004260		
W07		X	
W09	GEN004280		
W11	GEN004300		
W13	GEN004320		
W17	GEN004340		
W27		X	

Table S-1. Status of Old PDIs

New PDIs

The below mentioned new PDIs encompass PDIs that were previously designated with an N/A, PDIs that have been reworked to better ensure security requirements are met, new PDIs that reflect the Center of Internet Security (CIS) Benchmarks and National Security Agency (NSA) UNIX security guidance, as well as new security data for some UNIX platforms.

- *(GEN000100: CAT I) The IAO will ensure the operating system is a supported release.*
- *(GEN000140: CAT II) The SA will create and maintain a system baseline (all device files, sgid and suid files, and system libraries and binaries), to include cryptographic hashes of files in the baseline.*
- *(GEN000160: CAT II) The SA will maintain all baseline backups on write-protected media.*
- *(GEN000180: CAT II) The SA will execute a new system baseline after changes, additions, or deletions of any sgid and/or suid files are applied.*
- *(GEN000200: CAT II) The SA will execute a new system baseline after changes to system libraries and/or binaries are applied.*
- *(GEN000220: CAT II) The SA will ensure all filesystems are checked at least weekly against the system baseline to detect any unauthorized system libraries or binaries as well as unauthorized modification to authorized system libraries or binaries.*
- *(GEN000340: CAT II) The SA will ensure uids 0 – 99 (0 – 499 for Linux) are reserved for system accounts.*
- *(GEN000820: CAT II) The SA will ensure the system global password configuration files are configured per password requirements.*
- *(GEN001020: CAT II) The IAO will enforce users requiring root privileges to log on to their personal account and invoke the /bin/su - command to switch user to root.*
- *(GEN001720: CAT II) The SA will ensure global initialization files have permissions of 644, or more restrictive.*
- *(GEN001740: CAT II) The SA will ensure the owner of global initialization files is root.*
- *(GEN001760: CAT II) The SA will ensure the group owner of global initialization files is root, sys, bin, other, or the system default.*
- *(GEN001820: CAT II) The SA will ensure the owner of all default/skeleton dot files is root or bin.*

- *(GEN001840: CAT II) The SA will ensure the PATH variable definition in global initialization files does not contain a '.' or '::', or start or end with a ':'. All are equivalent to '.'.*

- *(GEN001900: CAT II) The user and SA will ensure the PATH variable definition in local initialization files does not contain a* ***'.'*** *or '::', or start with a ':'.*

- *(GEN001980: CAT II) The SA will ensure .rhosts, .shosts, hosts.equiv, shosts.equiv, /etc/passwd, /etc/shadow, and /etc/group files will not contain a plus (+) unless defining entries for NIS+ netgroups.*

- *(GEN002040: CAT I) The SA will ensure .rhosts, .shosts, hosts.equiv, nor shosts.equiv are used, unless justified and documented with the IAO.*

- *(GEN002100: CAT II) The SA will ensure .rhosts is not supported in the pluggable authentication module (PAM).*

- *(GEN002240: CAT III) All device files will be located in the directory trees as installed and designated by the operating system and/or application vendor.*

- *(GEN002540: CAT II) The SA will ensure the group owner of public directories is root, sys, bin, or the application group.*

- *(GEN002600: CAT II) The SA will ensure development systems are subject to the same security requirements as production systems.*

- *(GEN002620: CAT I) The SA will immediately change any default passwords.*

- *(GEN002880: CAT II) The IAO will ensure the auditing software can record the following for each audit event:*

  - *Date and time of the event*

  - *Userid that initiated the event*

  - *Type of event*

  - *Success or failure of the event*

  - *For I&A events, the origin of the request (e.g., terminal ID)*

  - *For events that introduce an object into a user's address space, and for object deletion events, the name of the object, and in MLS systems, the object's security level.*

- *(GEN002900: CAT III) The IAO will ensure audit files are retained at least one year; systems containing SAMI will be retained for five years.*

- *(GEN002920: CAT III) The IAO will ensure audit files are backed up no less than weekly onto a different system than the system being audited or backup media.*

- *(GEN002940: CAT II) On a daily basis, the IAO will review the audit trails and/or system logs for the following:*

  - *Excessive logon attempt failures by single or multiple users*

  - *Logons at unusual/non-duty hours*

  - *Failed attempts to access restricted system or data files indicating a possible pattern of deliberate browsing*

  - *Unusual or unauthorized activity by System Administrators*

  - *Command-line activity by a user that should not have that capability*

  - *System failures or errors*

  - *Unusual or suspicious patterns of activity*

- *(GEN003040: CAT II) The SA will ensure the owner of crontabs is root or the crontab creator.*

- *(GEN003060: CAT II) The SA will ensure default system accounts (with the possible exception of root) are not listed in the cron.allow file. If there is only a cron.deny file, the default accounts (with the possible exception of root) will be listed there.*

- *(GEN003500: CAT III) The SA will ensure core dumps are disabled or restricted.*

- *(GEN003520: CAT III) The SA will ensure the owner and group owner of the core dump data directory is root and permissions of 700, or more restrictive.*

- *(GEN003540: CAT II) The SA will ensure the executable stack is disabled.*

- *(GEN003560: CAT II) The SA will ensure NFS client requests are restricted.*

- *(GEN003580: CAT II) The SA will ensure more random TCP sequence numbers are used.*

- *(GEN003600: CAT II) The SA will ensure network parameters are securely set.*

- *(GEN003620: CAT III) The SA will configure separate filesystem partitions for /home, /export/home, and /var unless justified and documented with the IAO.*

- *(GEN003660: CAT II) The SA will ensure the authentication notice and informational data is logged.*

- *(GEN003700: CAT II) The SA will ensure inetd (xinetd for Linux) is disabled if all inetd/xinetd based services are disabled.*

- *(GEN004540: CAT II) The SA will ensure the help sendmail command is disabled.*

- *(GEN004720: CAT II) The SA will ensure FTP and telnet within an enclave is behind the premise router and protected by a firewall and router access control lists.*

- *(GEN004740: CAT II) The SA will ensure FTP and telnet within an enclave is justified and documented with the IAO.*

- *(GEN004760: CAT I) The SA will ensure FTP and telnet from outside the enclave into the enclave is not permitted, unless encrypted and the following conditions apply:*

  - *FTP and telnet are acceptable from outside the enclave through a remote access Virtual Private Network (VPN). The connection will terminate outside the firewall so as to not bypass the security architecture. The connection will be proxied at the firewall or via an FTP/telnet proxy.*

  - *FTP and telnet are acceptable via a site-to-site VPN between trusted enclaves; however, the risk will be accepted as part of the accreditation package, System Security Authorization Agreement (SSAA) or an Acceptance of Risk letter (AORL) must already be in place for the tunnel. FTP and telnet are acceptable within distributed enclaves, if required, as long as the traffic is physically or logically segregated from normal traffic using a method supported by the network technology to create a virtual connection (e.g., VLAN, VPN, LANE, MPLS, IPSec tunnels).*

- *(GEN004780: CAT I) The SA will ensure userids/passwords used for FTP and telnet do not have administrative or root privileges.*

- *(GEN004800: CAT II) The IAO will ensure an AORL is used to document the use of unencrypted FTP and telnet or the risk will be accepted as part of the accreditation package.*

- *(GEN004860: CAT II) The SA and IAO will ensure an anonymous FTP server houses only public information.*

- *(GEN005040: CAT II) The SA will ensure the FTP user's umask is 077.*

- *(GEN005060: CAT I) The SA will ensure FSP is not enabled.*

- *(GEN005180: CAT II) The SA will ensure .Xauthority files have permissions of 600, or more restrictive.*

- *(GEN005220: CAT II) X Clients that are authorized to connect to X Server display will be listed in the X*.hosts (or equivalent) file(s), if the .Xauthority utility is not used.*

- *(GEN005240: CAT II) The SA will ensure remote X-terminal access host is limited to authorized X clients.*

- *(GEN005260: CAT II) The SA will ensure remote X Window System connections are disabled if remote X Window System access is not required.*

- *(GEN005360: CAT II) The SA will ensure the owner of the snmpd.conf file is root with a group owner of sys and the owner of MIB files is root with a group owner of sys or the application.*

- *(GEN005440: CAT II) The SA will ensure local hosts are not configured to act as loghosts for systems outside the local network.*

- *(GEN005480: CAT III) The SA will ensure syslogd is not configured to accept remote messages, unless it is an IAO documented loghost.*

- *(GEN005520: CAT I) The SA and IAO will ensure SSH, or a functionally similar utility, is used to encrypt all communications. The sole exceptions are access via the system console device or anonymous FTP and public web pages on systems in the demilitarized zone (DMZ).*

- *(GEN005540: CAT II) The SA will ensure SSH is configured to work with TCP_WRAPPERS except in cases where the encryption utility can be configured for IP filtering and still display banners before granting access.*

- *(GEN005600: CAT II) The SA will ensure IP forwarding is disabled if the system is not dedicated as a router.*

- *(GEN006000: CAT II) The SA will ensure the public instant messaging clients are not installed.*

- *(GEN006020: CAT II) The SA will ensure instant messaging clients that are used for internal or DOD controlled IM applications are at the current patch level.*

- *(GEN006040: CAT II) The SA will ensure that peer-to-peer file-sharing applications are not installed unless authorized and documented with the DAA.*

- *(GEN006420: CAT II) The SA will ensure NIS maps are protected through hard-to-guess domain names.*

- *(GEN006560: CAT II) The SA will ensure vulnerability assessment tools, host-based intrusion detection tools, and file system integrity baseline methods notify the SA and the IAO if a security breach or a suspected security breach is discovered.*

- *(GEN006620: CAT II) The SA will ensure an access control program (e.g., TCP_WRAPPERS) hosts.deny and hosts.allow files (or equivalent), are used to grant or deny system access to specific hosts.*

- *(SOL00020: CAT II) The SA will ensure the nosuid option is configured in the /etc/rmmount.conf file.*

- *(SOL00320: CAT II) The SA will ensure the EEPROM password is set using UNIX STIG password guidelines.*

- *(SOL00340: CAT III) The SA will ensure the EEPROM password is unique.*

- *(SOL00420: CAT II) The SA will ensure hidden extended file attributes do not exist.*

- *(SOL00440: CAT I) The SA will ensure only root has the gid of 0 (root).*

- *(AIX00080: CAT I) The SA will ensure the SYSTEM attribute value is not configured as NONE.*

- *(IRIX0040: CAT II) The SA will ensure the Command (PROM) Monitor is password protected.*

- *(IRIX0060: CAT II) The SA will ensure the Command (PROM) Monitor password is set using UNIX STIG guidelines.*

- *(IRIX0080: CAT III) The SA will ensure the Command (PROM) Monitor password is unique.*

- *(LNX00200: CAT I) The SA will encrypt the LILO boot loader password.*

- *(LNX00540: CAT I) The SA will ensure the insecure option is not set.*

- *(LNX00620: CAT II) The SA will ensure the group owner of the /etc/securetty file is root, sys, or bin.*

- *(LNX00640: CAT II) The SA will ensure the owner of the /etc/securetty file is root.*

- *(LNX00660: CAT II) The SA will ensure the /etc/securetty file has permissions of 640, or more restrictive.*

- *(LNX00680: CAT II) The SA will ensure RealPlayer version 8 is removed from SuSE 9.1 and SuSE Linux Desktop 1.0.*

Appendix Changes

- Appendix, Standard Security File Template

  - Deleted this appendix. This appendix contained obsolete data, also, too difficult to ensure accurate data for the reviewer and user community. Checks are contained throughout this STIG to properly and more accurately check for required file ownership and permissions for system files.

- Appendix, Required Audit Flag Settings

  - Deleted this appendix. This data will be captured in the *UNIX Checklist* to allow for ongoing updates as systems change and functionality is enhanced.

- Appendix, DISA Field Security Operation ESM/ITA Directives Acquisition Instructions

  - Deleted this appendix. This appendix is no longer valid.

- Appendix, Acknowledgement of Risk Letter For Data Transfer Interface Userids

  - Updated this appendix to provide an Acknowledgment of Risk Letter Template. This is provided for FTP and Telnet uses.

- Appendix, UNIX IAVA Detection Procedures and Summary

  - Deleted this appendix.

- Appendix, Install Checklist – Creating New Systems

  - Updated this appendix to reference new section locations within this STIG.

- Appendix, Security Requirements Modifiable By Users

  - Added this appendix based on user comments.

- Appendix, List of Acronyms

  - Updated this appendix to accurately reflect the acronyms contained within this STIG.

1. INTRODUCTION

This UNIX STIG is intended to provide configuration guidance and is *not* to be construed as an endorsement or approval for the use of any product. Per the *Department of Defense Directive (DODD) 8500.1*, "All COTS IA or IA-enabled IT hardware, firmware, and software components or products incorporated into DOD information systems must comply with the evaluation and validation requirements of National Security Telecommunications and Information Systems Security Policy (NSTISSP) 11, reference (w). Such products must be satisfactorily evaluated and validated either prior to purchase or as a condition of purchase (i.e., vendors will warrant, in their responses to a solicitation and as a condition of the contract, that the vendor's products will be satisfactorily validated within a period-of-time specified in the solicitation and the contract). Purchase contracts shall specify that product validation will be maintained for updated versions or modifications by subsequent evaluation or through participation in the National Information Assurance Partnership (NIAP), Assurance Maintenance Program." For exceptions to this policy, please see the updated NSTISSP 11 (July 2003) for specific guidance on Exemptions and Deferred Compliance.

1.1 Background

Department of Defense Directive (DODD) 8500.1 establishes policy and assigns responsibilities to the Defense Information Systems Agency (DISA) to develop and provide security configuration guidance for IA and IA-enabled IT products in coordination with the National Security Agency (NSA). Paragraph 4.18 of the 8500.1 states, "All IA and IA-enabled IT products incorporated into DOD information systems shall be configured in accordance with DOD-approved security configuration guidelines." DISA Field Security Operations (FSO) develops the guidelines, which are called Security Technical Implementation Guides.

It should be noted that FSO support for the STIGs, Checklists, and Tools is only available to DOD Customers.

1.2 Authority

DOD Directive 8500.1 requires that “all IA and IA-enabled IT products incorporated into DOD information systems shall be configured in accordance with DOD-approved security configuration guidelines” and tasks DISA to “develop and provide security configuration guidance for IA and IA-enabled IT products in coordination with Director, NSA.” This document is provided under the authority of DOD Directive 8500.1.

The use of the principles and guidelines in this STIG will provide an environment that meets or exceeds the security requirements of DOD systems operating at the Mission Assurance Category (MAC) II Sensitive level, containing sensitive information.

1.3 Scope

The security requirements contained within this STIG are applicable to all DOD administered systems and all systems connected to DOD networks. This document provides requirements and associated steps to limit the security vulnerabilities for a UNIX system. These requirements are

designed to assist Security Managers (SMs), Information Assurance Managers (IAMs), Information Assurance Officers (IAOs), and System Administrators (SAs) with configuring and maintaining security controls in a UNIX environment.

DOD customers use several different UNIX platforms that support different versions of UNIX. All UNIX systems share some common characteristics, but at the same time, implement features differently, do not implement all the same features, or use different methods for implementing some of the same features. This document provides security requirements for all common variants of UNIX.

The Center for Internet Security (CIS) provides several UNIX/Linux benchmarks that contain industry standard security guidance, which may additionally aid the site in their UNIX/Linux security efforts. These benchmarks can be found at http://www.cisecurity.com.

1.4 Writing Conventions

Throughout this document, statements are written using words such as "**will**" and "**should**." The following paragraphs are intended to clarify how these STIG statements are to be interpreted.

A reference that uses "**will**" indicate mandatory compliance. All requirements of this kind will also be documented in the italicized policy statements in bullet format, which follow the topic paragraph. This makes all "**will**" statements easier to locate and interpret from the context of the topic. The IAO will adhere to the instruction as written. Only an extension issued by the Designated Approving Authority (DAA) will table this requirement. The extension will normally have an expiration date, and does not relieve the IAO from continuing their efforts to satisfy the requirement.

A reference to "**should**" indicates a recommendation that further enhances the security posture of the site. These recommended actions will be documented in the text paragraphs but not in the italicized policy bullets. Nevertheless, all reasonable attempts to meet this criterion will be made.

For each italicized policy bullet, the text will be preceded by parentheses containing the italicized Short Description Identifier (SDID), which corresponds to an item on the checklist and the severity code of the bulleted item, for example, "(*G111: CAT II*)." If the item does not have a Potential Discrepancy Item (PDI), or the PDI is being developed, it will contain a preliminary severity code and "N/A" for the SDID (i.e., "*[N/A: CAT III]*").

1.5 Vulnerability Severity Code Definitions

Category I	Vulnerabilities that allow an attacker immediate access into a machine, allow superuser access, or bypass a firewall.
Category II	Vulnerabilities that provide information that have a high potential of giving access to an intruder.
Category III	Vulnerabilities that provide information that potentially could lead to compromise.
Category IV	Vulnerabilities, when resolved, will prevent the possibility of degraded security.

Table 1-1. Vulnerability Severity Code Definitions

1.6 DISA Information Assurance Vulnerability Management (IAVM)

The DOD has mandated that all IAVMs are received and acted on by all commands, agencies, and organizations within the DOD. The IAVM process provides notification of these vulnerability alerts and requires that each of these organizations take appropriate actions in accordance with the issued alert. IAVM notifications can be accessed at the Joint Task Force - Global Network Operations (JTF-GNO) web site, http://www.cert.mil.

1.7 STIG Distribution

Parties within the DOD and Federal Government's computing environments can obtain the applicable STIG from the Information Assurance Support Environment (IASE) web site. This site contains the latest copies of any STIG, as well as checklists, scripts, and other related security information. The NIPRNet URL for the IASE site is http://iase.disa.mil/.

1.8 Document Revisions

Comments or proposed revisions to this document should be sent via e-mail to fso_spt@disa.mil. DISA FSO will coordinate all change requests with the relevant DOD organizations before inclusion in this document.

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2. UNIX OVERVIEW AND SITE INFORMATION

2.1 Organizational Relationships

Organizational relationships play a significant role in providing secure computing environments. The site must provide a robust and secure environment that protects the software environment from unauthorized access. This includes the protection of system-level resources (i.e., database systems, applications, and other utilities) used by the DOD user community. Data owners must define access requirements for their resources (i.e., actual databases, master files, and interactive transactions). Data owners are responsible for providing an access matrix that reflects subjects (processes and authorized personnel) and their access to resources (databases and applications).

2.2 Security Administration

Security administration is accomplished through the ongoing efforts of a number of personnel. The SM is the principal advisor to the site Commander/Director for the administration and management of the overall site security program. The IAM is responsible for the information assurance program of a DOD information system or organization. The IAO is responsible for implementing security requirements and ensuring the operational Information Assurance (IA) posture is maintained for a DOD information system or organization. The IAO is responsible to the IAM. The SA is responsible for the operational readiness and secure state of a computer system. The SA assists the IAO with implementing security directives in the operations environment and reports to the IAO.

2.3 Processing Environment

There are many objectives and goals to be considered when securing a UNIX operating system. When configuring UNIX operating system security, consider these critical principals of security known as the Confidentiality, Integrity, and Availability (CIA) triad:

- Confidentiality
- Integrity
- Availability

In addition to incorporating security controls that relate to the CIA triad, there are three additional security features that directly affect CIA and aid the overall site security program:

- Access control
- Auditing
- Backups

Access controls protect the systems and resources from unauthorized access and in some implementations can determine levels of authorizations. Access controls can include physical access restrictions to ensure only authorized personnel may access system equipment and the environments in which these systems reside. Access controls may also include system level access controls. System level access controls restrict access to system resources and objects, as well as restricting the capabilities of subjects to communicate with other subjects.

Auditing tools can track system activities to warn an SA of suspicious activity, allow the SA to understand the types of access that took place, identify a security breach, and aid in the research of the breach.

Backups are performed with prevention and recovery in mind. This includes, but is not limited to, the prevention of data loss and the loss of availability to data and resources. A daily backup of all changeable data and the proper storage of the data are invaluable in restoring data once a compromise has been detected and traced to the time it first occurred. Without these continual and consistent backups, recovery procedures are not reliable. Backups are also the most common way Continuity of Operations Plan (COOP) is implemented during catastrophe, natural disaster, hardware failures, and other circumstances. In all cases, the quality and depth of backups and the security of backup storage will have a direct impact on the quality and depth of restorative operations and COOP. Backups are the only path back to confidentiality, integrity, and availability of data once there has been a compromise, a natural disaster, or a catastrophe.

2.4 UNIX File Permissions

UNIX generally recognizes three user types: root (also referred to as the superuser), privileged users, and other users. Root is normally, but not necessarily, granted global privileges by the operating system. Role Based Access Control (RBAC) may also be implemented within most UNIX systems. RBAC allows for the delegation of administrative tasks, eliminating or reducing the need for superuser privileges granted to the root user and the root user alone.

Files are assigned access permissions with standard UNIX permissions or additionally with access control lists (ACLs). The sometimes cumbersome and restrictive nature of the standard UNIX file permissions is not always suitable for certain tasks. ACLs provide a greater degree of file access control and a more granular level of file protection, allowing certain privileges to either specific users or specific groups of users. This granular level of file protection provides more flexibility for ensuring file and directory access restrictions.

The standard UNIX file protection provides read, write, and execute permissions for three classes of users. These classes of users are owner, group, and other. Each class may be granted access to a file using any combination of the following three permissions:

- Read
- Write
- Execute

The permission of read allows for the ability to read a file or list the contents of a directory. The permission of write, allows for the ability to edit a file, or add or delete a directory entry. The permission of execute, allows for the ability to execute an executable file or access a directory. In the event a directory is required to allow all users permission to write to this directory, such as the case of public directories (e.g., /tmp), the sticky bit must be set. This sticky bit protects the files within this directory by preventing a user from deleting other users' files also located in this public directory. When a sticky bit has been set on a directory, only the owner of the file, owner of the directory, or root can delete a file.

2.5 Integrity

Computer information system integrity encompasses the reliability and correctness of a system. The system includes the hardware, software, data, and communications. The system must be able to process data as expected, maintain and ensure correctness of data, and securely process communications to and from the system.

Sites achieve UNIX system and data integrity by managing the complete system environment. Proper security and system management protects system hardware, software, applications, and data from unauthorized access and improper modification and leads to the secure operation of UNIX systems. A system is most vulnerable to malicious intrusion before it has been completely configured for secure operation. Newly built or configured systems increase the risk of a data integrity compromise upon connection to a production network if the system is not completely configured for secure operation.

2.5.1 Hardware Integrity

Hardware resources include central processing units (CPUs), disk drives, terminals, workstations, printers, as well as many other hardware components. Incorrectly installed, operated, or maintained hardware creates security vulnerabilities.

Controlling access to hardware resources is essential. Physical access control reduces the risk of theft, damage, and unauthorized access. Specific installation guidelines apply to classified equipment.

The operating environment must be capable of protecting the integrity of the hardware through physical means. The following sections define the hardware integrity requirements.

2.5.1.1 System Equipment

The UNIX operating system resides on, stores information on, and is accessed by a number of different devices including the hardware resources discussed in *Section 2.5.1, Hardware Integrity*. System equipment will be located in a controlled access area to prevent unauthorized access to the operating system via physical access to the system equipment.

Unauthorized access to the operating system may be gained via physical access by booting the server to a single-user mode. With basic UNIX knowledge and physical access to the CPU, the system can be booted to single-user or maintenance mode and in turn, root privileges will be gained. In single-user mode, the standard UNIX Identification and Authentication (I&A) process is not enabled. Sites will configure all systems that support the requirement for single-user passwords to enable and configure that feature. Systems that cannot be configured to require a single-user password are to be documented with the IAO and located in a restricted and controlled access area accessible only by SAs. Additionally, secure the console and other hardware for such systems in a restricted and controlled access area to prevent accidental or malicious access.

- *(GEN000020: CAT II) (Previously – G001) The IAO and SA will ensure, if configurable, the UNIX host is configured to require a password for access to single-user and maintenance modes.*

- *(GEN000040: CAT II) (Previously – G002) The SA will ensure a UNIX host that cannot be configured to require a password when booted to single-user mode is justified and documented with the IAO.*

- *(GEN000060: CAT II) (Previously – G003) The SA will ensure a UNIX host that cannot be configured to require a password when booted to single-user mode is located in a controlled access area accessible only by SAs.*

- *(GEN000080: CAT II) (Previously – G234) The SA will ensure all UNIX system equipment (e.g., servers, workstations, terminals, etc.) is located in a controlled access area.*

2.5.2 Software Integrity

2.5.2.1 Operating System

Maintaining the security of a UNIX system requires frequent reviews of security bulletins. Many security bulletins and IAVM notifications mandate the installation of software patches to overcome noted security vulnerabilities. The SA will be responsible for installing all such patches. The IAO will ensure the vulnerabilities have been remedied. FSO guidelines for remediation, including IAVMs are as follows:

Remediation Guidelines;

- Apply the applicable patch, upgrade to required software release, or remove the binary/application to remediate the finding.

- Or, the vulnerable binary may be renamed and the permissions modified to 000 to downgrade the finding, for example a CAT I finding may be downgraded to a CAT II.

SAs and IAOs will regularly check OS vendor web sites for information on new vendor recommended and security patches that are applicable to their site. All applicable vendor recommended and security patches will be applied to the system. A patch is deemed applicable if the product is installed; even it is not used or is disabled. The operating system will be a supported release to ensure the OS release may be patched. This will ensure the ability to comply with IAVM requirements as well as access to vendor recommended and security patches.

- *(GEN000100: CAT I) The IAO will ensure the operating system is a supported release.*

- *(GEN000120: CAT II) (Previously – G033) The SA will ensure vendor recommended and required security patches are applied.*

2.5.2.2 DOD Patch Repository

DISA maintains a repository of software patches and hot fixes. This patch server can be accessed at the following location:

NIPRNet - https://patches.csd.disa.mil

2.5.2.3 Open Source Software

DOD has clarified policy on the use of open source software to take advantage of the capabilities available in the Open Source community, as long as certain prerequisites are met. DOD no longer requires that operating system software be obtained through a valid vendor channel and have a formal support path, if the source code for the operating system is publicly available for review. Open source software may be used when there is an operational requirement that compels the use of the software. The responsible DAA assesses and accepts the risk of integrated public domain software.

DOD CIO Memo, Open Source Software (OSS) in Department of Defense (DOD), 28 May 2003:

> "DOD Components acquiring, using or developing OSS must ensure that the OSS complies with the same DOD policies that govern Commercial-Off-The-Shelf (COTS) and Government-Off-The Shelf (GOTS) software. This includes, but is not limited to, the requirements that all information assurance (IA) or IA-enabled IT hardware, firmware and software components or products incorporated into DOD information systems whether acquired or originated within DOD;
>
> - Comply with the evaluation and validation requirements of National Security Telecommunications and Information Systems Security Policy Number 11 and;
>
> - Be configured in accordance with DOD-approved security and configuration guidelines at http://iase.disa.mil/ and http://www.nsa.gov/."

Linux is acceptable based on the availability of source code, in some instances, and the support and guarantee of the vendor (e.g., Red Hat) and the support and guarantee of vendors who incorporate the software in their common release. Please additionally note that any UNIX based operating system in use in a DOD environment is subject to all relevant UNIX security requirements and must be capable of STIG compliance as verified by a Security Readiness Review (SRR).

2.5.3 Data Integrity

DISAI 630-230-19 provides the concepts to be used in evaluating the data integrity requirements supporting application data. This STIG is not intended to address data-level integrity in detail, but to provide techniques that can be used to help ensure security of the data residing on a UNIX platform.

2.5.3.1 File Integrity

Maintaining file integrity is a key factor in the protection of UNIX systems. Monitoring the access and modification of critical files (i.e., system files and libraries, application files, device files, etc.,) is a major component of ensuring file integrity. A baseline is a database that contains a snapshot of the system after it has been fully loaded with operating system files, applications, and users. Baseline control consists of comparing a current system snapshot with the original system snapshot. The purpose of maintaining and checking a system baseline is to detect unauthorized system changes. Unauthorized changes may indicate system compromise and, if detected, could prevent serious damage. A baseline consists of files that change infrequently in terms of size, access permissions, modification times, checksums, etc. They are most often found in the system directories but could be in other locations. It would be a mistake to try to maintain a baseline of user files and/or temporary files (i.e., files located in the /tmp directory) as these frequently change.

The integrity of sensitive system files will be checked at least weekly against a known baseline of these files using a baseline checking utility. A listing and description of some baseline checking tools are located in *Section 6, UNIX Security Tools*. Whatever is used, it must notify the IAO/SA of any unexpected changes. The SA and IAO will investigate any anomalies and decide if an actual file integrity breach has occurred. The system date and time-of-day can be a key forensic factor in detecting and tracking file compromises. Due to the great importance of the accuracy of the system clock and date setting, the SA should ensure the ongoing accuracy of the system clock and date. Authoritative DOD approved time-server sources for the NIPRNet can be found at http://tycho.usno.navy.mil/ntp.html. *Section 6, UNIX Security Tools*, includes discussion as well as additional security software requirements.

The file system integrity tool will take a baseline of all files, or a specific subset of files, to include cryptographic hashes of files in the baseline. The tool must be able to compare the existing baseline of the system against the current state of the system, so that unauthorized modification of the operating system can be detected.

The SA, under the direction of the IAO, is responsible for creating, checking, and maintaining a current system baseline. The IAO is responsible for verifying the system baseline. The IAM is responsible for setting overall policy for system baseline creation and maintenance.

The baseline database will be backed up on write-protected media and checked against the current baseline. The baseline changes whenever a change is made to the system. Changes include adding patches and packages. A new system baseline will be executed after every software change and after changes to system libraries and binaries are applied.

- *(GEN000140: CAT II) The SA will create and maintain a system baseline (all device files, all sgid and suid files, and system libraries and binaries), to include cryptographic hashes of files in the baseline.*

- *(GEN000160: CAT II) The SA will maintain all baseline backups on write-protected media.*

- *(GEN000180: CAT II) The SA will execute a new system baseline after changes, additions, or deletions of any sgid and/or suid files are applied.*

- *(GEN000200: CAT II) The SA will execute a new system baseline after changes to system libraries and/or binaries are applied.*

- *(GEN000220: CAT II) The SA will ensure all filesystems are checked at least weekly against the system baseline to detect any unauthorized system libraries or binaries as well as unauthorized modification to authorized system libraries or binaries.*

- *(GEN000240: CAT I) (Previously – G695) The SA will ensure the outside network time-server is an authoritative U.S. DOD source for both the NIPRNet and the SIPRNet.*

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3. DISCRETIONARY ACCESS CONTROL AND GENERAL SECURITY

This section discusses discretionary access control (DAC), overall general UNIX security measures, and the I&A criteria necessary to ensure access to system resources is effectively managed and controlled for the UNIX system. In this sense, it is also discussing confidentiality, which consists of assurance that information is not disclosed to unauthorized persons, processes, or devices. This entails incorporating the concept of least privilege. Least privilege states that users have only the authority to access those resources necessary to perform their required functions. DAC places a large part of the responsibility for data confidentially, integrity, and availability directly into the data owner's hands by delegating to the owner the ability to determine who can access the data and how it is accessed (e.g., read, write, delete). This STIG attempts to provide secure methods of accomplishing DAC and other operations, while still protecting the data owner, the data user, and the platform's operating system.

3.1 User Account Controls

Individual user accountability precludes the use of shared accounts (i.e., accounts where multiple users are allowed to log on directly to the same account). Applications may require that a specific account (e.g., oracle) be used for certain administrative tasks. The user is required to log on with that user's account name and su - to the application account. That action retains the individual accountability (through audit files). If there is an application account (e.g., oracle) that requires the account to be shared, this will be justified and documented with the IAO. If there is a vendor requirement for logging directly into an account, the IAO will obtain justification and documentation from the vendor that states the necessity and justification.

- *(GEN000260: CAT II) (Previously – G006) The SA will ensure any special purpose accounts or applications requiring a shared account are documented with the IAO. Documentation will include a statement from the SA or application developer, where applicable, stating the absolute necessity of and justification for the shared account.*

- *(GEN000280: CAT II) (Previously – G007) The IAO will ensure shared account logons are accomplished by invoking the su - (switch user) command from the individual user's UNIX session; the shared account will not be logged into directly.*

3.1.1 Interactive Users

DOD directives require unique identification for each system user. Authorized users should be granted access only to the resources needed to accomplish their mission. A user is either an individual or an executing process/task that accesses a computer resource. Each user will be identified with an account name and a corresponding user identification (uid) number. The uids and group identification (gid) numbers are assigned according to the following scheme:

- UNIX
  - uids
    - 0 – 99 Reserved for system account uids.
    - 100 – 999 Generally used for application uids.
    - 1000 – 60000 Generally used for interactive/user uids.
  - gids
    - 0 – 99 Reserved for system account gids.
- Linux
  - uids
    - 0 – 499 Reserved for system account uids.
    - 500 – 999 Generally used for application uids.
    - 1000 – 60000 Generally used for interactive/user uids.
  - gids
    - 0 – 499 Reserved for system account gids.

***NOTE*:** Debian application uids and user ids are 1000 – 29999.

DISAI 630-230-19 defines the requirements for user access. The IAO controls access to UNIX resources by authorizing user accounts to perform certain functions on the system. The SA will assign each user and application a uid based on the above detailed guidance. Systems reserve the first 99 (499 for Linux) uids and gids for system use.

Groups are collections of users with common resource requirements. A user is given resource access by assigning privileges to a group that the user belongs. Each user will belong to at least one group. Systems reserve gids 99 (499 for Linux) and below for system use. Therefore, the SA will assign each user and application a gid based on the above detailed guidance. An example of a situation, which it would be valid to add a user to a group with a gid of less than 100, would be the System Administrators on Solaris. System Administrators need to be members of the sysadmin group (e.g., gid 14) to allow for use of the Admintool. By contrast, there is no technical justification for the use of the Solaris staff group (i.e., gid 10), but is allowable. All gids that appear in the passwd file will be defined in the group file in order to maintain order and to maintain the integrity of the passwd file and group file.

Examples of valid situations where a user account has a gid of less than 100;

- Solaris
  - gid 10 (staff) — Not recommended, but allowable.
  - gid 14 (sysadmin) — System Administrators need to be members of the sysadmin group (i.e., gid 14) to allow for use of the Admintool. Requires documentation with the IAO.
- HPUX
  - gid 20 (users) — Not recommended, but allowable. Requires documentation with the IAO.

- *(GEN000300: CAT III) (Previously – G008) The SA will ensure each user is assigned a unique account name.*
- *(GEN000320: CAT II) (Previously – G009) The SA will ensure each user is assigned a unique uid.*
- *(GEN000340: CAT II) The SA will ensure uids 0 – 99 (0 – 499 for Linux) are reserved for system accounts.*
- *(GEN000360: CAT II) (Previously – G029) The SA will ensure gids 0 – 99 (0 – 499 for Linux) are reserved for system accounts. If used, the exceptions (detailed above) must be documented with the IAO.*
- *(GEN000380: CAT IV) (Previously – G030) The SA will ensure each group referenced in the /etc/passwd file is defined in the /etc/group file.*

3.1.2 Logon Warning Banner

CJCSM 6510.01 (Final):

> "All DOD information systems (to include routers and servers) must display a "log-on notice and consent banner" (Figure C-C-1) that presents the notice information on the initial log-on page regardless of access methodology (e.g., network, website, remote access, dial-in, etc.)."

The following sample is provided by the *CJCSM 6510.01 (Final).*

> THIS IS A DEPARTMENT OF DEFENSE COMPUTER SYSTEM. THIS COMPUTER SYSTEM, INCLUDING ALL RELATED EQUIPMENT, NETWORKS, AND NETWORK DEVICES (SPECIFICALLY INCLUDING INTERNET ACCESS), ARE PROVIDED ONLY FOR AUTHORIZED US GOVERNMENT USE. DOD COMPUTER SYSTEMS MAY BE MONITORED FOR ALL LAWFUL PURPOSES, INCLUDING TO ENSURE THEIR USE IS AUTHORIZED, FOR MANAGEMENT OF THE SYSTEM, TO

FACILITATE PROTECTION AGAINST UNAUTHORIZED ACCESS, AND TO VERIFY SECURITY PROCEDURES, SURVIVABILITY, AND OPERATIONAL SECURITY. MONITORING INCLUDES ACTIVE ATTACKS BY AUTHORIZED DOD ENTITIES TO TEST OR VERIFY THE SECURITY OF THIS SYSTEM. DURING MONITORING, INFORMATION MAY BE EXAMINED, RECORDED, COPIED, AND USED FOR AUTHORIZED PURPOSES. ALL INFORMATION, INCLUDING PERSONAL INFORMATION, PLACED ON OR SENT OVER THIS SYSTEM, MAY BE MONITORED.

USE OF THIS DOD COMPUTER SYSTEM, AUTHORIZED OR UNAUTHORIZED, CONSTITUTES CONSENT TO MONITORING OF THIS SYSTEM. UNAUTHORIZED USE MAY SUBJECT YOU TO CRIMINAL PROSECUTION. EVIDENCE OF UNAUTHORIZED USE COLLECTED DURING MONITORING MAY BE USED FOR ADMINISTRATIVE, CRIMINAL, OR OTHER ADVERSE ACTION. USE OF THIS SYSTEM CONSTITUTES CONSENT TO MONITORING FOR THESE PURPOSES.

A compressed version (subset) may be used as long as the below listed points are included:

- The system is a DOD system.
- The system is subject to monitoring.
- Monitoring is authorized in accordance with applicable laws and regulations and conducted for purposes of systems management and protection, protection against improper or unauthorized use or access, and verification of applicable security features or procedures.
- Use of the system constitutes consent to monitoring.
- This system is for authorized US government use only.

- *(GEN000400: CAT II) (Previously – G010) The SA will ensure a logon-warning banner is displayed on all devices and sessions at the initial logon.*

- *(GEN000420: CAT II) (Previously – G011) The IAO will ensure the Legal Notice Logon Warning Banner includes the five points outlined in the CJCSM 6510.01. All DOD AISs will display, as a minimum, an electronic logon notice and consent banner that advises users of the following principles:*

- *The system is a DOD system.*

- *The system is subject to monitoring.*

- *Monitoring is authorized in accordance with applicable laws and regulations and conducted for purposes of systems management and protection, protection against improper or unauthorized use or access, and verification of applicable security features or procedures.*

- *Use of the system constitutes consent to monitoring.*

- *This system is for authorized US government use only.*

3.1.3 Account Access

Many computer compromises occur as the result of account name and password guessing. This is generally done with an automated script that uses repeated logon attempts until the correct account and password are guessed. Logon and logout logs, account locking, retry delays, and session disconnect for users, as well as root, are effective methods of detecting and controlling potentially malicious account access. The SA will properly configure these methods to control unauthorized account access. Most systems do support account lockout, while some systems will disconnect the session after three consecutive failed logon attempts. Accounts will be locked after three failed logon attempts. Due to different system support, which is beyond the configuration control, and cannot be modified, most UNIX systems do support account lock out due to failed logon attempts, but certain releases of Solaris do not. In this event, session disconnect will be configured.

- *(GEN000440: CAT II) (Previously – G012) The SA will ensure all logon attempts (both successful and unsuccessful) are logged to a system log file.*

- *(GEN000460: CAT II) (Previously – G013) The SA will ensure, after three consecutive failed logon attempts for an account, the account is locked for 15 minutes or until the SA unlocks the account.*

NOTE: For Solaris, prior to Solaris 10 Solaris did not support this requirement, in this event, the SA will ensure session disconnect after three consecutive failed logon attempts.

- *(GEN000480: CAT II) (Previously – G015) The SA will ensure the logon delay between logon prompts after a failed logon is set to at least four seconds.*

3.1.4 Inactivity Timeout/Locking

When a user is logged on to a UNIX system, the system is susceptible to alteration or damage. A user may become busy or distracted and inadvertently leave a logon session. Such idle sessions leave the UNIX system vulnerable to unauthorized user exploitation. When a workstation is left unattended, users will ensure sessions are locked and not accessible without I&A or users will

log out. Additionally, users will ensure they log out when finished with a session. Sessions/terminals will be logged out or locked after 15 minutes of inactivity. Screen lock programs can be configured to activate if terminals are idle for a specified period. Shells (e.g., sh, ksh, etc.) also contain variables that can be set to terminate logon sessions after a specified period of inactivity. If a screen lock device is available, it should be able to be invoked by the user when the user wishes to leave the terminal unattended. Most terminals provide screen lockout, as opposed to session termination. There are also additional options that may be employed to ensure an unattended session is not left open or unlocked, such as token cards. Token cards are removed from a client when leaving a console and the token card is then used for access to the console upon return. Some terminals require continuous displays, such as network management terminals, and may be exempt from the requirement as long as they are located in a restricted access area, the logon session is not a root session, and fully justified and documented with the IAO.

- *(GEN000500: CAT II) (Previously – G605) The SA will configure systems to log out interactive processes (i.e., terminal sessions, ssh sessions, etc.,) after 15 minutes of inactivity or ensure a password protected screen lock mechanism is used and is set to lock the screen after 15 minutes of inactivity.*

- *(GEN000520: CAT II) (Previously – G016) The SA will ensure applications requiring continuous, real-time screen display (i.e., network management products) are exempt from the inactivity requirement provided the following requirements are met:*

  - *The logon session is not a root session.*
  - *The inactivity exemption is justified and documented with the IAO.*
  - *The display station (e.g., keyboard, CRT) is located in a controlled access area.*

3.2 Password Controls

UNIX operating systems allow specification of a password. The following guidelines will be used for password creation.

3.2.1 Password Guidelines

Apply the required information assurance controls for the Mission Assurance Category (MAC) and Confidentiality Level in accordance with *Enclosure 4, DODI 8500.2*. Modern UNIX systems accomplish this by encrypting passwords and placing them into a protected file that is separate from, and more secure than, the /etc/passwd file. Implementation of the password protection scheme is listed below and is dependent on the flavor of UNIX used:

1. In most System V, Solaris, Linux, and IRIX systems this is implemented via the /etc/shadow file.

2. In HP-UX 10.X and 11.X systems, running in secure mode, this is implemented in the /tcb/files/auth directory. This directory consists of a series of sub-directories (a-z, for

instance) named for the first letter of the account name. Each directory contains a password record for each user whose account begins with that letter.

3. In AIX systems, this is implemented in the /etc/security/passwd file.

Users must take precautions to protect passwords by choosing them wisely. Studies have shown that users who are allowed to choose their own passwords are more likely to remember them. Passwords so complex or obscure that they require recording to remember introduce the hazard of becoming accessible to unauthorized persons.

NOTE: Some systems will not allow the '#' and/or the '@' sign in passwords and certainly not in the account name.

There are several additional password guidelines to be configured, which provide additional system and user account protection. These include ensuring passwords are changed every 90 days for users as well as root. These password guidelines are to be configured for each individual user account as well as the global system password configuration file(s). Accounts created for and used by non-interactive/automated processing are subject to special consideration. These accounts may be used for a variety of functions such as activity log storage by remote or local devices, unattended database maintenance batch jobs, etc. These accounts will not be shared with interactive database users. Passwords for non-interactive/automated processing accounts will be changed at least once a year and anytime an application administrator is reassigned. When an individual with access to the root password is reassigned, the root password will be changed. Accounts will be locked after 35 days of inactivity. Accounts will be locked by making the default shell /bin/false, /usr/bin/false, /sbin/false, /sbin/nologin, or /dev/null, and/or by locking the password. Passwords will not be reused within the last ten changes. Access to the root account is to be limited to security and administrative users who require such access, these users are to be documented with the IAO as having such access.

- *(GEN000540: CAT II) (Previously – G004) The SA will ensure passwords are not changed more than once a day.*

- *(GEN000560: CAT I) (Previously – G018) The SA will ensure each account in the /etc/passwd file has a password assigned or is disabled in the password, shadow, or equivalent, file by disabling the password and/or by assigning a false shell in the password file.*

- *(GEN000580: CAT II) (Previously – G019) The IAO will ensure all passwords contain a minimum of eight characters.*

- *(GEN000600: CAT II) (Previously – G019) The IAO will ensure passwords include at least two alphabetic characters, one of which must be capitalized.*

- *(GEN000620: CAT II) (Previously – G019) The IAO will ensure passwords include at least one numeric character.*

- *(GEN000640: CAT II) (Previously – G019) The IAO will ensure passwords contain at least one special character, avoid '#' and '@'.*

- *(GEN000660: CAT II) (Previously – G019) The IAO will ensure passwords do not contain information such as names, telephone numbers, account names, dictionary words, etc.*

- *(GEN000680: CAT II) (Previously – G019) The IAO will ensure passwords contain no consecutive characters.*

- *(GEN000700: CAT II) (Previously – G020) The SA will ensure passwords are changed at least every 90 days.*

- *(GEN000720: CAT II) (Previously – G020) The SA will ensure the root password is changed at least every 90 days.*

- *(GEN000740: CAT II) (Previously – AD33) The SA will ensure passwords for non-interactive/automated processing accounts are changed at least once a year and anytime an application administrator is reassigned.*

- *(GEN000760: CAT II) (Previously – G071) The SA will ensure accounts are locked after 35 days of inactivity.*

- *(GEN000780: CAT I) (Previously – G511) The SA will ensure easily guessed passwords are not used.*

- *(GEN000800: CAT II) (Previously – G606) The SA will ensure passwords will not be reused within the last ten changes.*

- *(GEN000820: CAT II) The SA will ensure the system global password configuration files are configured per password requirements.*

- *(GEN000840: CAT II) (Previously – G691) The SA will ensure access to the root account is limited to security and administrative users who require such access. These users are to be documented with the IAO as having such access.*

- *(GEN000860: CAT III) (Previously – AD16) The IAO or SA will ensure the root password will be changed whenever an individual with access to the root password is reassigned.*

3.3 Root Account

The root account is used to accomplish system administrative functions. The system uses this account to run privileged programs. Because root enjoys access to all files and programs, root has no security constraints.

In most flavors of UNIX, by default, the root home directory is **'/'** which is readable by all UNIX users. In Linux, by default, the root home directory is /root. The root home directory will be in a directory other than **'/'** to afford the root startup and work files the same protection as is afforded to all other users. Sun's vipw (an old, manual method of altering the passwd file which has been superceded by the admintool) will not work correctly with this change. Using the Graphical User Interface (GUI), admintool or SMC (Solaris Management Console) - the recommended methods, is not affected.

Sites usually designate one or more primary and alternate SAs requiring root access. Sharing accounts and/or the root account and password is a breach of the security requirement for individual I&A and defeats the audit mechanism. The security breach is eliminated when all SAs and users log on using their individual account I&A; then, use the su - command to switch to a privileged account, especially if it is the root account. Use of the su - command and the sulog file, along with system auditing, gives the ability to identify use of authorized shared accounts (particularly the root account) and to audit those actions in an irrefutable manner. When using the su command, the su command should be called using the full path of the utility as well the **'-'** sign is to be used (e.g., /bin/su -). Using the full path to the utility ensures the correct binary is called. Using the **'-'** sign will ensure the privileged and/or root's environment is used when a user switches to the privileged user and/or root. In the event of system problems and emergency situations the root account may directly login, but only at the console. Additionally, to prevent network logon by root, remote consoles are not to be configured.

The root account will not have a directory in the search path that is group and/or world writable nor search in the current working directory. Current working directories or group and/or world writable directories that root searches would allow for the modification of current binaries or addition of trojanized binaries which root would execute when searching for a binary to execute. A '.' or '::' anywhere in the PATH definition or a '**:**' as the first or last element of a PATH definition represents the current directory.

Accounts that su – to the root account will be bound by the same PATH definition restrictions of the root account. They will log on to their named accounts. They will invoke the su – command to reach root, or the root role they have been assigned, if necessary. Their PATH will be the same as the root PATH once the command is completed. In any case, their personal PATH environment will be bound by the same restrictions as the root PATH environment. This restriction ensures that the search path used while accessing the root account is set per security guidelines in the event a root capable account uses su instead of su –. This also provides protection for the root capable account. Users with root capabilities should not be identified as such in the comment field of the passwd file to avoid clarifying potential targets for malicious users and/or intruders.

The only user with a uid of zero (0) will be root, as the uid of 0 allows superuser privileges. If another uid of zero (0) is in the password file, it may be an indication of system compromise. The smtp account that is distributed with Solaris 7 and earlier comes configured with a uid of zero (0). This uid is not necessary with the Solaris configurations. The smtp account uid will be changed (the uid of 6 is recommended, as this uid is not used by another system account), or the account deleted entirely.

The root account default shell will be located in /sbin or /bin if /usr has been partitioned (i.e., is not a part of the '/' partition). In the event /usr is partitioned, this ensures that root will have a shell when in single user or repair/maintenance modes, since /sbin is in the root filesystem and, for instance, /usr/bin is not in the root filesystem. The SA may invoke a different shell from the command line, after logging on and switching user to root (/bin/su -), by invoking the alternate shell and sourcing the necessary files.

- *(GEN000880: CAT II) (Previously – G021) The SA will ensure only root has a uid of 0.*

- *(GEN000900: CAT IV) (Previously – G022) The SA will ensure root is assigned a home directory other than '/' (e.g., /roothome).*

- *(GEN000920: CAT II) (Previously – G023) The SA will ensure the root account home directory (other than '/') has permissions of 700. Do not change the permissions of the '/' directory to anything other than 0755.*

- *(GEN000940: CAT II) (Previously – G024) The SA will ensure the root search PATH (and the search path of root capable accounts) does not contain '.', '::', or start or end with a ':'. All are equivalent to '.'.*

- *(GEN000960: CAT II) (Previously – G025) The SA will ensure the root search PATH (and the search path of root capable accounts) does not contain directories or files that are world writable.*

- *(GEN000980: CAT II) (Previously – G026) The SA will ensure root can only log on as root from the system console, and then only when necessary to perform system maintenance.*

- *(GEN001000: CAT I) (Previously – G698) The SA will ensure remote consoles are not defined.*

- *(GEN001020: CAT II) The IAO will enforce users requiring root privileges to log on to their personal account and invoke the /bin/su - command to switch user to root.*

- *(GEN001040: CAT II) (Previously – G027) The SA will ensure successful and unsuccessful root logon and logout attempts are recorded in a system log.*

- *(GEN001060: CAT II) (Previously – G027) The SA will ensure successful and unsuccessful switch user (su -) attempts are recorded in a system log.*

- *(GEN001080: CAT III) (Previously – G229) The SA will ensure the root shell is not located in /usr if /usr is partitioned.*

3.3.1 Encrypted Root Access

Information, including passwords, is normally passed in clear text form over the network whenever a user accesses a remote system. If a user accesses the root account (using /bin/su –, for instance), the password is passed in clear text form and is subject to interception and malicious misuse.

To protect against password and sensitive data interception, the IAO will require that each system accessed remotely by a privileged user enforce enhanced I&A with encryption. Password and data encryption will allow the root password and sensitive data to be passed over the network with a level of assurance that it will not be intercepted in a usable form. The use of SSH Tectia, OpenSSH, F-Secure, Reflection for Secure IT, or similar programs are some methods for accomplishing this. All systems that are accessed remotely using the root password (or any other privileged account password) will use a password and data encryption for that connection.

Secure Shell (SSH) gives the option to log on remotely as root even when the system has otherwise been configured to disallow direct logon as root. Ensure this feature is disabled in SSH in order to protect the audit trail. SSH also allows .shosts (the same as .rhosts but used by SSH). These features are not to be used unless the feature is operationally necessary and is documented with the IAO. Refer to *Section 3.10, Trusted System/User Access Control Files* and *Section 4.15, Secure Shell (SSH) and Equivalents*, for guidance on the use of .rhosts and .shosts.

- *(GEN001100: CAT I) (Previously – G499) The IAO will require strong I&A, with encryption for password and data, for all remote accesses (access from other than the system console) by the root account.*

- *(GEN001120: CAT II) (Previously – G500) The SA will configure the encryption program for direct root access only from the system console.*

3.4 File and Directory Controls

UNIX is a multi-user system. This means that multiple users may be concurrently logged on to a machine, and those users can read and use files belonging to each other if they have been granted permission to do so. The owner of a file, or root, can grant access permissions to a file by changing the permission bits. However, no user will possess a more permissive access to a file than the owner does. This is referred to as uneven file permissions. An example is the world having write permission to a file when the group owner is not granted write permission also. The only instance where uneven file permissions will be allowed is in the World Wide Web (WWW) file server directory tree. The uneven file permission allowed will be no more permissive than 460. Every file and directory can be assigned three basic file permissions.

Files can exist without a discernable owner or group owner by having the uid number and the gid number of a previous user (a user who has been deleted from the system). If a new user is added to the system and assigned the same uid/gid numbers as the previous user, the new user inherits all of the access permissions that previously belonged to the former user. Inheriting access permissions could mean unauthorized access to sensitive information. For that reason, ownerless

files and/or files with no group owner will be deleted or corrected to the proper owner and/or group owner.

The many rules that exist for system file ownership and access permissions must be observed in order to protect system security. System files and directories will be owned by a system account and group and will strictly limit access by group owners and the world.

A daemon refers to a service or process that runs in the background (or on demand via inetd) and services user requests. The telnet daemon (telnetd or in.telnetd) is just one example. System commands are utilities that perform system tasks, display system information, etc. Daemons and system commands are not to have group or world write permissions. System log files refer to logs of system activities, such as the /var/log/syslog file, the /var/messages file, and others. Man pages refer to online manual pages to provide users with an online help mechanism. These log files and man pages are to have permission of 644, or more restrictive to ensure these are not over written or deleted unintentionally or maliciously.

System library files (i.e., files used when compiling and running programs), manual page files (i.e., files that contain instructions for executing commands), and shells (i.e., programs such as sh and csh that determine the overall user operating environment) require access permissions that limit user access privileges in order to preserve system integrity. Two more special files, the /etc/passwd and /etc/shadow, or equivalent files, require special protection from malicious intruders in order to protect the account security of every user, including root, applications, and application data.

NIS and NIS+ are distributed database systems that provide a central location for configuring and administering site systems and users. Name service database and map files must be secured to ensure they are not writable by world or unintended users.

- *(GEN001140: CAT II) (Previously – G034) The SA will ensure there are no uneven file permissions. The exception will be in WWW server directory trees where write access may be granted to the group but denied to the owner.*

- *(GEN001160: CAT II) (Previously – G035) The SA will ensure all files have a valid owner and group.*

- *(GEN001180: CAT II) (Previously – G036) The SA will ensure all daemons have permissions of 755, or more restrictive.*

- *(GEN001200: CAT II) (Previously – G044) The SA will ensure all system commands have permissions of 755, or more restrictive.*

- *(GEN001220: CAT II) (Previously – G045) The SA will ensure the owner of all system files, programs, and directories is a system account.*

- *(GEN001240: CAT II) (Previously – G046) The SA will ensure the group owner of all system files, programs, and directories is a system group.*

- *(GEN001260: CAT II) (Previously – G037) The SA will ensure all system log files have permissions of 640, or more restrictive.*

- *(GEN001280: CAT III) (Previously – G042) The SA will ensure all manual page files (i.e., files in the man and cat directories) have permissions of 644, or more restrictive.*

- *(GEN001300: CAT II) (Previously – G043) The SA will ensure all system library files have permissions of 755, or more restrictive.*

- *(GEN001320: CAT II) (Previously – G039) The SA will ensure the owner of all NIS/NIS+/yp files is root, sys, or bin.*

- *(GEN001340: CAT II) (Previously – G040) The SA will ensure the group owner of all NIS/NIS+/yp files is root, sys, bin, or other.*

- *(GEN001360: CAT II) (Previously – G041) The SA will ensure all NIS/NIS+/yp files have permissions of 755, or more restrictive.*

- *(GEN001380: CAT II) (Previously – G048) The SA will ensure the /etc/passwd file has permissions of 644, or more restrictive.*

- *(GEN001400: CAT I) (Previously – G047) The SA will ensure the owner of the /etc/passwd and /etc/shadow files (or equivalent) is root.*

- *(GEN001420: CAT II) (Previously – G050) The SA will ensure the /etc/shadow file (or equivalent) has permissions of 400.*

3.5 Home Directories

Users will be assigned home directories in the /etc/passwd file. A home directory contains a user's files and exists for that user's exclusive use. A user's home directory will be owned by the user and the group owner will be the user's primary group. Home directories will have an initial access permission of 700. DAC allows a user to change the home directory access permissions, but these will never be more permissive than 750, which would allow group read and list access.

- *(GEN001440: CAT IV) (Previously – G051) The SA will assign every user a home directory in the /etc/passwd file.*

- *(GEN001460: CAT IV) (Previously – G052) The SA will ensure all home directories defined in the /etc/passwd file exist.*

- *(GEN001480: CAT II) (Previously – G053) The SA will ensure user home directories have initial permissions of 700, and never more permissive than 750.*

- *(GEN001500: CAT II) (Previously – G054) The SA will ensure the user's home directory is owned by the user.*

- *(GEN001520: CAT II) (Previously – G055) The SA will ensure the user's home directory is owned the user's primary group, exceptions may exist for application directories, which will be documented with the IAO.*

3.6 User Files

User files are files owned by a user, except for the possibility of some user local initialization files that may be owned by root, and maintained by the user in the user's home directory. User files will have an initial access permission of no more permissive than 700 and will never be more permissive than 750. All files in user home directory will be owned by the user with the possible exception of local initialization files that may be owned by root. The SA and the user, as well as application developers, will be responsible for maintaining these requirements.

- *(GEN001540: CAT III) (Previously – G067) The user, application developers, and the SA will ensure files and directories (excluding a limited set of local initialization files) in user home directory trees will be owned by the user who owns the home directory.*

- *(GEN001560: CAT II) (Previously – G068) The user, application developers, and the SA will ensure user files and directories will have an initial permission no more permissive than 700, and never more permissive than 750.*

3.7 Run Control Scripts

Run control scripts are executed by the system and/or kernel when the system is booted. They are also executed (with a different argument such as stop) when the system is shut down in an orderly manner. They may also be executed by root at any time. The numbers associated with an rc directory name relate to the run level at which the system executes the control scripts. Files in rc2.d, for instance, would only be executed when the system is going into run level 2. Run control scripts set parameters for the kernel and start or stop applications and system utilities (such as daemons). Their names and locations are dependent on the system architecture.

Run control scripts normally refer to the files in, and subordinate to, /etc that begin with the letters, rc or reside in a directory such as rc0.d, rc1.d, and so on. The number relates to the run level at which they are invoked. Run control scripts are usually located in a central directory, such as in /etc/init.d and /sbin/init.d, and /etc/rc.config.d, depending on the system. The scripts residing in the rc<n>.d directories are usually linked to the above mentioned central directory.

- *(GEN001580: CAT II) (Previously – G058) The SA will ensure run control scripts have permissions of 755, or more restrictive.*

- *(GEN001600: CAT II) (Previously – G059) The SA will ensure the PATH variable definition in run control scripts do not contain a '.' or '::', or start or end with a ':'.*

- *(GEN001620: CAT II) (Previously – G061) The SA will ensure run control scripts files do not have the suid or sgid bit set.*

- *(GEN001640: CAT I) (Previously – G062) The SA will ensure run control scripts do not execute world writable programs.*

- *(GEN001660: CAT II) (Previously – G611) The SA will ensure the owner of run control scripts is root.*

- *(GEN001680: CAT II) (Previously – G612) The SA will ensure the group owner of run control scripts is root, sys, bin, other, or the system default.*

- *(GEN001700: CAT II) (Previously – G613) The SA will ensure run control scripts only execute programs owned by a system account or an application default.*

3.8 Initialization Files

3.8.1 Global Initialization Files

Global initialization files provide a centralized location to globally distribute and set environment variables and directory paths. The global initialization files are located in the /etc directory. Global initialization files (e.g., /etc/profile, /etc/.login, /etc/default/login, and /etc/environment) contain global parameters, such as PATH variables, that are set each time a user logs on. Global initialization files will be owned by root and will be no more permissive than 644.

The global initialization files will not set a search path that searches a directory that is group and/or world writable or search in the current working directory. Current working directories or group and/or world writable directories that are searched would allow for the modification of current binaries or addition of trojanized binaries which root would execute when searching for a binary to execute. A **'.'** or **'::'** anywhere in the PATH definition or a '**:**' as the first or last element of a PATH definition represents the current directory.

Executing the command mesg -y opens up the user terminal to writing by all users. The mesg -y command will not be executed by a global initialization file; also the global initialization files (e.g., /etc/profile) will contain mesg –n or mesg n.

There are also default user initialization files that are placed in a new user's directory to get them started. Depending on the flavor of UNIX, these are normally located in /etc/skel and have names such as local.cshrc, local.login**,** local.profile (i.e., dot files). Default user initialization files will be owned by root or bin and will be no more permissive than 644.

- *(GEN001720: CAT II) The SA will ensure global initialization files have permissions of 644, or more restrictive.*

- *(GEN001740: CAT II) The SA will ensure the owner of global initialization files is root.*

- *(GEN001760: CAT II) The SA will ensure the group owner of global initialization files is root, sys, bin, other, or the system default.*

- *(GEN001780: CAT III) (Previously – G112) The SA will ensure global initialization files contain the command mesg –n.*

- *(GEN001800: CAT II) (Previously – G038) The SA will ensure all default/skeleton dot files have permissions of 644, or more restrictive.*

- *(GEN001820: CAT II) The SA will ensure the owner of all default/skeleton dot files is root or bin.*

- *(GEN001840: CAT II) The SA will ensure the PATH variable definition in global initialization files does not contain a* **'.'** *or* **'::'**, *or start or end with a* **':'**. *All are equivalent to '.'.*

3.8.2 Local Initialization Files

Local initialization files (i.e., files in a user's home directory with a name that begins with **'.'**) are files that are normally read by the kernel (or utility programs) and used to customize the user's environment. These files include .login**,** .profile, .cshrc, and other files that are used by a system's shell or other utilities to set the initial working environment whenever users log on or execute an application or system utility. A list of common UNIX local initialization files is located in *Appendix B, Home Directory Security-Related Files*. Local initialization files will be owned by the user or root and will be no more permissive than 740, the exception to this is the .dt directory and the .dtprofile file is CDE is being used. If a local initialization file, such as .profile, sets the PATH variable, it will not contain a **'.'** or **'**::**'** except in the last position. The PATH variable defines the search sequence the shell uses to find executable programs. A PATH variable may be observed by typing the env or set command, which will display a users environment configuration, or by typing echo $PATH, which will only display path data. The PATH is normally placed in the global initialization files (for global settings), or in each user's .profile, .cshrc, or .login file (depending on the user's shell). The PATH is constructed in the following format (for sh or ksh):

PATH=/bin:/usr/bin:/oracle/bin:/usr/local/bin

This indicates that when a user types a command name the shell will search /bin for the command first, and if the command is not found there, the shell will search for the command in /usr/bin, and so on. A **'.'** or **'::'** anywhere in the PATH definition or a '**:**' as the first or last element of a PATH definition represents the current directory.

If a PATH variable is written as follows:

PATH=/bin:.:/usr/bin:/oracle/bin:/usr/local/bin

Then the shell would search the current directory for the command immediately after it searched /bin. Assume the user was in the /tmp directory (the current directory) when attempting to execute the ls command. Assume a malicious user created an executable program in /tmp named ls. Assume the ls program in /tmp executes a command to delete all of the user's files. If the user typed ls and the shell did not find it in /bin, it would search the current directory, execute the malicious ls, and destroy all of the user's files. For this reason, it is preferable to never have a **'.'** or a **'::'** in the PATH variable. Since it would be more disastrous if the above scenario happened to root, root will never have a **'.'** or **'::'** anywhere in the PATH definition or a '**:**' as the first or last element of a PATH definition. Users may configure the current working directory in the search path if this is required and if configured as the last search path.

Ensure users' local initialization files are not executable by others and do not have the suid or sgid bits set, which could allow a malicious user to gain expanded privileges. To aid in the protection against introducing Trojan horses, the SA and users will ensure local initialization files do not execute world writable programs or scripts. Root's local initialization files are initialization files in root's home directory that serve the same purpose for root as user local initialization files do for users. Finally, local initialization files will not execute the mesg –y or mesg y command that would make their terminal devices world writable and open for possible exploitation.

- *(GEN001860: CAT II) (Previously – G056) The SA will ensure the owner of users local initialization files is the user or root.*

- *(GEN001880: CAT II) (Previously – G057) The SA will ensure local initialization files have permissions of 740, or more restrictive. The following files/directories are to be excluded from GEN001880:*

  .dt (a directory, this should have permissions of 755)
  .dtprofile (a file, this should have permissions of 755)

- *(GEN001900: CAT II) The user and SA will ensure the PATH variable definition in local initialization files does not contain a* **'.'** *or '::', or start with a ':'.*

- *(GEN001920: CAT II) (Previously – G060) The SA will ensure local initialization files do not have the suid or sgid bit set.*

- *(GEN001940: CAT II) (Previously – G609) The SA will ensure local initialization files do not execute world writable programs.*

- *(GEN001960: CAT III) (Previously – G610) The SA will ensure local initialization files do not contain the command mesg –y or mesg y.*

3.9 Trusted System/System Access Control Files

System access control (network) files establish parameters for UNIX systems to establish connections to and from other systems. The .rhosts and hosts.equiv files are used most often in establishing trust relationships between NIS/NIS+ hosts, but NIS/NIS+ is not necessary for setting up trust relationships. The '+' in the /etc/passwd, /etc/shadow, etc., files was used as a marker for systems to insert data from NIS maps. As this is no longer a requirement for the proper functionality of NIS and the '+' may allow unauthorized privileged access, the /etc/passwd, /etc/shadow, etc., files will not contain a '+'. The .rhosts (.shosts with SSH) and hosts.equiv (shosts.equiv with SSH) files can allow unrestricted system access with no I&A. The .netrc files are used to automate FTP sessions but they will not be allowed except where they are associated with the use of the SFTP or equivalent.

The hosts.equiv and .rhosts files are security files that authorize system access by remote hosts and by users on local or remote hosts. The hosts.equiv file and .rhosts files in users' directories specify equivalent remote hosts and users to the local host or user. Users from equivalent remote hosts are permitted to access local accounts using rcp, remsh, or rlogin without supplying a password. The .rhosts file is used to authorize users to access the specific account in which the .rhosts file is located (the .rhosts file is required to be owned by the user whose directory it resides in). The hosts.equiv file can authorize many users from a specific host. Refer to *Section 4.15, Secure Shell (SSH) and Equivalents,* for additional guidance on the use of hosts.equiv, .rhosts and .shosts.

- *(GEN001980: CAT II) The SA will ensure .rhosts, .shosts, hosts.equiv, shosts.equiv, /etc/passwd, /etc/shadow, and /etc/group files will not contain a plus (+) unless defining entries for NIS+ netgroups.*

- *(GEN002000: CAT II) (Previously – G066) The SA will ensure .netrc files do not exist.*

- *(GEN002020: CAT II) (Previously – G614) The SA will ensure, if .rhosts, .shosts, hosts.equiv, and/or shosts.equiv files exist, will contain only lines with host-user pairs (e.g., host2 root) except in cases where they are defining netgroups for NIS+. These files will also to be justified and documented with the IAO.*

- *(GEN002040: CAT I) The SA will ensure .rhosts, .shosts, hosts.equiv, nor shosts.equiv are used, unless justified and documented with the IAO.*

- *(GEN002060: CAT II) (Previously – G615) The SA will ensure, if .rhosts, .shosts, hosts.equiv, and/or shosts.equiv files exist, they will not be accessible by anyone other than the owner or root.*

- *(GEN002080: CAT II) (Previously – G616) The IAO will not allow a trusted relationship with any system that is not also under the control of a security program that is acceptable to DOD.*

- *(GEN002100: CAT II) The SA will ensure .rhosts is not supported in the pluggable authentication module (PAM).*

3.10 Shells

A shell is a program that serves as the basic interface between a user and the operating system. It is a command interpreter that accepts input from a user, interprets what is needed, and calls the appropriate kernel functions to accomplish requests. The shell also establishes the environment that a user operates in, or controls the user's view of the system. It may be modified to suit almost any user, and it may run additional programs that serve as additional layered front-end interfaces. Every system comes supplied with several shells (e.g., sh, ksh, csh, bash, etc.) that may be defined as the default shell for users. The IAO will ensure the validity of and approve these shells. The IAO will define the shells that users are allowed to use in a file called /etc/shells. This will prohibit the use of shells that have not been validated and approved for usage. Without this file, shells may be used with unknown results. If a user does not have a shell authorized through inclusion in this file, that user will not be able to log on. The SA may use shells not listed in the /etc/shells file to disable accounts. These are /usr/bin/false, /bin/false, /sbin/nologin, or /dev/null. They will not be included in the /etc/shells. The shell sdshell may also be referenced in the /etc/passwd file, although not listed in the /etc/shells file. The sdshell is required for proper functionality of the SecureID product; this is the only occasion the sdshell is to be referenced.

- *(GEN002120: CAT II) (Previously – G069) The SA will ensure the /etc/shells (or equivalent) file exits.*

- *(GEN002140: CAT II) (Previously – G070) The SA will ensure all shells referenced in the /etc/passwd file are listed in the /etc/shells (or equivalent) file. The /usr/bin/false, /bin/false, /dev/null, /sbin/nologin, and sdshell will be considered valid shells for use in the /etc/passwd file, but will not be listed in the /etc/shells file.*

- *(GEN002160: CAT I) (Previously – G072) The SA will ensure no shell has the suid bit set.*

- *(GEN002180: CAT II) (Previously – G073) The SA will ensure no shell has the sgid bit set.*

- *(GEN002200: CAT II) (Previously – G074) The SA will ensure the owner of all shells is root or bin.*

- *(GEN002220: CAT II) (Previously – G075) The SA will ensure all shells (excluding /dev/null and sdshell) have permissions of 755, or more restrictive.*

3.11 Device Files

A device file is a special UNIX file that is configured with major and minor device numbers. Major and minor device numbers identify the device special file and its characteristics to the UNIX kernel. They provide a linkage from the user to the UNIX device drivers that control peripheral and memory operations. Device drivers reside in the kernel. The device directory and device file access permissions, as well as device driver major and minor number integrity, are critical to system security. The function of a UNIX device file can be changed by changing the major and/or minor numbers associated with it. If the device directory, device special file, or a device driver is compromised, then the entire system could be compromised.

Device files located outside the normal locations may indicate attempts to compromise the system. For this reason, the system will be scanned weekly for extraneous device files. If extraneous device files are located, the IAO will investigate to identify the source and take appropriate action. Backup devices present a more subtle security hazard. If they are writable by any user except root or a pseudo backup user, a backup could be destroyed accidentally or maliciously or even altered. Files not usually accessible to users may be accessible from a world readable and writable backup device. Therefore, backup devices (normally devices controlling tape drives and system floppy disks) will not be world readable or writable.

Audio and video devices that are globally accessible have proven to be another security hazard. There is software that can activate system microphones and video devices connected to user workstations and/or X terminals. Once the microphone has been activated, it is possible to eavesdrop on otherwise private conversations without the victim being aware of it. This action effectively changes the user's microphone to a bugging device. Vendor procedures normally install /dev/audio (or the equivalent) with the device file permissions set to 600 and in some cases 666 (globally writable and therefore vulnerable). The SA and IAO will ensure the access permissions for the audio device are 644, or more restrictive. The audio device will be owned by root with a group owner of root, sys, or bin.

- *(GEN002240: CAT III) All device files will be located in the directory trees as installed and designated by the operating system and/or application vendor.*

- *(GEN002260: CAT III) (Previously – G076) The SA will ensure all local filesystems are checked at least weekly against the system baseline to detect any extraneous device files.*

- *(GEN002280: CAT II) (Previously – G077) The SA will ensure device file directories will not be writable except by the owner or as configured by the vendor.*

- *(GEN002300: CAT II) (Previously – G078) The SA will ensure backup devices (e.g., tape and floppy disk device) and files will only be readable and writable by root.*

- *(GEN002320: CAT II) (Previously – G501) The SA will ensure the audio devices have permissions of 644, or more restrictive.*

- *(GEN002340: CAT II) (Previously – G502) The SA will ensure the owner of audio devices is root.*

- *(GEN002360: CAT II) (Previously – G504) The SA will ensure the group owner of audio devices is root, sys, or bin.*

3.12 Special Purpose Access Modes

When the suid permission bit is set on an executable file, a user/process that runs the executable file is granted access based on the file's owner rather than the uid of the user/process that has executed the file. When the sgid permission bit is set on an executable file, similar to the suid permission bit, a user/process that runs the executable file is granted access based on the file's group owner rather than the gid of the user/process that has executed the file. Special operating characteristics may be assigned to a file or directory with the chmod command. These special characteristics are as follow:

set-user-id (suid)	(i.e., -rwsr----)
set-group-id (sgid)	(i.e., -r-x---s---)
set sticky bit	(i.e., drwxrwxrwxt)

3.12.1 Set User ID (suid)

Authorized, vendor-supplied suid programs are crucial to the correct operation of the UNIX operating system, but unauthorized suid programs present a security hazard. When the suid attribute is set on the access permissions of a program, a user executing the program has the same privileges as the owner of the program. If the owner of the program is root, then the user, while executing that program, has all the powers of root, at least for the scope of the program being executed. Therefore, it is extremely important that any program that has the suid bit set is of known origin and scope.

Refer to the specific vendor's UNIX documentation for details concerning suid programs. Commercial and Government-supplied applications may also contain programs with the suid bit set. If so, the vendor/proponent instructions must be followed.

If a mounted filesystem has any suid executable scripts or programs, a user who invokes the executable takes on the uid of the executable's owner. The owner of such suid executables is typically a privileged user usually root. If a filesystem is exported, a remote user, who may be normal or privileged, may execute suid files and alter files mounted, but not exported, on the exporting host system. Also, the root account on the exporting server may create a script or program with the suid set, logon to the NFS client as an unprivileged user (as this user may not have root access on the NFS client) and then execute the script or program with the suid set. This user would then have root access on the NFS client as well. This is a serious vulnerability, which must be managed with the nosuid within the mount command options.

- *(GEN002380: CAT II) (Previously – G082) The IAO will document the ownership, permissions, and location of any files having the suid bit set.*

- *(GEN002400: CAT II) (Previously – G084) The SA will ensure all local filesystems are checked at least weekly against the system baseline to detect any unauthorized suid files as well as unauthorized modification to authorized suid files.*

- *(GEN002420: CAT II) (Previously – G086) The SA will ensure user filesystems, removable media, and remote filesystems will be mounted with the nosuid option.*

3.12.2 Set Group ID (sgid)

Authorized, vendor-supplied sgid programs are crucial to the correct operation of the UNIX operating system, but unauthorized sgid programs present a security hazard. The sgid bit can be set on executable programs and directories. When this attribute is set on executable programs, the user executing the program has the same privileges as the group owner of the program. It is extremely important therefore, that any program that has the sgid bit set is of known origin and scope. Programs with the sgid bit set must never allow escapes to the command line.

Refer to the specific vendor's UNIX documentation for details concerning sgid. Commercial and Government-supplied applications may also supply programs with the sgid bit set. If so, then vendor/proponent instructions must be followed.

- *(GEN002440: CAT II) (Previously – G083) The IAO will document the ownership, permissions, and location of any files having the sgid bit set.*

- *(GEN002460: CAT II) (Previously – G085) The SA will ensure all local filesystems are checked at least weekly against the system baseline to detect any unauthorized sgid files as well as unauthorized modification to authorized sgid files.*

3.12.3 Sticky Bit

If directories are other (a.k.a., world) writable, they can be accessed and changed by any friendly or malicious user with access to the system. In other words, users could populate the directories with erroneous, malicious, and harmful information. In addition, users could also delete files belonging to other users contained in these directories. In the event a directory is required to allow all users permission to write to this directory, such as the case of public directories (e.g., /tmp) the sticky bit must be set. This sticky bit protects the files within this directory by preventing a user from deleting other users' files also located in this public directory. When a sticky bit has been set on a directory, the owner of the file, owner of the directory, or root, may only delete a file. For that reason, world writable directories will only be allowed if they are public directories and have the sticky bit set.

The sticky bit will not be used to justify the existence of world writable directories. The only authorized world writable directories are those temporary directories supplied with the system or those designed to be temporary file repositories. The setting is normally reserved for directories used by the system and by users for temporary file storage (e.g., /tmp) and for directories that require global read/write access. Since the public directory owner can change or delete any file within the public directory, all public directories will be owned by root or the COTS/GOTS default application user, and the sticky bit will be set. The group owner of all public directories will be root, bin, sys, or the COTS/GOTS default application group.

- *(GEN002480: CAT II) (Previously – G079) The SA will ensure no world writable files exist and world writable directories are public directories.*

- *(GEN002500: CAT III) (Previously – G087) The SA will ensure the sticky bit is set on all public directories.*

- *(GEN002520: CAT II) (Previously – G088) The SA will ensure the owner of public directories is root or the application user.*

- *(GEN002540: CAT II) The SA will ensure the group owner of public directories is root, sys, bin, or the application group.*

3.13 Umask

The umask is a kernel variable that controls the file access permissions assigned to newly created files and directories. Data and program integrity, confidentiality, and availability are directly affected by the system and user umask. Newly created files/directories will be accessible to unauthorized and possibly malicious users if the umask is too permissive. Additionally, applications may not function correctly if the umask is too restrictive. Therefore, the umask is a critical component of every user and system process.

The umask controls access permissions for the following three groups:

- File owner (or creator)
- Owner's default group
- Rest of the world (others)

By default, the system creates files with permissions of 666 and directories with permission to 777. To determine what permissions a given umask will assign to a newly created file, subtract the umask from 666. A 022 umask, for instance, would assign the file creator read and write permissions while assigning the group and world read permissions. The access permissions are read as 644. Most UNIX systems are fielded with a default umask of 022. This allows access permissions of 644 for files and 755 for directories. The umask must be configured to only allow access to the file by the owner of the file. To accomplish this, the system and user umask will be set to 077. Exceptions to this will be some applications, such as Oracle, which require an umask of 022, during software installation when the installation process demands a more permissive value, during database access by users, and during administrative actions. If required, only after explicit action by the owner (i.e., discretionary access control [DAC]) would file access be granted to group users and/or the rest of the world. All requirements will be justified and documented with the IAO.

- *(GEN002560: CAT II) (Previously – G089) The SA will ensure the system and user umask is 077.*

- *(GEN002580: CAT III) (Previously – G090) The SA will ensure applications requiring an umask more permissive than 077, will be no more permissive than 022 and will be justified and documented with the IAO.*

3.14 Development Systems

Application developers often ignore security requirements in favor of development expediency. One of the most important parts of applications today, however, is security. Therefore, development systems will be subject to the same security requirements as production systems and are subject to SRRs by FSO. Development systems are often connected to live production networks and, because security requirements have not been observed, jeopardize the entire network. If network connectivity is a requirement for development systems, they will be connected to a testing network that is completely isolated from all other production systems and networks, such as with an isolated subnetwork. Applications will be designed to work correctly in a secure environment. Performing SRRs on development systems will help ensure secure practices are used in the development stages. This will avoid the problem of trying to retrofit security into newly released systems, hardware, and applications. If access to live test data is required, then a mirror of real data, that does not jeopardize personal data, will be used.

- *(GEN002600: CAT II) The SA will ensure development systems are subject to the same security requirements as production systems.*

3.15 Default Accounts

UNIX systems come configured with default system accounts and, when software is installed, default accounts for applications. These accounts usually have default standard passwords. Default system accounts are normally listed at the beginning of the /etc/passwd file and have names like bin, lib, uucp, news, sys, guest, and daemon. They are usually disabled in the password or shadow file. The SA will ensure system default accounts, other than root, are

disabled by locking the password and the shell field will contain an invalid shell. The SA will ensure that all default passwords are changed. This is accomplished by assigning new passwords for applications, both internally (Oracle is shipped with a standard manager password of manager, for instance) and in the password and shadow files.

- *(GEN002620: CAT I) The SA will immediately change any default passwords.*

- *(GEN002640: CAT II) (Previously – G092) The SA will ensure logon capability to default system accounts (e.g., bin, lib, uucp, news, sys, guest, daemon, and any default account not normally logged onto) will be disabled by making the default shell /bin/false, /usr/bin/false, /sbin/false, /sbin/nologin, or /dev/null, and by locking the password.*

3.16 Audit Requirements

Auditing is not system logging and is not system accounting. System logging is done via the syslog facility. System accounting, when activated, collects data useful for charging timeshare customers and for system capacity planning.

Most systems provide system software for the purpose of auditing. Each is configured differently and has unique utilities for reading audit data files. Audit utilities can extract information about specific users and processes from the audit files. The IAO and SA will ensure audit files are only accessible to authorized personnel. Auditing will be configured to immediately alert personnel of any unusual or inappropriate activity with potential IA implications. The audit files will be retained for five years if the system contains sources and methods intelligence (SAMI); otherwise audit files will be retained for one year on backup media. All users, including root, will be audited. The SA will rotate and compress the audit logs one or more times a day to ease space requirements and to reduce the time required for log searches and reviews. Audit data will be backed up no less than weekly onto a different system or media than the system being audited. The implementation of an audit server will ease the attention required by audit logs and provide compliance with the requirement for the back up of audit data.

Red Hat Enterprise Linux 3 and SuSE Enterprise Server 8 have added an auditing subsystem, Linux Audit-Subsystem (LauS), that provides auditing of security-critical events and security functions that protect network-transmitted data. Earlier systems did not provide that auditing. SAs with earlier systems will obtain and implement third party software, such as auditd or snare, to ensure required auditing until the vendor supplies a workable auditing function or upgrades are applied. For earlier versions, and other vendors, third party auditing applications are available.

- *(GEN002660: CAT II) (Previously – G093) The SA will configure and implement auditing.*

- *(GEN002680: CAT II) (Previously – G094) The SA will ensure audit data files and directories will be readable only by personnel authorized by the IAO.*

- *(GEN002700: CAT I) (Previously – G095) The SA will ensure audit data files have permissions of 640, or more restrictive.*

- *(GEN002720-GEN002840: CAT II) (Previously – G100-G106) The SA will configure the auditing system to audit the following events for all users and root:*

  - *Logon (unsuccessful and successful) and logout (successful)*

  - *Process and session initiation (unsuccessful and successful)*

  - *Discretionary access control permission modification (unsuccessful and successful use of chown/chmod)*

  - *Unauthorized access attempts to files (unsuccessful)*

  - *Use of privileged commands (unsuccessful and successful)*

  - *Use of print command (unsuccessful and successful)*

  - *Export to media (successful)*

  - *System startup and shutdown (unsuccessful and successful)*

  - *Files and programs deleted by the user (successful and unsuccessful)*

  - *All system administration actions*

  - *All security personnel actions*

- *(GEN002860: CAT II) (Previously – G674) The SA and/or IAO will ensure old audit logs are closed and new audit logs are started daily.*

- *(GEN002880: CAT II) The IAO will ensure the auditing software can record the following for each audit event:*

  - *Date and time of the event*

  - *Userid that initiated the event*

  - *Type of event*

  - *Success or failure of the event*

  - *For I&A events, the origin of the request (e.g., terminal ID)*

- *For events that introduce an object into a user's address space, and for object deletion events, the name of the object, and in MLS systems, the object's security level*

- *(GEN002900: CAT III) The IAO will ensure audit files are retained at least one year; systems containing SAMI will be retained for five years.*

- *(GEN002920: CAT III) The IAO will ensure audit files are backed up no less than weekly onto a different system than the system being audited or backup media.*

3.16.1 Audit Review Guidance

Collection of user and process audit information is only part of the process of system monitoring. Collected data will be examined and analyzed at least daily to detect any compromise or attempted compromise of system security. The basic commands to review the audit files on a Solaris system are auditreduce and praudit. The command to review audit files on a HP is audisp. The commands have ample options to allow viewing the information in many formats. Other systems use similar utilities for reviewing audit data. The IAO will review audit files daily to detect possible system compromise, malicious users, or users that may need more instruction.

- *(GEN002940: CAT II) On a daily basis, the IAO will review the audit trails and/or system logs for the following:*

  - *Excessive logon attempt failures by single or multiple users*

  - *Logons at unusual/non-duty hours*

  - *Failed attempts to access restricted system or data files indicating a possible pattern of deliberate browsing*

  - *Unusual or unauthorized activity by System Administrators*

  - *Command-line activity by a user that should not have that capability*

  - *System failures or errors*

  - *Unusual or suspicious patterns of activity*

3.17 Cron

Cron is a job scheduling utility that controls jobs configured to run in the background on a recurring schedule. Cron determines the schedule and the jobs from configuration files called crontabs. Cron keeps track of each specific crontab creator and executes the programs with all the privileges of the crontab creator. Because of that, crontabs will not execute world or group writable programs nor will the programs be located in, or subordinate to, world writable directories.

3.17.1 Access Controls

Cron uses a file called cron.allow, populated by the SA, to determine which users are authorized to create, edit, display, and remove crontabs. Cron uses a file called cron.deny, also populated by the SA, to deny access to specific users. If cron.allow is used, there is no absolute need to also have a cron.deny file, because users not listed in the cron.allow file will not have access by default. If there are no cron.allow or cron.deny files, the system assumes either everybody can access cron or nobody can access cron, depending on the system. Therefore, every system will have either a cron.allow file listing users authorized to access crontab, or a cron.deny file, listing users not authorized to access crontab. Default system accounts (with the possible exception of root) will not be listed in the cron.allow file. If there is only a cron.deny file, the default system accounts (with the possible exception of root) will be listed there. In addition, access to the use of cron facilities will be authorized and documented with the IAO.

3.17.2 Access Permissions and Owners

The maximum access permissions for the cron.allow and cron.deny files will be 600. The cron.allow and cron.deny files will be owned by root with a group owner of root.

Cron has the capability to log its actions, and their success or failure, to a log file. The SA will ensure the system is configured to log all cron actions. The SA will also ensure the cron log access permissions are set to 600, or more restrictive. The owner for the cron log will be root. The group owner of the cron log file will be root, bin, or sys. The SA or IAO will review the cron logs on a daily basis to detect any possible problems.

Other files and directories associated with cron will be owned by root or bin with a group owner of root, sys, or bin. Crontabs will be owned by root or the crontab creator. Crontabs will have a maximum access permission of 600. The access permissions for the cron and crontab directories will be 755, or more restrictive.

3.17.3 Restrictions

A crontab, or any program executed by a crontab, will not relax the system umask unless the requirement has been justified and documented with the IAO.

Users will use the crontab -e command to create or edit all crontabs associated with their account name. This utility provides file locking to prevent multiple users from editing the same file at the same time and notifies the cron daemon when crontabs have changed so the cron daemon knows to reread the crontabs. It should also provide the correct access permissions to the crontab.

- *(GEN002960: CAT II) (Previously – G200) The SA will control access to the cron utilities via the cron.allow and/or cron.deny file(s).*

- *(GEN002980: CAT II) (Previously – G201) The SA will ensure the cron.allow file has permissions of 600, or more restrictive.*

- *(GEN003000: CAT II) (Previously – G203) The SA and cron users will ensure crontabs do not execute group or world writable programs.*

- *(GEN003020: CAT II) (Previously – G204) The SA and cron users will ensure crontabs do not execute programs located in, or subordinate to, world writable directories.*

- *(GEN003040: CAT II) The SA will ensure the owner of crontabs is root or the crontab creator.*

- *(GEN003060: CAT II) The SA will ensure default system accounts (with the possible exception of root) will not be listed in the cron.allow file. If there is only a cron.deny file, the default accounts (with the possible exception of root) will be listed there.*

- *(GEN003080: CAT II) (Previously – G205) The SA will ensure crontabs have permissions of 600, or more restrictive, (700 for some Linux crontabs, which is detailed in the UNIX Checklist).*

- *(GEN003100: CAT II) (Previously – G206) The SA will ensure cron and crontab directories have permissions of 755, or more restrictive.*

- *(GEN003120: CAT II) (Previously – G207) The SA will ensure the owner of the cron and crontab directories is root or bin.*

- *(GEN003140: CAT II) (Previously – G208) The SA will ensure the group owner of the cron and crontab directories is root, sys, or bin.*

- *(GEN003160: CAT II) (Previously – G209) The SA is responsible for ensuring cron logging is implemented.*

- *(GEN003180: CAT II) (Previously – G210) The SA will ensure cron logs have permissions of 600, or more restrictive.*

- *(GEN003200: CAT II) (Previously – G620) The SA will ensure the cron.deny file has permissions of 600, or more restrictive.*

- *(GEN003220: CAT III) (Previously – G621) The SA will ensure cron jobs will not execute a program that sets the umask to a value more permissive than 077, unless justified and documented with the IAO.*

- *(GEN003240: CAT II) (Previously – G622) The SA will ensure the owner and group owner of the cron.allow file is root.*

- *(GEN003260: CAT II) (Previously – G623) The SA will ensure the owner and group owner of the cron.deny file is root.*

3.18 At

The at utility reads commands from standard input and groups them together for deferred execution at a time specified by the user. Because at executes jobs with the privileges of the user, at will not execute world or group writable programs nor will the programs be located in, or subordinate to, world writable directories.

3.18.1 Access Controls

At uses a file called at.allow, populated by the SA, to determine which users are allowed to create at jobs. At uses a file called at.deny, also populated by the SA, to determine which users are specifically denied use of the at facilities. Users specifically allowed to use at are listed in the at.allow file. Users specifically denied access appear in the at.deny file. If either at.allow or at.deny exist, then root is the only user allowed access to use at. However, if only an empty at.deny file exists, then anyone may use at. The at.allow file may exist without the at.deny file. The at.deny file may exist without the at.allow file, but will not be empty. Users not listed in the at.allow file, if it exists, will not be allowed access to at. Therefore, every system will have either an at.allow file listing authorized at users, or an at.deny file, listing users not authorized to use the at. Default system accounts (with the possible exception of root) will not be listed in the at.allow file. If there is only an at.deny file, the default system accounts (with the possible exception of root) will be listed there. In addition, access to the use of at facilities will be authorized and documented with the IAO.

3.18.2 Access Permissions and Owners

The maximum access permissions for the at.allow and at.deny files will be 600. The at.allow and at.deny files will be owned by root with a group owner of root.

Access permissions for the at (or equivalent) directory will be 755 or more restrictive. The owner and group owner of the at (or equivalent) directory will be root, sys, bin, or daemon.

3.18.3 Restrictions

At jobs, or any program executed by an at job, will not relax the system umask unless the requirement has been justified and documented with the IAO.

The SA and at users will ensure programs executed via the at utility are neither world nor group writable and that programs run by root are not writable by any except root, the user, or the application. In general, the user, root, or an application will own programs executed by at. The SA and at users will ensure programs executed using at are located in a directory where every directory in the path is owned by the user, root, or the application, and that none are world writable.

The IAO will maintain documentation of all recurring at jobs, who runs them, and why. At jobs should be converted to cron jobs if justified by recurring requirements. At jobs can contain commands to reschedule themselves. This feature should only be used if documented and justified with the IAO.

- *(GEN003280: CAT II) (Previously – G211) The SA will ensure access to at will be controlled via the at.allow and/or the at.deny file(s).*

- *(GEN003300: CAT II) (Previously – G212) The SA will ensure the at.deny file is not empty.*

- *(GEN003320: CAT II) (Previously – G213) The SA will ensure default system accounts (with the possible exception of root) are not listed in the at.allow file. If there is only an at.deny file, the default accounts (with the possible exception of root) will be listed there.*

- *(GEN003340: CAT II) (Previously – G214) The SA will ensure the at.allow and at.deny files have permissions of 600, or more restrictive.*

- *(GEN003360: CAT II) (Previously – G215) The SA and at users will ensure programs executed via at are not group or world writable.*

- *(GEN003380: CAT II) (Previously – G216) The SA and at users will ensure at jobs do not execute programs in, or subordinate to, world writable directories.*

- *(GEN003400: CAT II) (Previously – G625) The SA will ensure the at (or equivalent) directory has permissions of 755, or more restrictive.*

- *(GEN003420: CAT II) (Previously – G626) The SA will ensure the owner and group owner of the at (or equivalent) directory is root, sys, bin, or daemon.*

- *(GEN003440: CAT II) (Previously – G627) The SA will ensure at jobs will not execute a program that sets the umask to a value more permissive that 077, unless justified and documented with the IAO.*

- *(GEN003460: CAT II) (Previously – G629) The SA will ensure the owner and group owner of the at.allow file is root.*

- *(GEN003480: CAT II) (Previously – G630) The SA will ensure the owner and group owner of the at.deny file is root.*

3.19 Batch Access

Batch reads commands to be executed either immediately or later depending on CPU scheduling and priority. Batch is equivalent to the at command at -q b -m now, where queue b is a special at queue specifically for batch jobs.

Batch, unlike at, executes commands and requests serially. This avoids the high system load that could be caused by running several background jobs at once.

Since batch and at are related, and use the same allow, deny, and log files, the security constraints for batch will be the same as for at.

3.20 Kernel Tuning

This section provides discussion and requirements for kernel settings and parameters to greatly increase the security of a UNIX system.

3.20.1 Restrict/Disable Core Dumps

A core dump may provide valuable information for a programmer in the terms of debugging, but this is a rarely used debugging tool. In addition, core dumps may also contain sensitive data that is not intended for viewing by other users on the system. Core dumps will be disabled or the core dump data will be written to a directory expressly created for this purpose, owned and group owned by root, with permissions set to 700.

These requirements are further detailed in the *UNIX Checklist,* as these may or may not be applicable to all UNIX platforms and versions.

- *(GEN003500: CAT III) The SA will ensure core dumps are disabled or restricted.*

- *(GEN003520: CAT III) The SA will ensure the owner and group owner of the core dump data directory is root with permissions of 700, or more restrictive.*

3.20.2 Disable Executable Stack

Numerous security bugs, issues, and compromises are related to the default permission settings of executable stacks. To prevent many of these stack buffer overflow attacks, the executable stack will be disabled.

This requirement is further detailed in the *UNIX Checklist*, as this may or may not be applicable to all UNIX platforms and versions.

- *(GEN003540: CAT II) The SA will ensure the executable stack is disabled.*

3.20.3 Restrict NFS Port Listening

The NFS server may be configured to ensure the NFS server only responds to NFS client requests that originate from a privileged port. A privileged port is a port less than 1024. This configuration provides security checking via the NFS server to enforce integrity on the part of the NFS clients. This integrity checking prevents system users from writing RPC-based applications that attempt to defeat the NFS client access control checking.

This requirement is further detailed in the *UNIX Checklist*, as this may or may not be applicable to all UNIX platforms and versions.

- *(GEN003560: CAT II) The SA will ensure NFS client requests are restricted.*

3.20.4 Use More Random TCP Sequence Numbers

To decrease the risk of session hijacking by an attacker predicting TCP sequence numbers, more random TCP sequence numbers will be used.

This requirement is further detailed in the *UNIX Checklist*, as each UNIX platform may or may not provide this functionality or may or may not require this setting due to the default behavior of the particular UNIX platform.

- *(GEN003580: CAT II) The SA will ensure more random TCP sequence numbers are used.*

3.20.5 Network Security Settings

UNIX is a general-purpose operating system that provides for configuration of certain network parameters. These are low-level network parameters configured to provide enhanced security at the network level.

Ensuring the proper configuration of these network parameters can aid in the defense against a multitude of attacks such as Address Resolution Protocol (ARP) attacks, Internet Control Message Protocol (ICMP) denial of service, SYN flood attacks, etc.

Some basic security network configurations, for example;

- Disable source routed packets.
- Disable, for Ipv6, source routed packets.
- Disable source routed return packets.
- To increase the size of the unestablished connection queue.
- To increase the size of the established connection queue.
- Do not respond to ICMP timestamp requests.
- Do not respond to ICMP timestamp broadcast requests.
- Do not respond to echo request broadcasts.

This requirement is further detailed in the *UNIX Checklist*, as each UNIX platform provides similar security settings, with a different way to implement the security requirement. Each UNIX platform, as well as versions of a particular platform may implement the required network parameters in a different way.

- *(GEN003600: CAT II) The SA will ensure network parameters are securely set.*

3.21 File Systems

The /home, /export/home, and /var filesystems will have their own partitions. If not properly partitioned, in the event that one of these partitions becomes full, the risk of the root partition becoming 100% full will occur, which may cause system and application issues.

A corrupted root filesystem is one avenue an attacker with physical access to the system console can use to compromise the system. To reduce the likelihood of the event, enable the logging option. The SA may also want to enable the logging option to other ufs filesystems. This will help the system to reboot faster in the event of a crash. The cost in disk space is approximately 64MB per partition for the transaction log file.

- *(GEN003620: CAT III) The SA will configure separate filesystem partitions for /home, /export/home, and /var unless justified and documented with the IAO.*

- *(GEN003640: CAT II) (Previously – G690) The SA will ensure logging is implemented for the root filesystem.*

3.22 Syslog AUTH/AUTHPRIV Facility

The AUTH facility is the authorization system, such as login, su, etc. Security related data is sent via the AUTH facility, as such, the SA will ensure the authentication notice and informational data is configured to log to the syslog AUTH facility.

- *(GEN003660: CAT II) The SA will ensure the authentication notice and informational data is logged.*

4. NETWORK SERVICES

Most system services that can be accessed via the network are defined in the inetd.conf file. The inetd.conf file contains the configuration for the inetd program. The inetd program is a daemon that listens for network connection requests and services them by spawning another process. If the requested service is not defined in its configuration file, inetd will not listen on the service's port and refuse to provide the service. Sites can limit the types of network services provided by commenting out the lines that define the service in the inetd.conf file.

This section is not intended to endorse the use of the services described. This is merely to familiarize the reader with the purpose of the service.

Inetd logging/tracing will be enabled. Tracing tells inetd to trace all incoming connections by logging the client's Internet address, TCP port number, and the name of the service using syslog.

The inetd.conf file will be owned by root or bin and have permissions of 440, or more restrictive. The services file will be owned by root or bin and have permissions of 644, or more restrictive.

The SA will be responsible for disabling network services not necessary for operations. These services will be disabled in the inetd.conf file and will not be allowed to run from inside, or outside inetd, or in any other fashion. Additionally, network services that are started by other means (e.g., run control scripts) must be disabled if not necessary for operations. Network services required for operations and are not disabled are to be documented with the IAO.

The Center for Internet Security (CIS) provides several UNIX/Linux benchmarks that contain industry standard security guidance, which may additionally aid the site in their UNIX/Linux security efforts. These benchmarks may be found at http://www.cisecurity.com.

- *(GEN003680: CAT III) (Previously – A028) The SA will ensure all network services not required for operations are disabled. Any network services required for operations must be documented with the IAO.*

- *(GEN003700: CAT II) The SA will ensure inetd (xinetd for Linux) is disabled if all inetd/xinetd based services are disabled.*

- *(GEN003720: CAT II) (Previously – G107) The SA will ensure the owner of the inetd.conf (xinetd.conf file and the xinetd.d directory for Linux) file is root or bin. This is to include any directories defined in the includedir parameter.*

- *(GEN003740: CAT II) (Previously – G108) The SA will ensure the inetd.conf (xinetd.conf for Linux) file has permissions of 440, or more restrictive. The Linux xinetd.d directory will have permissions of 755, or more restrictive. This is to include any directories defined in the includedir parameter.*

- *(GEN003760: CAT II) (Previously – G109) The SA will ensure the owner of the services file is root or bin.*

- *(GEN003780: CAT II) (Previously – G110) The SA will ensure the services file has permissions of 644, or more restrictive.*

- *(GEN003800: CAT III) (Previously – G198) The SA will ensure inetd (xinetd for Linux) logging/tracing is enabled.*

4.1 Rlogin and rsh

The rlogin and rlogind programs provide remote terminal service similar to telnet and telnetd. The client program is rlogin, and the server program is rlogind. The important difference between rlogin and telnet is that if the rlogin connection is coming from a trusted host or a trusted user (i.e., .rhosts and/or hosts.equiv is properly configured), no password is required.

The rsh and remsh programs are similar to rlogin. The client program is rsh, and the server program is rshd. The rsh command requires no password if .rhosts and/or hosts.equiv is set up correctly.

Secure shell provides a functional and more secure alternative to the typical requirements for rlogin and rsh.

- *(GEN003820: CAT I) (Previously – V042) The SA will ensure remote login and remote shell are not enabled.*

4.2 Rexec

The remote command execution daemon, rexecd, allows users to use rsh or remsh to execute commands on other systems. A password may or may not be required depending on the use of .rhosts and/or hosts.equiv. Unlike login and telnet, rexecd returns different error messages for invalid accounts and passwords. If an invalid username is supplied the error message returned is login incorrect. If an invalid password is supplied, it returns password incorrect. This allows a potential unauthorized user to probe the system to find a valid user account name and then to work on the password.

- *(GEN003840: CAT III) (Previously – V102) The SA will ensure rexec is not enabled.*

4.3 Finger

The finger command makes personal information available to users on the network. Hackers use this feature to obtain and exploit information about users and to help obtain unauthorized access to accounts. The syntax is simple, finger user@host. The finger command output displays a user's information, such as login name, real name, terminal name, etc. The finger daemon will be disabled.

- *(GEN003860: CAT III) (Previously – V046) The SA will ensure finger is not enabled.*

4.4 Remote Host Printing

The /etc/hosts.lpd (Berkeley Software Distribution [BSD]), /etc/lp/Systems (System V), /etc/printer.conf, or an equivalent file enables remote host printing on most systems. It is possible for unauthorized remote systems to print to hosts (as a print server) if the printer configuration files are not configured properly. All print clients and print servers will be documented with the IAO.

- *(GEN003880: CAT II) (Previously – G120) The SA will ensure all print server and print client configurations are documented with the IAO.*

- *(GEN003900: CAT II) (Previously – G121) The SA will ensure the local UNIX host printer configuration file, if one exists, does not contain the '-' (minus) or '+' character.*

- *(GEN003920: CAT II) (Previously – G122) The SA will ensure the owner of printer configuration files is root, sys, bin, or lp.*

- *(GEN003940: CAT II) (Previously – G123) The SA will ensure printer configuration files have permissions of 664, or more restrictive.*

4.5 Traceroute

Traceroute is a utility used to determine the path a packet takes between two points. If a packet filter firewall is configured incorrectly, an attacker can use the traceroute command, through the firewall, to obtain knowledge of the network topology inside the firewall. The information may allow an attacker to determine trusted routers and other network information that may lead to system and network compromise. Traceroute is often used by network management software.

- *(GEN003960: CAT II) (Previously – G631) The SA will ensure the owner of the traceroute command is root.*

- *(GEN003980: CAT II) (Previously – G632) The SA will ensure the group owner of the traceroute command is root, sys, or bin.*

- *(GEN004000: CAT II) (Previously – G633) The SA will ensure the traceroute command has permissions of 700, or more restrictive.*

4.6 Client Browser Requirements

Navigator is a web browser client from Netscape Communications Corporation. Navigator has a number of security-related options that must be set. Netscape is no longer a vendor-supported product. Limited support is available for the Netscape Browser product through the DOD license agreement. Details about the DOD license agreement can be found at http://dii-sw.ncr.disa.mil/Del/netlic.html. More details concerning the support are available at http://netscape.intelligent.net/redisa/.

Commonly used open source web browsers include Mozilla, which is supported on Linux x86 and comes bundled with Solaris 9 and above. Firefox is also an open source web browser, which is supported on Linux i686.

The below requirements are for all browsers, these requirements ensure a more secure operating environment as well as protecting the UNIX system from authorized access and/or process (e.g., Active-X and Java Scripts).

- *(GEN004020: CAT III) (Previously – G634) The SA will ensure the browser is capable of 128-bit encryption.*

- *(GEN004040: CAT II) (Previously – G635) The SA will ensure the SmartUpdate, or software update feature, of a browser is not enabled.*

- *(GEN004060: CAT II) (Previously – G636) The SA will configure browsers to disallow secure content caching unless encrypted.*

- *(GEN004080: CAT III) (Previously – G637) The SA will configure browsers to disallow automatic downloading of active content.*

- *(GEN004100: CAT III) (Previously – G638) The SA will configure browsers to disallow active scripting.*

- *(GEN004120: CAT II) (Previously – G639) The SA will configure browsers to issue a warning when form data is redirected.*

- *(GEN004140: CAT III) (Previously – G640) The SA will disable JavaScript on browsers.*

- *(GEN004160: CAT II) (Previously – G641) The SA will configure browsers to issue a warning when viewing data on a remote site containing a security certificate that does not match its Internet address.*

- *(GEN004180: CAT II) (Previously – G642) The SA will configure browser home pages for the local site home page or a blank page.*

- *(GEN004200: CAT II) (Previously – G643) The SA will ensure browsers are configured for Secure Socket Layer (SSL) v2 and SSL v3.*

SSL v2 Enable	
X	RC4 encryption with 128-bit key
X	RC2 encryption with 128-bit key
X	Triple DES encryption with 168-bit key
	DES encryption with 56-bit key
X	RC4 encryption with 128-bit key
	RC2 encryption with 40-bit key

Table 4-1. SSL v2 Enable

SSL v3 Enable	
X	RC4 encryption with 128-bit key and an MD5 MAC
X	Triple DES encryption with 168-bit key and a SHA-1 MAC
	DES encryption with 56-bit key and a SHA-1 MAC
	RC4 encryption with 40-bit key and an MD5 MAC
	RC2 encryption with a 40-bit key and an MD5 MAC
	No encryption with an MD5 MAC

Table 4-2. SSL v3 Enable

- *(GEN004220: CAT I) (Previously – G644) The root account will not use a browser for any reason other than to control local applications.*

- *(GEN004240: CAT II) (Previously – W01) The SA will ensure the browser is a supported version.*

- *(GEN004260: CAT III) (Previously – W03) The SA will configure browsers to issue a warning when accepting/storing cookies.*

- *(GEN004280: CAT III) (Previously – W09) The SA will configure browsers to display a warning when submitting non-encrypted form data.*

- *(GEN004300: CAT III) (Previously – W11) The SA will configure browsers to display a warning when viewing documents with both secure and non-secure content.*

- *(GEN004320: CAT III) (Previously – W13) The SA will configure browsers to issue a warning when leaving an encrypted or secure site.*

- *(GEN004340: CAT III) (Previously – W17) The SA will ensure Java is disabled on browsers.*

4.7 Sendmail or Equivalent

The Simple Mail Transfer Protocol (SMTP) is the standard for transferring e-mail between hosts. The sendmail program or equivalent (e.g., mmdf, rmail, smail) implements both the client and server sides of the SMTP protocol. Sendmail can deliver e-mail to local and remote users, mailing lists, and programs. E-mail addresses are located in an aliases file in which users, working through their electronic mail administrator, may establish e-mail addresses and mailing lists.

The sendmail.cf file contains the configuration parameters for the sendmail program. Two parameters, expand (expn) and verify (vrfy), are used somewhat like the finger command to provide e-mail information about users. The expn command can be used to expand a user's address to show the complete path to where the account is maintained. The vrfy command can be used to verify that a user has an account on the specific host. These commands are available, on an interactive basis, after connecting to a system on port 25. Because they deliver information that could be used to hack accounts, they will be disabled. Sendmail runs with root privileges and has had many security vulnerabilities associated with it, for those reasons, ensuring a secure configuration is of utmost importance. Sendmail has become a favorite object of hacker attacks. The SA will configure sendmail, or equivalent, to not display version information. This can be accomplished by changing the greeting line in sendmail.cf from:

O SmtpGreetingMessage=$j Sendmail $v/$Z; $b

to

O SmtpGreetingMessage= Mail Server Ready ; $b

If the system version of sendmail, or equivalent, supports the following features, they should also be entered into the sendmail.cf file:

needmailhelo
: Insists on the HELO/EHLO before accepting a MAIL command.

restrictmailq
: Restrict who can see the mail queue.

restrictqrun
: Restrict who can restart sending email in the mail queue.

- *(GEN004360: CAT II) (Previously – G127) The SA will ensure the aliases file is owned by root.*

- *(GEN004380: CAT II) (Previously – G128) The SA will ensure the aliases file has permissions of 644, or more restrictive.*

- *(GEN004400: CAT I) (Previously – G131) The SA will ensure programs executed through an aliases file entry are owned by root and reside in a directory that is owned by root.*

- *(GEN004420: CAT II) (Previously – G132) The SA will ensure programs executed through an aliases file entry have permissions of 755, or more restrictive.*

- *(GEN004440: CAT IV) (Previously – G133) The SA will ensure the sendmail logging level (the detail level of e-mail tracing and debugging information) in the sendmail.cf file is set to a value no lower than nine (9).*

- *(GEN004460: CAT II) (Previously – G134) The SA will ensure critical-level sendmail messages are logged to a system log file.*

- *(GEN004480: CAT II) (Previously – G135) The SA will ensure the owner of the critical sendmail log file is root.*

- *(GEN004500: CAT II) (Previously – G136) The SA will ensure the critical sendmail log file has permissions of 644, or more restrictive.*

- *(GEN004520: CAT III) (Previously – G137) The SA will ensure critical-level sendmail messages generate e-mail to the postmaster.*

- *(GEN004540: CAT II) The SA will ensure the help sendmail command is disabled.*

- *(GEN004560: CAT II) (Previously – G646) To help mask the e-mail version, the SA will use the following in place of the original sendmail greeting message:*

  O SmtpGreetingMessage= Mail Server Ready ; $b

- *(GEN004580: CAT I) (Previously – G647) The SA will ensure .forward files are not used.*

- *(GEN004600: CAT I) (Previously – V124) The SA will ensure all sendmail security patches are incorporated or the latest vendor version of sendmail is loaded.*

- *(GEN004620: CAT I) (Previously – V125) The SA will ensure the debug sendmail command is disabled.*

- *(GEN004640: CAT I) (Previously – V126) The SA will ensure the decode entry is disabled (deleted or commented out) from the alias file.*

- *(GEN004660: CAT III) (Previously – V128) The SA will ensure the expn sendmail command is disabled.*

- *(GEN004680: CAT II) (Previously – V130) The SA will ensure the vrfy sendmail command is disabled.*

- *(GEN004700: CAT I) (Previously – V131) The SA will ensure the wiz/wizard sendmail command is disabled.*

4.8 File Transfer Protocol (FTP) and Telnet

Under certain circumstances the use of FTP and telnet may be the only viable solution (primarily due to legacy applications); however, the use of FTP and telnet is not a recommended best practice. The use of clear text transmission will be phased out as quickly as possible and the use of encrypted sessions will be implemented in the architecture. The use of an encrypted session is required if supported by the device.

If encryption protocols such as SSL or SSH transmit traffic directly to a host, then a host based intrusion detection (HID) system must be employed on the device if supported. All network traffic must be visible to an Intrusion Detection System (IDS). VPN traffic will not bypass the security architecture and must terminate in order for the traffic to be processed by a network intrusion detection (NID) system.

FTP and telnet are permissible inside an enclave, behind the premise router and protected by a firewall and router access control lists (ACLs); however, the requirement must be justified and documented with the IAO. If either of these services is not required, the service will be deleted, disabled or turned off. If the service is disabled, the site will continue to ensure that all appropriate patches are applied. When used, all associated traffic will be restricted by IP source and destination address if technically feasible. Under no circumstances will FTP or telnet be used with a uid and password that has administrative or root privileges.

- *(GEN004720: CAT II) The SA will ensure FTP and telnet within an enclave is behind the premise router and protected by a firewall and router access control lists.*

- *(GEN004740: CAT II) The SA will ensure FTP and telnet within an enclave is justified and documented with the IAO.*

- *(GEN004760: CAT I) The SA will ensure FTP and telnet from outside the enclave into the enclave is not permitted, unless encrypted and the following conditions apply:*

    - *FTP and telnet are acceptable from outside the enclave through a remote access Virtual Private Network (VPN). The connection will terminate outside the firewall as to not bypass the security architecture. The connection will be proxied at the firewall or via an FTP/telnet proxy.*

    - *FTP and telnet are acceptable via a site-to-site VPN between trusted enclaves; however, the risk will be accepted as part of the accreditation package, System Security Authorization Agreement (SSAA) or an Acceptance of Risk letter (AORL) must already be in place for the tunnel. FTP and telnet are acceptable within distributed enclaves, if required, as long as the traffic is physically or logically segregated from normal traffic using a method supported by the network technology to create a virtual connection (e.g., VLAN, VPN, LANE, MPLS, IPSec tunnels).*

Under no circumstances will FTP or telnet be used with a userid (UID)/password that has administrative or root privileges.

- *(GEN004780: CAT I) The SA will ensure userids/passwords used for FTP and telnet do not have administrative or root privileges.*

System-to-System FTP accounts (no user intervention) may be treated as an Application-type account and the password will be changed at least once a year or when an administrator with knowledge of the password leaves. When FTP is used for system-to-system FTP, an AORL is required. A system-to-system transfer via a VPN would not require an AORL.

The AORL will be used to document the use of unencrypted FTP or telnet or the risk will be accepted as part of the accreditation package, SSAA. The customer (data owner), the local DAA (when the site is not the data owner) will sign an acknowledgement of risk letter. The IAO will maintain the AORL. This AORL will identify the UIDs, passwords, and the data that is being transmitted unencrypted inside the site's enclave. The AORL will be dated and will be reviewed and renewed at least every 18 months.

- *(GEN004800: CAT II) The IAO will ensure an AORL is used to document the use of unencrypted FTP and telnet or the risk will be accepted as part of the accreditation package.*

An anonymous FTP connection within the enclave will not be allowed. Individual uids will be created for each user. This requirement should not be confused with an anonymous FTP server. An anonymous FTP server is a special purpose server, which is used to distribute information (files, educational material, etc.). An anonymous FTP server utilizes an unauthenticated default username such as anonymous or FTP and a commonplace password such as guest. An anonymous FTP server is permitted as long as (1) the server is compliant with the applicable *Operating System STIG*; is segregated into the network Demilitarized Zone (DMZ); is on its own subnet on a dedicated system; and as long as it only houses public information (information approved by the Public Affairs Officer, or equivalent).

- *(GEN004820: CAT II) (Previously – G147) The SA will ensure anonymous FTP is documented with the IAO.*

- *(GEN004840: CAT II) (Previously –V052) The SA will ensure anonymous FTP is segregated into the network DMZ.*

- *(GEN004860: CAT II) The SA and IAO will ensure an anonymous FTP server houses only public information.*

4.8.1 FTP Configuration

When FTP is used to contact a remote host, the remote host requires the use of a valid account and password. FTP logons are recorded in the /var/adm/wtmp file. The ftpusers file allows identification of who may not use FTP to transfer files. This file is required for the vendor-supplied version and for encrypted versions of ftp and/or ftpd. At a minimum, it will contain all the default system users and root, have access permissions of 640, or more restrictive, and be owned by root with a group owner of root or bin. The FTP daemon will be owned by bin or root and have access permissions no more permissive than 755. Ftpd will be configured in the inetd.conf file and, on systems that support the logging and/or verbose options; ftpd will be configured with the –l and/or –v options to increase the level of logging.

- *(GEN004880: CAT II) (Previously – G140) The SA will ensure the ftpusers file exists.*

- *(GEN004900: CAT II) (Previously – G141) The SA will ensure the ftpusers file contains the usernames of users not allowed to use FTP, and contains, at a minimum, the system pseudo-users usernames and root.*

- *(GEN004920: CAT II) (Previously – G142) The SA will ensure the owner of the ftpusers file is root.*

- *(GEN004940: CAT II) (Previously – G143) The SA will ensure the ftpusers file has permissions of 640, or more restrictive.*

- *(GEN004960: CAT II) (Previously – G144) The SA will ensure the owner of the FTP daemon is root or bin.*

- *(GEN004980: CAT III) (Previously – G145) The SA will ensure systems using ftpd are configured with the logging (-l) and/or verbose (-v) options.*

- *(GEN005000: CAT I) (Previously – G649) The SA will implement the anonymous FTP account with a non-functional shell such as /bin/false.*

- *(GEN005020: CAT I) (Previously – G650) The SA will implement anonymous FTP using all system security recommendations.*

- *(GEN005040: CAT II) The SA will ensure the FTP user's umask is 077.*

4.9 File Service Protocol (FSP)

File Service Protol (FSP) is an alternative to FTP, although FSP transfers files using User Datagram Protocol (UDP) rather than TCP. The majority of FSP activity is illegitimate. Any server running FSP should be thoroughly investigated for possible software piracy or intrusion.

- *(GEN005060: CAT I) The SA will ensure FSP is not enabled.*

4.10 Trivial File Transfer Protocol (TFTP)

TFTP is a file transfer program that requires no I&A. Normally, commenting this servie out of the inetd.conf file will disable it. TFTP, if required by a site, will be justified and documented with the IAO. The TFTP daemon will be run in secure mode when that option is available. For instance, Solaris systems allow the -s option as an argument when invoking the TFTP daemon. The SA will also ensure specific pathnames are defined to limit the paths available to the TFTP daemon for reading and writing. Some TFTP implementations incorrectly assume that tftpd should have the suid bit set to overcome directory access permissions. If the SA configures TFTP correctly, however, this problem can be easily overcome. Therefore, setting the suid or sgid bits on the TFTP daemon will not be allowed.

- *(GEN005080: CAT I) (Previously – G149) The SA will ensure the secure mode option is used if TFTP is implemented on a system that supports it.*

- *(GEN005100: CAT I) (Previously – G150) The SA will ensure tftpd does not have the suid or sgid bit set.*

- *(GEN005120: CAT II) (Previously – G151) The SA will ensure implementations of TFTP will be configured to vendor specifications and will include the following:*

  - *A TFTP user will be created.*
  - *The default shell will be set /bin/false, or equivalent.*
  - *A home directory owned by the TFTP user will be created.*

- *(GEN005140: CAT I) (Previously – V141) The SA will ensure all TFTP implementations are justified and documented with the IAO.*

4.11 X Window System

Used mainly in UNIX, the X Window System is a windowing system that allows for the display of graphics via the network. This network-based display provides users with a GUI based console without having to be physically located at the UNIX server. The xhost and xauth commands are two basic X Window System commands used for security. They each authorize X Windows users to the server. The xhost command authorizes hosts by name. The xauth command authorizes X Window System connections using an encoded string to identify host and client. The xhost + command, without arguments, authorizes all hosts to access the X Window System. The xhost - command, without arguments, removes access rights from all hosts that are not on the access list. The command xhost +hostX would add a host called hostX to the access list. The command xhost -hostX would remove a host called hostX from the access list. The xhost command creates a file called X0.hosts to list authorized hosts in (the access list).

The xauth command (in conjunction with some other X Window System commands) writes a file called .Xauthority in the home directory of each user who invokes X Windows. The .Xauthority file helps ensure the X Terminal user is the only one who can run programs on their X Terminal. The xauth program can also be invoked to edit the .Xauthority file to expand or restrict access privileges to the X Client. The .Xauthority file contains security information passed between the X Client and the X Server to authorize access to the X Server by the X Client. The information allows the X Client to open windows from the X Server. The file will be protected, therefore, with an access permission of 600, or more restrictive. The xhost command overrides the .Xauthority file and should not be used unless it is followed by the xhost - command when finished. The local X Server stores files in /tmp/.X11-unix. Ensure no other process can delete the X0 file, and set the sticky bit on the /tmp/.X11-unix (and all .X11 subdirectories in /tmp).

- *(GEN005160: CAT II) (Previously – G152) The SA will ensure each X Window System host will be configured to write .Xauthority files (or equivalent) into each X Windows user's home directory.*

- *(GEN005180: CAT II) The SA will ensure .Xauthority files have permissions of 600, or more restrictive.*

- *(GEN005200: CAT I) (Previously – V155) The xhost + command will not be used to globally authorize X Clients.*

- *(GEN005220: CAT II) X Clients that are authorized to connect to X Server display will be listed in the X*.hosts (or equivalent) file(s) if the .Xauthority utility is not used.*

- *(GEN005240: CAT II) The SA will ensure remote X-terminal access host is limited to authorized X clients.*

- *(GEN005260: CAT II) The SA will ensure remote X Window System connections are disabled if remote X Window System access is not required.*

4.12 UNIX to UNIX Copy Program (UUCP)

The UUCP utility is designed to assist in transferring files, executing remote commands, and sending electronic mail between UNIX systems over phone lines and direct connections between systems. The uucp utility is a primitive and arcane system with many security issues. There are alternate data transfer utilities/products that can be configured to more securely transfer data by providing for authentication as well as encryption. The UUCP utility will be disabled.

- *(GEN005280: CAT II) (Previously – V145) The SA will ensure UUCP is not enabled.*

4.13 Simple Network Management Protocol (SNMP)

The *Network Infrastructure STIG* should be referred to for specific and authoritative SNMP information. This STIG provides secure set-up of some SNMP configuration files on UNIX systems. Most vendors ship systems with SNMP configured to start at boot-up and to honor SNMP requests from any host or program that knows the default passwords. The default passwords are the same for all a vendor's systems, so it represents a significant security risk if allowed to run indiscriminately. Whether SNMP is required or not, ensure the default SNMP access communities are changed to unique values.

SNMP servers will be configured to only run SNMP software, network management software and such data base management systems as the network management system requires. SNMP will be disabled if not required.

Improperly configured SNMP is a great tool for malicious users and intruders to obtain system and network information and for crashing systems and networks. An intruder or malicious user can learn system and network architectures, change system and network configurations, and shut down systems and networks by using carefully constructed SNMP queries and messages. Ensure SNMP configuration files (i.e., Management Information Bases [MIBs]) are owned by root and have a group owner of sys or the application. Also, ensure the snmpd.conf file is owned by root with a group owner of sys.

Ensure the community string in the snmpd.conf file is changed from the default (e.g., public, private, etc.,) to some other value determined by following the password controls defined for application passwords. By changing the community strings to an acceptable password, the amount of information that a potential attacker can learn using SNMP is limited. Ensure the MIB is not world writable or readable and is owned by root. When a SNMP monitoring program (management station) queries a SNMP client for information, the monitoring program must provide the correct community string or the client does not return any information.

- *(GEN005300: CAT I) (Previously – G224) The SA will ensure SNMP communities are changed from the default and will not be guessable.*

- *(GEN005320: CAT II) (Previously – G225) The SA will ensure the snmpd.conf file has permissions of 700, or more restrictive.*

- *(GEN005340: CAT II) (Previously – G226) The SA and network administrator will ensure MIB files have permissions of 640, or more restrictive.*

- *(GEN005360: CAT II) The SA will ensure the owner of the snmpd.conf file is root with a group owner of sys and the owner of MIB files is root with a group owner of sys or the application.*

- *(GEN005380: CAT II) (Previously – G655) The IAO will ensure SNMP servers only run SNMP server software, network management software, and such data base management systems as the network management system requires.*

4.14 System Logging Daemon

The system-logging daemon, syslogd, reads and forwards system messages to the log files and/or users. Malicious users can flood the logging daemon with unauthorized messages unless syslogd is configured to accept messages only from designated hosts. System logging normally takes place over port 514. Services to this port should be restricted to local hosts at the firewall or premise router.

If syslogd is required to log system messages to the local machine, ensure the system name in /etc/hosts contains the alias loghost. If the /etc/hosts file shows the loghost as some other system, then system log messages will be sent to that host instead of being logged on the local host. The advantage of a centralized log server is that it allows an SA or IDS a central location for the monitoring of possible malicious activity in a UNIX environment. The IAO will maintain documentation of the machines using a non-local loghost. Local hosts will not be permitted to act as loghosts for systems outside the local network. Some messages need to be reviewed immediately by responsible parties such as root. Use the following example (or one similar) in the /etc/syslog.conf file to ensure alerts are written to the terminal screen of root or operator if they are logged on:

```
*.alert root,operator
```

- *(GEN005400: CAT II) (Previously – G656) The SA will ensure the owner of the /etc/syslog.conf file is root with permissions of 640, or more restrictive.*

- *(GEN005420: CAT II) (Previously – G657) The SA will ensure the group owner of the /etc/syslog.conf file is root, sys, or bin.*

- *(GEN005440: CAT II) The SA will ensure local hosts are not configured to act as loghosts for systems outside the local network.*

- *(GEN005460: CAT II) (Previously – G658) The SA will ensure machines using a non-local loghost will be documented with the IAO.*

- *(GEN005480: CAT III) The SA will ensure syslogd is not configured to accept remote messages, unless it is an IAO documented loghost.*

4.15 Secure Shell (SSH) and Equivalents

SSH is a communications software that uses encrypted communications to log on to and perform tasks on other computers. It can also be used to execute remote commands and to transfer files between systems using the sftp sub-process. SSH communicates using encryption to protect data and passwords. It provides strong authentication and secure communications over insecure channels. SSH also provides rlogin, rsh, rcp, and rdist services, but since the communications are encrypted, it is done in a much more secure manner than traditional services. The use of SSH Tectia, OpenSSH, F-Secure, Reflection for Secure IT, or similar programs are some methods for accomplishing this.

Hackers, curious administrators, employers, and criminals, both industrial and government can eavesdrop on network communications using sniffers to collect private and corporate information such as account names, passwords, and sensitive data. Communication packets also include information about destination and origination network addresses. A sniffer is a program that puts a network interface into promiscuous mode. The interface, when in promiscuous mode, listens to all communication packets passing through the network instead of just packets that contain its destination address.

It is also possible to hijack unencrypted network connections. This technique can be used to enter in the middle of existing connections to modify data in both directions and to insert new commands in sessions authenticated by one-time passwords.

SSH connects to the Secure Shell daemon (sshd) on the server machine. It verifies the server machine really is the intended server machine. SSH then exchanges encryption keys (protected from sniffers), and performs authentication, RSA (Rivest, Shamir, and Adleman) authentication or conventional password based authentication. The server normally allocates a pseudo-terminal and starts an interactive shell or user program. SSH will also work with X Windows and provides encrypted replacements for rlogin, rsh, rcp, rdist, and ftp, as well as for telnet.

Several versions of Secure Shell are in use. FSO recommends the latest vendor version of the particular version of Secure Shell, or equivalent, used by the site. As of this writing, the current version of OpenSSH is SSH-2.0-OpenSSH_4.2. For SSH Tectia client/server solution version (previously SSH Secure Shell for Workstations or previously SSH Secure Shell for Servers, respectively) is 4.2. For Reflection for Secure IT (formerly F-Secure SSH) is 6.0.

There are two protocol versions (1 and 2) for all known versions of SSH. Due to the security concerns and integer overflow vulnerabilities with protocol version 1, protocol version 1 will not be used.

Some versions of OpenSSH have a problem working correctly with the Basic Security Module (BSM) on Solaris because of a lack of interaction with the pluggable authentication module (pam). Compiling it with the following options can solve this: **‘**--with-pam’ or ‘--with-tcp-wrappers’, in order to get it to work with TCP_WRAPPERS.

SSH offers the ability to log on directly as root even when the system configuration files disables that feature for other access methods. Ensure this feature is disabled. SSH also allows the use of .rhosts or .shosts. These features are not to be used unless the feature is operationally necessary and is documented with the IAO. Refer to *Section 3.9, Trusted System/System Access Control Files*, for guidance on the use of .rhosts. It should be disabled in the sshd_conf file. Refer to *Section 3.3.1, Encrypted Root Access*, for security requirements for root when using SSH.

SSH can be used with X-windows by enabling port forwarding. This is enabled by default in the configuration file that comes with the source package.

- *(GEN005500: CAT I) (Previously – G701) The IAO and SA will ensure SSH Protocol version 1 is not used, nor will Protocol version 1 compatibility mode be used.*

- *(GEN005520: CAT I) The SA and IAO will ensure SSH, or a functionally similar utility, is used to encrypt all communications. The sole exceptions are access via the system console device or anonymous FTP and public web pages on systems in the demilitarized zone (DMZ).*

- *(GEN005540: CAT II) The SA will ensure SSH is configured to work with TCP_WRAPPERS except in cases where the encryption utility can be configured for IP filtering and still display banners before granting access.*

4.16 UNIX Routing Vulnerabilities

The *Network Infrastructure STIG* should be referred to for specific and authoritative reference material for routing. This STIG provides secure set-up of some routing configuration files on UNIX systems.

Routing is the process of reading the destination IP address in the header of a TCP or UDP packet and selecting the best route to send the packet to its destination. A router from direct data entry gains routes, dynamically, or from other routers using Routing Information Protocol (RIP), RIP-2, Open Shortest Path First (OSPF), and other protocols. UNIX systems can be configured as routers.

Some vendors (e.g., Sun) ship systems that will automatically configure routing unless the administrator first configures a default gateway. A default gateway is a router the UNIX host will use for routing packets to their destination. Ensure configuring a default gateway disables route discovery. If the machine is not used for routing, ensure IP forwarding is disabled. The file /etc/notrouter (a Solaris only configuration file used to disable IP forwarding prior to Solaris 9) will be owned by root with a group owner of sys and permissions of 400.

Some vendors ship systems with the RIP software. RIP is older and more easily spoofed (allowing intruders to change the routing table information) than newer protocols such as RIP-2 or OSPF.

One way to determine if a system is currently running a routing protocol is to execute the netstat –r command. The output should be similar to the following:

ROUTING TABLE					
Destination	***Gateway***	***Flags***	***Reference***	***Use***	***Interface***
192.136.137.192	Nonstigunix	U	3	6	hme0
224.0.0.0	Nonstigunix	U	3	0	hme0
default	192.136.137.193	UG	0	2	
localhost	Localhost	UH	0	8	lo0

Table 4-3. Routing Table

The reference to default (the third item in the Destination column, meaning default gateway) means the machine obtains its routing information from the default gateway and does not need to run the route daemon (e.g., routed, in.routed, or gated). If there is no default gateway defined, then the command will show many more routes (addresses) or a routing table, and the following commands will show that routing is enabled:

```
ps –ef | grep rout        (For Solaris)
ps –ef | grep gated       (For HP)
```

If this is the case, the IAO and the IAM will maintain documentation indicating the machine is being used as a router and indicate which systems it exchanges routing information with directly.

- *(GEN005560: CAT II) (Previously – G661) The SA will ensure systems not running routing have a default gateway defined.*

- *(GEN005580: CAT II) (Previously – G662) The IAO will ensure routing is implemented only on dedicated hardware. Systems used as routers will be documented with the IAO.*

- *(GEN005600: CAT II) The SA will ensure IP forwarding is disabled if the system is not dedicated as a router.*

4.17 Lotus Domino Web Application

Lotus Domino is a Web application and messaging server. Lotus Domino Server version 5.0.5 could allow a remote attacker to traverse directories on the Web server. A remote attacker can request a URL containing .nsf, .box, or .ns4 with dot dot sequences (/../) to read sensitive files on the Web server. In order to exploit this vulnerability, the server must be installed under the root directory.

- *(GEN005620: CAT III) (Previously – V5899) The SA will ensure the Lotus Domino Web Application is not vulnerable to the .nsf, .box, and .ns4 directory traversal exploit.*

4.18 Squid Web Proxy

Squid is a freely available Web Proxy software package included with some Linux distributions.

4.18.1 Authentication Header

Squid Web Proxy Cache versions 2.x up to and including 2.4.STABLE6 could disclose sensitive information. Under certain conditions, the Squid proxy authentication header could be forwarded to external web sites, which could allow a remote attacker to obtain the proxy username and password.

- *(GEN005640: CAT III) (Previously – V9478) The SA will ensure the Squid Proxy Cache server is not vulnerable to the authentication header forwarding exploit.*

4.18.2 MSNT Auth Helper

Squid Web Proxy Cache versions 2.x up to and including 2.4.STABLE6 are vulnerable to a buffer overflow in the MSNT auth helper component. Under certain configurations, a remote attacker could overflow a buffer and execute arbitrary code on the system or cause the proxy server to crash.

- *(GEN005660: CAT II) (Previously – V9482) The SA will ensure the Squid Proxy Cache server is not vulnerable to the MSNT auth helper buffer overflow exploit.*

4.18.3 Version

Squid Web Proxy Cache is running on the system. A rogue proxy server could intercept, redirect, or reject valid web requests. The version must be 2.7STABLE7 or later.

- *(GEN005680: CAT III) (Previously – V9730) The SA will ensure the Squid Proxy Cache server is not a vulnerable version.*

4.19 iPlanet Web Server

iPlanet Web Server (now known as The Sun Java System Web Server) versions 4.1 and 6.0 could allow a remote attacker to view any file on the server, caused by a vulnerability in iPlanets search engine. A remote attacker could send a search command containing the path to a known file specified using dot dot sequences (/../) as a value for the NS-query-pat parameter, which would cause the search engine to return the contents of the requested file.

- *(GEN005700: CAT III) (Previously – V9517) The SA will ensure the iPlanet Web Server is not vulnerable to the search engine NS-query-pat file viewing vulnerability.*

4.20 Network Filesytem (NFS)

NFS allows clients to access filesystems located on remote servers as though the filesystems were resident on the clients. This allows a filesystem to be stored in one common location and securely exported to many clients at once instead of replicating it across many systems. NFS has the capability to enforce security policies for exported/shared filesystems. A security concern is presented with NFS because filesystems are physically located on remote servers and users can access and change the data without logging on to the server. This would appear to defeat the I&A requirements. This is also true for remote databases.

Several steps are required to secure NFS against most forms of unauthorized access. The file (either /etc/exports or /etc/dfs/dfstab) contains a list of directories that are being exported and any restrictions, attributes, or options associated with them. This export file will be protected against unauthorized modification. Exported/shared system files will be owned by root and will not be world or group writable. Filesystems exported as other than read only will be documented with the IAO. These steps prevent sensitive system files from being modified or replaced.

Several options must be enabled in the NFS server file export configuration file. The NFS server must be configured to disallow access from client requests that do not include a userid. Access to exported filesystems must be restricted to local hosts via the export configuration file. The default userid mapping of root to exported filesystems will not be modified, and will not be used unless authorized and documented with the IAO. Solaris additionally provides a secure option that is used if Secure RPC (true if NIS+ is enabled on the system) is enabled on the system, NIS or NIS+ also is required for proper functionality. NIS or NIS+ is used to house and distribute public and encrypted secret. This allows NFS to use DES (Data Encryption Standard) for encrypting the authentication session between the server and client. Solaris systems must not set the sec option to none, the current default for the sec option allows for system authentication. In turn, the default is not be modified.

NFS clients will use the nosuid and nosgid options to mount filesystems from a server to prevent setuid and setguid executables of dubious origin from gaining root access on the client system.

Port monitoring causes NFS requests that do not come from privileged ports to be rejected. Port monitoring will be enabled.

Because NFS presents such a target of opportunity for attackers, the NFS daemons will not be allowed to run unless NFS is actually being used.

- *(GEN005720: CAT II) (Previously – G177) The SA will ensure, if NFS is running, NFS port monitoring will be enabled.*

- *(GEN005740: CAT II) (Previously – G178) The SA will ensure the owner of the export configuration file is root.*

- *(GEN005760: CAT III) (Previously – G179) The SA will ensure the export configuration file has permissions of 644, or more restrictive.*

- *(GEN005780: CAT II) (Previously – G180) The SA will ensure filesystems are exported as read only unless an operational requirement warrants otherwise and has been justified and documented with the IAO.*

- *(GEN005800: CAT II) (Previously – G181) The SA will ensure the owner of exported system files and directories is root.*

- *(GEN005820: CAT II) (Previously – G182) The SA will ensure the NFS server is configured to deny client access requests that do not include a userid.*

- *(GEN005840: CAT II) (Previously – G183) The SA will ensure access to exported filesystems is restricted to local hosts via the export configuration file.*

- *(GEN005860: CAT II) (Previously – G184) The SA will ensure the sec option is not set to none (or equivalent); additionally the default authentication is not to be set to none.*

- *(GEN005880: CAT II) (Previously – G185) The SA will ensure root access options are not used unless justified and documented with the IAO.*

- *(GEN005900: CAT II) (Previously – G186) The SA will ensure NFS clients will mount filesystems with the nosuid and nosgid options set.*

4.21 Domain Name System (DNS)

The *DNS STIG* contains the latest reference material for DNS. Please see the *DNS STIG* for DNS guidance and requirements. This STIG entry is meant only as a general DNS discussion.

DNS is an Internet service that translates domain names into IP addresses as well as translating IP addresses to domain names. Domain names, such as machine.disa.mil, are alphabetic because they are easier to remember. The Internet, however, is based on IP addresses. Every time a domain name is used, therefore, a DNS service must translate the name into the corresponding IP address. For example, the domain name machine.disa.mil might translate to IP address 198.105.232.4. The Berkeley Internet Name Domain (BIND) is one of the implementations of DNS that was designed for Berkeley UNIX operating systems such as BSD, but has been adapted to most other vendor systems.

The BIND daemons, named and in.named, are the same DNS software (without the configuration files). Systems other than the common HP and Sun systems may refer to the software by a different name. The named (or in.named) daemon is the software that implements BIND. The name/address resolver library included in the BIND distribution provides the standard application program interfaces (APIs) for translation between domain names and IP addresses. The resolver library is used for linking with applications requiring DNS. BIND has been plagued with security problems in all known versions.

Configuration files associated with BIND are as follows:

/etc/resolv.conf	Contains the domain and the server to use for address lookups
named.conf	Configuration boot file (contains locations of other files/tables)

The ISC, www.isc.org, distributes the source for BIND. Different vendors distribute compiled BIND packages, www.sunfreeware.com, for instance.

4.22 Instant Messaging (IM)

Instant Messaging or IM clients provide a way for a user to send a message to one or more other users in real time. Additional capabilities may include file transfer and support for distributed game playing. Communication between clients and associated directory services are managed through messaging servers. Commercial IM clients include AOL Instant Messenger (AIM), MSN Messenger, and Yahoo! Messenger.

IM clients present a security issue when the clients route messages through public servers. The obvious implication is that potentially sensitive information could be intercepted or altered in the course of transmission. This same issue is associated with the use of public e-mail servers. In order to reduce the potential for disclosure of sensitive Government information and to ensure the validity of official government information, IM clients that connect to public instant messaging services will not be installed. Clients used to access an internal or DOD controlled IM applications are permitted.

- *(GEN006000: CAT II) The SA will ensure that public instant messaging clients are not installed.*

- *(GEN006020: CAT II) The SA will ensure instant messaging clients that are used for internal or DOD controlled IM applications are at the current patch level.*

4.23 Peer-to-Peer File-Sharing Utilities and Clients

File sharing utilities and clients can provide the ability to share files with other users (Peer-to-Peer File Sharing). This type of utility is a security risk due to the potential risk of loss of sensitive data and the broadcast of the existence of a computer to others. There are also many legal issues associated with these types of utilities including copyright infringement and intellectual property issues.

ASD Memo, Use of Peer-to-Peer (P2P) File-Sharing Applications across the DOD:

"P2P file-sharing applications are authorized for use on DOD networks with approval by the appropriate Designated Approval Authority (DAA). Documented requirements, security architecture, configuration management process, and a training program for users are all requirements within the approval process. The unauthorized use of application or services, including P2P applications, is prohibited, and such applications or services must be eliminated."

P2P applications include, but not limited to the following:

- Napster
- Kazaa
- ARES
- Limewire
- IRC Chat Relay
- BitTorrent

- *(GEN006040: CAT II) The SA will ensure that peer-to-peer file-sharing applications are not installed unless authorized and documented with the DAA.*

4.24 Samba

Samba is a utility allowing file and printer sharing between UNIX and Microsoft Windows operating systems. UNIX systems use TCP/IP whereas Windows uses Server Message Block (SMB) for sharing files. Windows shares files using the Common Internet Filesystem (CIFS). CIFS uses SMB and the Network Basic Input Output System (NetBIOS) interface to share network resources. Samba was created to provide an interface to give the look, feel, and functionality of Windows and enable UNIX systems to become part of a Windows domain, allowing file, directory, and printer sharing. If Windows sharing is not a requirement then the Samba utility should be removed or not installed. If the Samba utility is required, follow the security guidance provided below.

Samba is a suite of programs that use /etc/samba/smb.conf as the configuration file. The smbd daemon provides file and printer sharing, while nmbd provides NetBIOS name resolution and service browser support. Several utilities allow NFS-like access, mounting and unmounting of shared directories, and checking the status of the SMB server. Samba includes an administration tool called the Samba Web Administration Tool (SWAT). It provides a GUI interface to configure the /etc/samba/smb.conf file through a web browser. When sharing network files and printers, access can be granted in two different ways, share mode and user mode. In share mode, one password is set for each shared resource and any user that knows the password can access it. In user mode, each user has an individual password that is stored in the smbpasswd file (which defaults to the /etc directory, but may be put anywhere depending on the smb.conf configuration).

Samba provides services, but there is some risk. SWAT runs as a service on port 901 by default, and requires a root logon to be accessed. If SWAT is used to administer Samba, it will be redirected through SSH, or a similar utility, to encrypt the root logon and Samba configuration data. The /etc/samba/smb.conf file will be owned by root, have a group owner of root, with permissions of 644, or more restrictive. The smbpasswd utility will be owned by root, with a group owner of root, with permissions of 644, or more restrictive. The /etc/samba/smb.conf file will be configured to allow access to systems on the local network, require the user access mode, password encryption, and have shares defined with guest set to No.

Samba is an add-on package available for most UNIX platforms, although, Linux provides this package as part of the default operating system platform.

- *(GEN006060: CAT II) (Previously – L170) The SA will ensure SMB is disabled, removed, or not installed if file sharing with Windows is not operationally required and implemented.*

- *(GEN006080: CAT II) (Previously – L048) The SA will only use the Samba Web Administration Tool with SSH port forwarding.*

- *(GEN006100: CAT II) (Previously – L050) The SA will ensure the owner of the/etc/samba/smb.conf file is root.*

- *(GEN006120: CAT II) (Previously – L051) The SA will ensure the group owner of the /etc/samba/smb.conf file is root.*

- *(GEN006140: CAT II) (Previously – L052) The SA will ensure the /etc/samba/smb.conf file has permissions of 644, or more restrictive.*
- *(GEN006160: CAT II) (Previously – L054) The SA will ensure the owner of smbpasswd is root.*

- *(GEN006180: CAT II) (Previously – L055) The SA will ensure group owner of smbpasswd is root.*

- *(GEN006200: CAT II) (Previously – L057) The SA will configure permissions for smbpasswd to 600, or more restrictive.*

- *(GEN006220: CAT II) (Previously – L056) The SA will configure the /etc/samba/smb.conf file to:*

  - *Set the hosts allow option to contain the local network subnet masks and the loopback address.*
  - *Set the security option to user.*
  - *Set the encrypt passwords option to Yes.*
  - *Enter the path to the smbpasswd utility in the smb password file option.*

4.25 Internet Network News (INN)

INN servers access Usenet news feeds and store news group articles. INN servers use the Network News Transfer Protocol (NNTP) to transfer information from the Usenet to the server and from the server to authorized remote hosts.

Several news servers are available for UNIX and Linux, and most distributions of Linux include at least one news server package. An Internet news server will not be loaded if there is no operational requirement. The /etc/news/hosts.nntp file will contain the list of authorized Usenet servers and have permissions of 600, or more restrictive, if there is an operational requirement. The /etc/news/nnrp.access file will contain the list of remote systems authorized for news access and have permissions of 600, or more restrictive. The /etc/news/passwd.nntp file will have permissions of 600, or more restrictive. All configuration files will be owned by root or news, and have a group of root or news.

- *(GEN006240: CAT II) (Previously – L040) The SA will disable all Internet news package files unless justified and documented with the IAO.*

- *(GEN006260: CAT II) (Previously – L154) The SA will ensure the /etc/news/hosts.nntp file has permissions of 600, or more restrictive.*

- *(GEN006280: CAT II) (Previously – L156) The SA will ensure the /etc/news/hosts.nntp.nolimit file has permissions of 600, or more restrictive.*

- *(GEN006300: CAT II) (Previously – L158) The SA will ensure the /etc/news/nnrp.access file has permissions of 600, or more restrictive.*

- *(GEN006320: CAT II) (Previously – L160) The SA will ensure the /etc/news/passwd.nntp file has permissions of 600, or more restrictive.*

- *(GEN006340: CAT II) (Previously – L162) The SA will ensure the owner of all files under the /etc/news subdirectory is root or news.*

- *(GEN006360: CAT II) (Previously – L164) The SA will ensure the group owner of all files in /etc/news is root or news.*

5. NETWORK BASED AUTHENTICATION

In the early days of computer use, all information necessary for an application was contained on storage media physically attached to the computer system on which the application executed. With the advent of networks and network technologies, many computer applications were designed to communicate with other computers to share information and to store data centrally. Initial communication protocols for sharing information did not consider authenticating requests for data or command execution. In turn, the confidentiality and integrity of data was not ensured. Today, computer information must be guarded to assure privacy and accuracy. This guarding is handled by assorted encryption schemes and protocols that establish trust relationships between two or more computers. Communication protocols also ensure end-to-end data integrity.

5.1 Network Information Service (NIS)

NIS is a database system that provides a mechanism for sharing network objects and resources. NIS provides a uniform storage and retrieval method for network-wide information in a transport-protocol and media-independent fashion.

NIS provides databases, called maps, to house name service data, including information such as user data, machine addresses and names, network and network services, mail, timezone, etc. NIS provides a centralized location for the SA to distribute and update maps among the NIS master and slave servers and NIS clients. This collection of network information is referred to as the NIS namespace.

NIS maps can only be updated by transferring an entire map to a slave. NIS uses no authentication between computers on a network. This poses a serious threat to security. NIS maps will be secured in such a way they cannot easily be obtained by a malicious user. The best way to do this is to make the NIS domain name hard to guess. NIS can be easily configured incorrectly. It has several well-known vulnerabilities, making it difficult to secure systems using NIS. For that reason and others, NIS should not be used. If NIS must be used, this will be justified and documented with the IAO.

- *(GEN006380: CAT I) (Previously – G663) The SA will ensure NIS does not run under UDP.*

- *(GEN006400: CAT II) (Previously – G174) The SA will ensure NIS is not used unless it is justified and documented with the IAO.*

- *(GEN006420: CAT II) The SA will ensure NIS maps are protected through hard-to-guess domain names.*

5.2 Network Information Service Plus (NIS+)

Network Information Service Plus (NIS+) was designed to replace NIS. Like NIS, NIS+ is a distributed database system that allows a master server to share selected files with slave servers. These shared files are called NIS+ objects. NIS+ objects include password files, group files, and directory information. The files appear to be available on each computer, while in reality the files are resident on only the master server, or are replicated on database servers. The master is called the NIS+ root domain server. Workstations on the network, referred to as NIS+ principals, use the databases stored on the network as if they were being accessed locally.

Unlike NIS, NIS+ provides a level of security for the namespace and the information it stores by incorporating authorization and authentication. NIS+ authentication works by passing all communications between master and principal through a secure Remote Procedure Call (RPC) that encrypts the authentication session between the master and client, but does not encrypt the data that is transmitted. Every component in the namespace specifies the type of operation it will accept and from whom. NIS+ attempts to authenticate all access requests to the namespace. Access requests come from NIS+ principles. An NIS+ principal can be a process, machine, root, or a user. NIS+ credentials are used to authorize NIS+ principles. NIS+ authenticates the originator of the request by checking the originator's credential. NIS+ executes requests if there is a valid credential and the principal is authorized to perform the request. If the credential is invalid, or the request is not one the principal is authorized to perform, NIS+ denies the request for access.

NIS+ can operate in one of two security levels, 0 or 2. Security level 0 allows access by any NIS+ principals with full access to all NIS+ objects. Security level 2, the default, provides a higher level of security by authenticating principal requests using DES credentials.

- *(GEN006440: CAT II) (Previously – G173) The SA will ensure, when a Network Information Service is required for operations, NIS+ will be used as opposed to NIS, when available.*

- *(GEN006460: CAT II) (Previously – G176) The SA will ensure NIS+ servers operate at security level 2 (the default level).*

6. UNIX SECURITY TOOLS

Security tools can generally be classified as vulnerability assessment, file system integrity checking, intrusion detection, and intrusion prevention (such as firewalls, proxy servers, honey pots). These tools provide enhanced security by allowing SAs to monitor and/or limit system and file access and modification. The SA must utilize vulnerability assessment and intrusion detection tools. Vulnerability assessment and intrusion detection tools generally operate with a flexible set of rules and policies and keep system baselines in a database. Some security tools require their databases to be online continuously; others do not. In some cases, such as with Tripwire, it is very easy to completely remove the application and the associated database files after they have been used, and reload them once a week when needed.

The mention of any particular tool within this section does not, in any way, suggest endorsement or approval. The tools mentioned within this section are merely meant to provide some level of options. This is by no means an all-inclusive list. These are among many other options, as well, a site may develop homegrown tools that encompass the security requirements detailed within this STIG.

Whenever possible and practical (as with Tripwire databases), working copies of security tools and their database files should not be kept on the system. This will help protect against unauthorized database manipulation and program modification. When that is not possible, the programs and databases will be protected from unauthorized access by applying access permissions no more permissive than 740. Security tools and databases will be owned by a system uid and a system gid, or the COTS/GOTS default.

To ensure vulnerability assessment and intrusion detection is exercised, the IAO will develop Standard Operating Procedures (SOPs) to require intrusion detection on a continuous basis, and vulnerability assessment on a weekly basis. The SOP will also require the SA to provide all vulnerability assessment and intrusion detection reports to the IAO as soon as possible after the reports are available. All security reports will be retained in accordance with applicable Command regulations/directives. Any security incident detected by security tools will be reported and dealt with according to Command incident reporting procedures. The IAO will ensure security problems (not to be confused with security incidents) will be corrected as soon as possible. The SA will be responsible for documenting all actions to correct security tool findings in the system log and the IAO will review the log weekly.

- *(GEN006480: CAT II) (Previously – G031) The SA and IAO will ensure a host-based intrusion detection tool is implemented.*

- *(GEN006500: CAT II) (Previously – G188) The SA will ensure security tools and security files are owned by a system uid and gid.*

- *(GEN006520: CAT II) (Previously – G189) The SA will ensure security tools and databases have permissions of 740, or more restrictive.*

- *(GEN006540: CAT II) (Previously – G190) The SA will run vulnerability assessment tools at least weekly.*

- *(GEN006560: CAT II) The SA will ensure vulnerability assessment tools, host-based intrusion detection tools, and file system integrity baseline methods notify the SA and the IAO if a security breach or a suspected security breach is discovered.*

6.1 Obtaining Security Tools

The site at https://sso.mont.disa.mil/prodsupport/utilities/index.html contains OpenSSH, OpenSSL, Sudo, TripWire, TCP Wrappers, and SSO Putty. This site does not require logon.

The CM site at https://sso-dads.mont.disa.mil contains some SSO-supported products for Tivoli, MQSeries, PCAnywhere, and Mercury Interactive Topaz products. It also contains SSO-developed UNIX and Windows Security Automation products. This site is UID controlled. To obtain a UID, select "New Users Enter Here" from the center of the page, select DD Form 2875, complete it, and follow the instructions on the page to submit it.

The site, http://www.cert.org/security-improvement/implementations/i042.07.html, which is maintained by Carnegie Mellon Software Engineering Institute, also maintains a comprehensive list of tools that aid in detecting suspicious behavior for the UNIX and Linux operating systems. Though not required, some of these tools can be utilized in fulfilling the UNIX security requirements.

6.2 Baseline/File System Integrity Tools

A file system integrity/baseline tool will take a baseline of all files, or a specific subset of files, to include cryptographic hashes of files in the baseline. The tool must be able to compare the baseline of the system against the current state of the system later so that unauthorized modification of the file system can be detected.

6.2.1 Symantec Enterprise Security Manager (ESM)

Symantec Enterprise Security Manager (ESM) is a client/server product that provides the capability to define and implement user policies to manage systems in an enterprise network. ESM scans the operating system, and detects and reports variations from user-defined policies. ESM includes the capabilities of CRACK and Tripwire.

6.2.2 Tripwire

Tripwire is a utility that checks file and directory integrity against a previous baseline database. Tripwire reports all differences including added or deleted entries it detects. When run against system files on a regular basis, Tripwire enables the detection of changes in critical system files and facilitates immediate damage control measures.

6.2.3 Automated Security Enhancement Tool (ASET)

Solaris includes the ASET, which monitors and controls system security. One of the many security features included within ASET is a baseline/file system vulnerability checking feature.

6.2.4 Basic Audit Reporting Tool (BART)

Solaris 10 includes the BART, which is a filesystem tracking tool. BART allows for the creation of baselines and additionally provides snapshot and reporting ability to easily check for any unwanted file changes.

6.2.5 Advanced Intrusion Detection Environment (AIDE)

AIDE provides for creating a baseline database and checking the integrity of the file system.

6.2.6 FCheck

FCheck is an open source PERL script providing intrusion detection and file system integrity checking through the use of comparative system snapshots. FCheck provides monitoring and notifications of any file modifications, additions, and deletions.

6.2.7 Symantec Intruder Alert (ITA)

ITA provides intrusion detection by monitoring system logs and audit files. ITA will generate notification of possible intrusions using electronic mail, beepers, or screen messages. It can also be programmed to initiate defensive action, such as terminating a logon process, disabling accounts, and disabling tty devices.

6.3 Host-Based Intrusion Detection Tools

6.3.1 FCheck

FCheck is an open source PERL script providing intrusion detection and file system integrity checking through the use of comparative system snapshots. Fcheck provides monitoring and notifications of any file modifications, additions, and deletions.

6.3.2 Symantec Intruder Alert (ITA)

ITA provides intrusion detection by monitoring system logs and audit files. ITA will generate notification of possible intrusions using electronic mail, beepers, or screen messages. It can also be programmed to initiate defensive action, such as terminating a logon process, disabling accounts, and disabling tty devices.

6.4 Vulnerability Assessment Tools

Vulnerability assessment tools will aide in the identification of security weaknesses. These tools can scan UNIX platforms and notify the SA of possible security issues.

- CyberCop
- Enterprise Inspector
- Internet Scanner
- SAINT
- Retina

6.5 Password Checking Tools

6.5.1 Computer Oracle and Password System (COPS)

COPS includes many features: security checks related to file permissions and modes, format of password and group files, anonymous FTP configuration, and weak passwords to name a few.

6.5.2 CRACK

Crack is a classic UNIX password-cracking tool.

6.5.3 John the Ripper

John the Ripper is a fast password-cracking tool with a primary purpose to detect weak UNIX passwords.

6.6 Access Control Programs and TCP_WRAPPERS

The Transmission Control Protocol/Internet Protocol (TCP/IP) wrapper program provides an IP filtering capability and additional network logging information. It gives an SA the ability to deny or allow access from certain systems or domains to the host on which the program is installed. The IAO and the SA should work together to ensure access to their systems is restricted to authorized systems, domains, and networks. TCP_WRAPPERS uses hosts.allow and hosts.deny files to accomplish this. Hosts can be allowed access to only certain network services while being denied access to all others. TCP_WRAPPERS provides a good method of restricting access to systems and of detecting unauthorized access attempts through its logging and notification capability. TCP_WRAPPERS also provides the capability to display messages prior to a logon attempt. For that reason, it is the preferred method of displaying system-warning banners. It offers much more functionality than other programs, such as klaxon, that claim to detect port scans. Additionally, TCP_WRAPPERS is integrated into many of the newest releases of UNIX.

- *(GEN006580: CAT II) (Previously – G196) The SA will ensure an access control program (e.g., TCP_WRAPPERS) is implemented on all UNIX hosts connected to a network.*

- *(GEN006600: CAT II) (Previously – G197) The SA will ensure an access control program (e.g., TCP_WRAPPERS) is configured to log each system access attempt.*

- *(GEN006620: CAT II) The SA will ensure an access control program (e.g., TCP_WRAPPERS) hosts.deny and hosts.allow files (or equivalent) are used to grant or deny system access to specific hosts.*

6.7 System Hardening

6.7.1 Bastille

The Bastille Hardening System is a set of scripts that, when run on a Linux system, increase the security (also called hardening) of many of the configurations. The application walks the SA through several modules, and automates changing a large number of configurable system items. Bastille has modules for checking and configuring Internet services, suid (set-user-ID) files, account and boot security, and TCP_WRAPPERS.

FSO has not subjected the Bastille Hardening System to acceptance testing. It is presently not available from a trusted source. If the SA chooses to use the Bastille utilities, the SA should use only the latest version of the product, remove the system from the network before execution, and execute a complete system backup. After use, as a precaution, the SA will verify that the changes selected were implemented and they were the only changes implemented and there were no security vulnerabilities introduced. The SA will perform a self-assessment after using Bastille, by running the UNIX scripts and noting deficiencies. The Bastille Hardening System program is available from http://www.bastille-linux.org/. Bastille currently supports:

- Red Hat (Fedora Core, Enterprise, and Numbered/Classic)
- SuSE
- Debian
- Gentoo
- Mandrake
- HP-UX

6.8 Auditing

6.8.1 System iNtrusion Analysis & Reporting Environment (SNARE)

System iNtrusion Analysis & Reporting Environment (SNARE) provides an auditing and logging system for Linux.

6.9 Secure Configuration Suite (SCTS)

The SCTS, as described below, is a DOD enterprise-wide solution for vulnerability assessment and vulnerability remediation and is comprised of two tools: Secure Configuration Compliance Validation Initiative (SCCVI) and Secure Configuration Remediation Initiative (SCRI). SCCVI provides vulnerability assessment capability and SCRI provides vulnerability remediation capability. Below is an overview of SCCVI and SCRI tools and the capabilities of each tool.

SCCVI and SCRI POCs at FSO are Bob Foth, DSN 570-9981, Bob.Foth@disa.mil. For technical assistance with these tools, contact the SCTS Help Desk, (866) 721-3472, disahd_sccviscri@digitalnet.com.

6.9.1 Secure Configuration Compliance Validation Initiative (SCCVI)

SCCVI is comprised of eEye Digital Security's Retina® Network Security Scanner and its Remote Enterprise Management (REM) console. The SCCVI tool is instrumental in downloading Information Assurance Vulnerability Management (IAVM) information, conducting scans to identify network assets impacted by the vulnerability, passing information to the SCRI tool regarding impacted network assets, conducting vulnerability mitigation scans, and reporting IAVM compliance status to the DOD Information Assurance Vulnerability Management System (VMS) database.

The scanner can conduct two types of scans. For systems supported by the capability and for which it has administrative permissions, the SCCVI tool conducts an internal scan of the system's configuration and registry files. SCCVI supports most hardware systems, all operating systems and the majority of common software applications. For systems the tool has not been provided administrative rights (or the occasional software application not supported by SCCVI), the scanner will conduct an external ping scan of the system. By scanning, SCCVI discovers assets and identifies known security vulnerabilities on various network platforms and technologies including servers, databases, switches, routers, and wireless access points.

The Remote Enterprise Manager (REM) allows multiple scanners to be managed from one centralized location. It also provides the ability for scanners to report their findings to one centralized location. Reports can be generated based on data collected from all of the scanners reporting to the REM.

6.9.2 Secure Configuration Remediation Initiative (SCRI)

SCRI is comprised of Citadel Hercules technology. The SCRI tool imports information from the SCCVI tool (scanners) regarding impacted network assets and conducts remediation operations (i.e. software patch installations) to address the vulnerabilities.

Vulnerability remediation involves implementation of corrective actions to eliminate or mitigate identified vulnerabilities. Remediation actions may include implementation of a new or revised policy such as a firewall configuration changes, frequent password change, type/character/length of password, as well as the installation of patch code to address a vulnerability via software changes. Patch installation can be a time consuming, knowledge-intensive task and the use of automated methods to conduct patch installations greatly reduces the level of effort required to correct a given vulnerability.

The SCRI tool leverages the scanned data provided by SCCVI to apply patches, upgrades, fixes, or custom changes to a specific system or group of systems impacted by IAVM information to facilitate the automatic vulnerability remediation of devices on a network. The SCRI tool provides a sequence of automatically executable remediation steps known as remedies that will

correct each recognized vulnerability. Users of the product will download new patches from the Information Assurance Support Environment (IASE) website - iase.disa.mil. The SCRI tool provides System Administrators with the ability to manage a large-scale vulnerability remediation process in a manner that is both systematic and comprehensive.

The principle components of the SCRI suite include the SCRI Server, file download server, SCRI Administrator, and SCRI Clients. In addition to SCRI components, the system requires the Window 2000 Operating System and Microsoft IIS Web Server for reporting via remote server access.

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7. SYSTEM BACKUPS

Please see *Section 2.5.4, Backup and Recovery,* of the *Enclave STIG* for operating system backup and recovery guidance and requirements.

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8. SUN SOLARIS

Although general UNIX considerations are covered in the initial sections of this document, this section addresses several Solaris specific items. Solaris 10 has many advantages in regards to security, including compliance with password history and account lockout capabilities. These are two requirements, which until Solaris 10, Solaris could not incorporate without add-on tools or configuration of PAM modules. *Section 8.8, Solaris 10*, provides an overview of the security enhancements provided within this release of Solaris.

8.1 Removable Media

The nosuid option will be configured on removable media to prevent suid programs being copied or moved onto the system.

- *(SOL00020: CAT II) The SA will ensure the nosuid option is configured in the /etc/rmmount.conf file.*

8.2 The audit_user File

The /etc/security/audit_user file is an access-restricted audit configuration file for customizing per-user auditing flags. The file is used to change the auditing level for specific users without changing the system-wide auditing defaults. Vendors supply the file populated with an entry for root. The SA will remove this entry and ensure the audit_user file never contains flags that diminish the level of auditing for any user, including root and other system accounts. The owner of the file will be root and group owner of the file will be root, sys, or bin. The file will not be accessible by any but root, sys, or bin and should have file permissions of 640, or more restrictive.

- *(SOL00040: CAT II) (Previously – G677) The SA and IAO will ensure the audit_user file will not be used to diminish the level of auditing for any user, including root and other system accounts.*

- *(SOL00060: CAT II) (Previously – G678) The SA will ensure the owner of the audit_user file is root.*

- *(SOL00080: CAT II) (Previously – G679) The SA will ensure the group owner of the audit_user file root, sys, or bin.*

- *(SOL00100: CAT II) (Previously – G680) The SA will ensure the audit_user file has permissions are 640, or more restrictive.*

8.3 Automated Security Enhancement Tool (ASET)

ASET is designed to help the SA monitor and control system security. It can be set to operate at one of three security levels (low, medium, or high). These security levels restrict the permission settings for ASET identified objects.

- *(SOL00120: CAT II) (Previously – G681) The SA will ensure the ASET master files (tune.high, tune.low, tune.med, and uid_aliases) are located in the /usr/aset/masters directory.*

8.3.1 The uid_aliases File

The uid_aliases file contains a list of user accounts sharing the same username. ASET warns about any such multiple user accounts.

- *(SOL00140: CAT III) (Previously – G682) The SA will ensure the /usr/aset/masters/uid_aliases file has no entries.*

8.3.2 The asetenv File

The environment file /usr/aset/asetenv contains a list of variables that affect ASET tasks and has two main sections—a user-configurable parameters section and an internal environment variables section.

- *(SOL00160: CAT II) (Previously – G685) The SA will ensure that if the UNIX computer system is used as a firewall, the user-configurable parameters section of the /usr/aset/asetenv file are configured to run as a firewall.*

- *(SOL00180: CAT II) (Previously – SO05) The SA will ensure the following shell environment variables are defined as indicated:*

  *CKLISTPATH_LOW=${ASETDIR}/tasks:${ASETDIR} *
  /util:${ASETDIR}/masters:/etc
  CKLISTPATH_MED=${CKLISTPATH_LOW};/usr/bin:/usr/ucb
  *CKLISTPATH_HIGH=${CKLISTPATH_MED}:/usr/lib:/sbin: *
  /usr/sbin:/usr/ucblib
  *PERIODIC_SCHEDULE="0 0 * * *" (NOTE: A daily run.)*
  UID_ALIASES=${ASETDIR}/masters/uid_aliases

8.3.3 Running ASET

YPCHECK environment variable specifies whether ASET should also check system configuration file tables. YPCHECK is a Boolean variable; only true or false may be specified. The default value is false, which disables NIS+ table checking. When set to false, ASET checks the local passwd file. When set to true, the task also checks the NIS+ passwd table for the domain of the system. The userlist file will have an entry for each user on the system. ASET will perform environment checks on each user listed within the userlist file. The file name is specified with the –u userlist_file parameter, a different file name may be specified; this is to be taken into consideration.

- *(SOL00200: CAT II) (Previously – SO06) The SA will ensure if using ASET and NIS+ is running, YPCHECK will be set to true.*

- *(SOL00220: CAT II) (Previously – SO07) The SA will ensure a list of all users on a system are kept in a file called /usr/aset/userlist. The userlist file will contain one user per line.*

- *(SOL00240: CAT II) (Previously – SO08) The SA will ensure the owner of the /usr/aset/userlist file is root.*

- *(SOL00260: CAT II) (Previously – SO09) The SA will ensure the/usr/aset/userlist file has permissions of 600, or more restrictive.*

8.4 The Electrically Erasable Programmable Read-only Memory (EEPROM) Command

The Electrically Erasable Programmable Read-only Memory (EEPROM) command displays or changes the values of parameters in the EEPROM. It is possible to restrict who can bring the system to single-user mode by requiring a password for EEPROM.

The EEPROM Security Mode will be set to command or full. Auto-boot should be set to false if the system is not located in a restricted access area. Auto-boot should be set to true if the system is in a restricted access area and it is desired the system reboot itself automatically if power is lost and restored. The EEPROM security password will be set using existing password guidelines. The EEPROM password will be protected. The EEPROM password will be unique. This will allow an operator to boot the system without needing to know the root password. The EEPROM monitor will provide a logon banner. Since it cannot be as extensive as the operating system level banner, a suggested banner is: “DOD use only! Subject to monitoring, reporting, and prosecution.” The oem-banner will be set to true to ensure the banner is displayed when the EEPROM monitor is logged on to.

- *(SOL00280: CAT II) (Previously – G687) The SA will ensure the EEPROM logon warning banner is configured.*

- *(SOL00300: CAT II) (Previously – SO10) The SA will ensure the EEPROM Security-mode is command or full.*

- *(SOL00320: CAT II) The SA will ensure the EEPROM password is set using UNIX STIG password guidelines.*

- *(SOL00340: CAT III) The SA will ensure the EEPROM password is unique.*

8.5 Sun Answerbook2

Sun AnswerBook2 is a utility that allows users to view Sun documentation using a Web browser.

8.5.1 Script Access

A vulnerability regarding the lack of authentication in AnswerBook2, versions 1.2 through 1.4.2 could allow a remote attacker to gain unauthorized access to administrative scripts. This would allow the attacker to perform administrative functions, such as creating a new admin user or view the server's error log.

Suns AnswerBook 2 utilizes a third-party web server daemon (dwhttpd) that suffers from a format string vulnerability. The vulnerability can be exploited to cause the web server process to execute arbitrary code. The web server runs as user and group, daemon. The user, daemon, under recent installations of Solaris, owns no critical files. Typically, daemon only owns all files pertaining to the AnswerBook 2 installation. This effectively limits the severity of the vulnerability to a remote unprivileged shell.

In addition, not all AnswerBook Admin scripts require authentication, allowing the attacker to perform administrative functions without an account. Among other things, it is possible to add a new admin user or view the server's error log.

The combination of these two vulnerabilities allows for a remote exploit that can determine the exact location of its payload, requiring no guessing of return addresses or NOP padding.

- *(SOL00360: CAT II) (Previously – V9756) The SA will ensure the Sun Answerbook2 does not allow unauthorized script access.*

8.5.2 dwhttpd Format String

By default, AnswerBook2 installs a third-party web server daemon, Inso DynaWeb Web server (dwhttpd), to display the online documentation. AnswerBook2 versions 1.2 through 1.4.2 are vulnerable to a format string vulnerability in the dwhttpd daemon. A remote attacker can exploit this vulnerability by supplying an overly long input string of hexadecimal encoded characters as a file name in a specially crafted GET request to execute code on the system with daemon privileges.

- *(SOL00380: CAT II) (Previously – V9758) The SA will ensure the Sun Answerbook2 is not vulnerable to the dwhttpd format string vulnerability.*

8.6 NFS Server Logging

NFS server logging enables an NFS server to provide a record of file operations that are performed on its filesystems. This feature is particularly useful for sites that make anonymous FTP archives available to NFS and WebNFSTM clients.

- *(SOL00400: CAT II) (Previously – G696) The IAO will ensure NFS server logging is implemented on NFS servers.*

8.7 Extended File Attributes

Starting with Solaris 9, Solaris provides for extended file attributes. The extended file attributes functionality allows any user to hide programs and files. This can provide a means for concealing data, hiding hacking tools or root kits, or used as additional file repository space. There will be no extended file attributes. As this functionality cannot be disabled or removed, the file system will be monitored for extended file attributes.

- *(SOL00420: CAT II) The SA will ensure hidden extended file attributes do not exist.*

8.8 Solaris 10

Of the many features provided with Solaris 10, below listed are a few related to security and performance.

- Password History
- Disable account after failed login attempts
- BART, discussed in *Section 6.2.4, Basic Audit Reporting Tool (BART)*
- N1 Grid Containers – Allows for a server to be divided to appear as several machines
- Increased TCP/IP networking processing
- NextGen file system, to allow for 128-bit addressing schemes to accommodate exabyte size data
- Predictive self-healing monitors and detects memory problems

8.8.1 Root Default Group

Prior to Solaris 10, the group for the root account is other; Solaris 10 is configured with root's default group as root. This is another security step to prevent unauthorized access to root owned files.

- *(SOL00440: CAT I) The SA will ensure only root has the gid of 0 (root).*

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9. HEWLETT PACKARD UNIX (HP-UX)

Although general UNIX considerations are covered in the initial sections of this document, this section addresses several HP-UX specific items.

9.1 Trusted Mode

Trusted mode is a requirement and it can be implemented using the HP System Administration Manager (SAM). When trusted mode is configured, it also enables the auditing capability. Auditing can then be configured using SAM.

- *(HPUX0020: CAT II) (Previously – HP02) The IAO will ensure all HP-UX systems are configured to operate in trusted mode.*

9.1.1 Trusted System Auditing

Besides the standard HP-UX auditing features, a system that has been configured to run in trusted mode enables an SA to track user activities by the system calls they evoke. Tunable auditing parameters and events are located in /etc/rc.config.d/auditing. The default primary audit log file is /.secure/etc/audfile1. Also, during the system conversion to trusted mode, the process creates audit ID numbers for all users to enable specific tracking of user activities.

- *(HPUX0040: CAT II) (Previously – HP14) The SA will ensure the AUDOMON_ARGS flag is set to the following:*

  - *fss is set to a minimum of 20 percent (-p 20). fss is the minimum percentage of free space left on an audit log file's filesystem before switching to the secondary audit log file.*

  - *sp_freq is set to a maximum of one minute (-t 1). sp_freq is the time interval within which warning messages about the switch points are generated and sent to the console.*

  - *warning is set to a maximum of 90 percent (-w 90). warning is the percentage of audit file space used or minimum free space used, after which warning messages are sent to the console.*

9.2 The /etc/securetty File

HP-UX restricts direct root logon via the /etc/securetty file. The IAO will ensure the file exists, has permissions of 640, or more restrictive, is owned by root, and has a group owner of root.

- *(HPUX0060: CAT II) (Previously – HP08) The SA will ensure the owner of the /etc/securetty file is root.*

- *(HPUX0080: CAT II) (Previously – HP07) The SA will ensure the group owner of the /etc/securetty file is root, sys, or bin.*

- *(HPUX0100: CAT II) (Previously – HP09) The SA will ensure the /etc/securetty file has permissions of 640, or more restrictive.*

10. IBM ADVANCED INTERACTIVE EXECUTIVE (AIX)

Although general UNIX considerations are covered in the initial sections of this document, this section addresses several AIX specific items.

10.1 Security Structure

AIX implements a Trusted Computing Base (TCB). The TCB regulates access to system resources by acting as the interface between the user and the AIX kernel.

- *(AIX00020: CAT II) (Previously – AIX02) The IAO will ensure the TCB module is installed and implemented.*

10.2 Network Security

Some TCP/IP commands and daemons are not trusted and lack the ability for required I&A, these are as follows:

- rcp
- rlogin
- rlogind
- rsh
- rshd
- tftp
- tftpd

The AIX command securetcpip provides enhanced security by disabling these commands and daemons. These are not deleted, but disabled by changing the mode to 0000.

SSH is a much more secure option. SSH communicates using encryption to protect data and passwords. It provides strong authentication and secure communications over insecure channels. SSH also provides rlogin, rsh, rcp, and rdist services, but since the communications are encrypted, it is done in a much more secure manner than traditional services.

- *(AIX00040: CAT II) (Previously – AIX07) The SA will ensure the securetcpip command is used.*

10.3 System Commands

Shell scripts cannot run suid. Only binary commands may have the suid bit set. This feature of AIX limits the security exposure.

AIX provides a command, chtcb, for root's use to set a special TCB bit in a program's inode. This bit, when set, signifies the trusted kernel may execute the program.

- *(AIX00060: CAT II) (Previously – AIX10) The SA will ensure the TCB bit baseline file is compared with the online TCB bit files on a weekly basis.*

10.4 Authentication

AIX provides the capability to disable method authentication. This can be disabled in the /etc/security/user file by setting the SYSTEM attribute value to NONE. The SYSTEM attribute value will not be NONE.

- *(AIX00080: CAT I) The SA will ensure the SYSTEM attribute value is not configured as NONE.*

11. SILICON GRAPHICS (SGI) IRIX

Although general UNIX considerations are covered in the initial sections of this document, this section addresses several IRIX specific items.

11.1 Xfsmd

The xfsmd daemon in SGI IRIX versions 6.2 through 6.5.x is installed and running by default. A vulnerability regarding the lack of filtering for shell metacharacters in the popen() function (xfsmd) could allow a remote attacker to embed arbitrary commands in user-supplied arguments to the popen() function to execute arbitrary commands on the system with root privileges.

- *(IRIX0020: CAT I) (Previously – V9402) The SA will ensure the Xfsmd is not enabled.*

11.2 Programmable Read-Only Memory (PROM)

The Command (Programmable Read-Only Memory [PROM]) Monitor provides access to IRIX system hardware. This can allow unauthorized users to boot the system with an unauthorized program, remove hardware, or install hardware. The SA will ensure the Command (PROM) Monitor is password protected. The Command (PROM) Monitor security password will be set using existing password guidelines. The Command (PROM) Monitor password will be protected. The Command (PROM) Monitor password will be unique.

- *(IRIX0040: CAT II) The SA will ensure the Command (PROM) Monitor is password protected.*

- *(IRIX0060: CAT II) The SA will ensure the Command (PROM) Monitor password is set using UNIX STIG guidelines.*

- *(IRIX0080: CAT III) The SA will ensure the Command (PROM) Monitor password is unique.*

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12. LINUX

Although general UNIX considerations are covered in the initial sections of this document, this section addresses several Linux specific items. This section is for all Linux variants, but guidance is based on Version 6.2 through 9.0 of Red Hat Linux and version 9.0 of SuSE Linux. Based on the variant of Linux, file names, directory paths, variable names, etc., may have to be taken into consideration.

There are numerous versions of Linux and it would be beyond the scope of this STIG to try to detail them all. All requirements listed within this section will pertain to all versions of Linux unless explicitly noted otherwise.

12.1 Processing Environment

Linux was designed, at first, to run on x86 systems. It has migrated to larger systems such as Sun Scalable Processor Architecture (SPARC), and the IBM mainframe.

12.2 System BIOS Configuration

The more common hardware platform for a Linux system is a PC. PCs use a Basic Input Output System (BIOS) contained in a programmable complimentary metal-oxide semiconductor (CMOS). The CMOS contains the machine instructions needed to bring the system to the point the operating system can be loaded (i.e., booted). When the SA is configuring the CMOS after initial configuration, the CMOS will be set to disable booting from other than the hard disk. The reasons for setting a BIOS password are to prevent accidental or malicious tampering with BIOS settings and to prevent booting from other media. If the BIOS password is not set and a malicious user or intruder obtains physical access to the system, it is possible to boot the system to single-user mode or to boot from a CDROM or diskette. The root shell runs when in single user mode. Root can be gained by booting from diskette or CDROM. An intruder has compromised the system once access to root is obtained.

- *(LNX00020: CAT II) (Previously – L003) The SA will set the CMOS password for x86 systems.*

- *(LNX00040: CAT I) (Previously – L007) The SA will edit the CMOS settings to disable the capability to boot from removable media (e.g., diskette).*

12.3 Restricting the Boot Process

As in *Section12.2, System BIOS Configuration,* boot options will be set to prevent booting from a floppy disk. This operation will vary from computer to computer, based on the manufacturer's specifications. Assuming use of an x86 system during the initial boot sequence, the prompt 'Press FX to enter setup' is displayed. (FX is used here as an example. Some systems use F2, Ctrl/Del, or Ctrl/Esc. Check the system's operating manual for specific details.) The SA will set the Password Configuration Table with the Supervisor Password ON and the User Password OFF.

- *(LNX00060: CAT II) (Previously – L064) The SA will set the Password Configuration table with the Supervisor Password ON and the User Password OFF.*

12.4 Boot Loaders

The boot loader runs the operating system when the system is powered up or rebooted. There are four options for boot loaders:

1. Grand Unified Boot Loader (GRUB) Console Loader
2. Linux Loader (LILO)
3. A third party loader
4. No loader at all

If a boot loader was not chosen, a boot disk would have to be created and would open the system to being booted from any boot disk. The SA will configure Linux systems to use a boot loader. That leaves the GRUB Console, LILO, or a third party loader. The boot loader must support journaling filesystem types and encrypt the boot loader password. If the boot loader does not support these requirements, for example, a vendor proprietary configuration, this will be justified and documented with the IAO.

The security concern is what if someone else obtained the recovery disk and decided to install their own boot partition on to it and install an additional backdoor for them to access the system. This is just one example of what can happen when it is on a separate disk. For disaster recovery purposes, the boot partition, which contains the boot loader files and sometimes referred to as the master boot record (MBR), can be backed up onto removable media for recovery purposes. The recovery disk should be kept in a secured container to prevent further corruption of the file systems.

- *(LNX00080: CAT I) (Previously – L066) The SA will not implement a boot diskette as a boot loader.*

- *(LNX00100: CAT I) (Previously – L068) The SA will only configure the GRUB Console as the boot loader or a boot loader, such as current releases of LILO, that supports journaling filesystem types and the boot loader password can be encrypted. If the boot loader does not support these requirements (for example a vendor proprietary configuration), the host is to be located in a controlled access area accessible only by SAs and this will be justified and documented with the IAO.*

- *(LNX00120: CAT I) (Previously – L084) The IAO will not allow the boot partition to reside on removable media unless it is stored in a secure container (safe) to be used in emergencies only.*

12.4.1 Boot Loader Passwords

The reasons for password protecting boot loader passwords are to prevent access to:

1. Single User Mode. This allows root level access.

2. The boot loader. This allows the capability to view and/or modify hardware information.

3. Non-Secure Operating Systems. If a dual-boot system, possibly allows booting from un-authorized operating systems.

12.4.1.1 Password Protecting the GRUB Console Boot Loader

The GRUB Console boot loader must be password protected to avoid the possibility of maliciously booting to a single user mode, or booting an insecure operating system. The permissions of the grub.conf file will be 600.

- *(LNX00140: CAT I) (Previously – L072) The SA will configure the GRUB Console Boot Loader with a MD5 encrypted password.*

- *(LNX00160: CAT II) (Previously – L074) The SA will ensure the grub.conf file has permissions of 600, or more restrictive.*

12.4.1.2 Password Protecting the LILO Boot Loader

The LILO boot loader must be password protected to avoid the possibility of maliciously booting to a single user mode, or booting an insecure operating system. The permissions of the lilo.conf file will be 600.

- *(LNX00180: CAT I) (Previously – L078) The SA will ensure the global password is configured in the lilo.conf file.*

- *(LNX00200: CAT I) The SA will encrypt the LILO boot loader password.*

- *(LNX00220: CAT II) (Previously – L080) The SA will ensure the lilo.conf file has permissions of 600 or more restrictive.*

12.5 Filesystems

Journaling provides for more stable filesystems and stronger data integrity by ensuring no loss of data after unclean system crashes and shutdowns. Prior to any disk writes, the data changes are first recorded to a log, and then written to disk. Journaling will commit a change to the log or can roll back in a transactional manner. A journaled filesystem will be used on all primary Linux filesystems.

- *(LNX00240: CAT II) (Previously – L017) The SA will configure a journaling filesystem on the primary Linux filesystem partitions, if this is not supported this will be justified and documented with the IAO.*

12.6 Red Hat Kickstart and SuSE AutoYaST

Newer Red Hat Linux versions have a utility to automate installation called Kickstart. SuSE Linux supplies a similar product with the same functionality called AutoYaST. An SA can create a file with the answers, one on each line, to all the questions that would normally be asked while installing Linux. The Kickstart/Auto YaST files can be kept on one server and read by many clients to achieve installation standardization. This installation method leaves the machines exposed to attack prior to and during the installation process. Kickstart and Auto YaST will only be used to configure systems connected to an isolated development LAN with no outside network connections. Upon completion of the installation process and implementation of DOD security standards and requirements, the system(s) may be incorporated into the production environment.

- *(LNX00260: CAT I) (Previously – L088) The SA will ensure Kickstart and Auto YaST are used only on an isolated development LAN.*

12.7 Dual Boot

Linux can co-exist with other operating systems, such as Windows, on the same physical medium. Many Linux distributions provide a boot manager and can read File Allocation Table (FAT), FAT32, and New Technology Filesystem (NTFS) partitions. This ability allows Linux applications to access information on those partition types. The information could be sensitive. This flexibility creates risks to systems with multiple operating systems where the systems, other than Linux, are not aware of and take heed to the capability. In some instances, it could be very useful. In other instances, it could be very harmful. The possibility of harmful consequences outweighs the good. Linux systems will not be allowed to contain more than one operating system unless the IAO is provided with justification and documentation from the proponents of the alternate 0perating system(s).

- *(LNX00280: CAT II) (Previously – L022) The SA will configure the system to boot only Linux unless justified and documented with the IAO.*

12.8 Ugidd RPC Daemon

The ugidd daemon is used on older Linux systems to map uids and gids that may differ from the NFS server to the NFS client. The ugidd daemon could allow a remote attacker to list all the users on specific systems. If installed on the machine, it will not be used.

- *(LNX00300: CAT II) (Previously – L128) The SA will ensure the ugidd daemon is not enabled.*

12.9 Default Accounts

Several accounts are created by default during the standard Linux install process. Default system accounts are normally listed at the beginning of the /etc/passwd file and have names like bin, lib, uucp, news, sys, guest, and daemon. Some of the accounts (e.g., shutdown and halt) may allow access to system administration tasks without giving the operator, for instance, the root password. Others provide no operational purpose (such as games and operator). These accounts (including shutdown and halt) will be removed from the system before it is connected to the network.

- *(LNX00320: CAT I) (Previously – L140) The SA will delete accounts that provide a special privilege such as shutdown and halt.*

- *(LNX00340: CAT II) (Previously – L142) The SA will delete accounts that provide no operational purpose, such as games or operator, and will delete the associated software.*

12.10 X Windows

Linux uses Xfree86 in place of the proprietary X Windows System found in UNIX, but the functionality and configuration is almost identical.

- *(LNX00360: CAT II) (Previously – L032) The SA will enable the X server –audit (at level 4) and –s option (with 15 minutes as the timeout time) options.*

- *(LNX00380: CAT II) (Previously – L034) The SA will disable the X server –ac, -core, and -nolock options.*

12.11 Console Access

Linux provides an additional layer of security by allowing for restricting console login access. Depending on the version of Linux, the file used to restrict access is /etc/login.access or /etc/security/access.conf. The /etc/login.access or /etc/security/access.conf file will be owned by root, group owned by root, and have permissions of 640, or more restrictive. The /etc/login.access or /etc/security/access.conf file will contain entries to allow access only from the system console by authorized SAs.

- *(LNX00400: CAT II) (Previously – L044) The SA will ensure the owner of the /etc/login.access or /etc/security/access.conf file is root.*

- *(LNX00420: CAT II) (Previously – L045) The SA will ensure the group owner of the /etc/login.access or /etc/security/access.conf file is root.*

- *(LNX00440: CAT II) (Previously – L046) The SA will ensure/etc/login.access or /etc/security/access.conf file will be 640, or more restrictive.*

- *(LNX00460: CAT II) (Previously – L168) The SA will ensure /etc/login.access or /etc/security/access.conf will contain entries restricting console access to authorized SAs only.*

12.12 Kernel Configuration File

Network parameters are configured in /etc/sysctl.conf, which is the kernel configuration file. The /etc/sysctl.conf file will be owned by root, have a group owner of root, and permissions set at 600.

- *(LNX00480: CAT II) (Previously – L204) The SA will ensure the owner of the /etc/sysctl.conf file is root.*

- *(LNX00500: CAT II) (Previously – L206) The SA will ensure the group owner of the /etc/sysctl.conf file is root.*

- *(LNX00520: CAT II) (Previously – L208) The SA will ensure the /etc/sysctl.conf file has permissions of 600, or more restrictive.*

12.13 NFS Server

By default NFS exports with the secure option set. The secure option configures NFS to run on a reserved port (i.e., ports 1-1024). This ensures non-root users cannot open a spoofed NFS dialogue on a non-reserved port.

By default NFS exports with the secure_locks option set. Please note this setting is for older Linux releases and may not apply. The secure_locks option ensures user permissions are checked prior to file access.

- *(LNX00540: CAT I) The SA will ensure the insecure option is not set.*

- *(LNX00560: CAT I) (Previously – L214) The SA will ensure the insecure_locks option is not set.*

12.14 The /etc/inittab File

The /etc/inittab file controls the initial boot level as well as processes and daemons started within each boot level. The SA will disable the Ctrl-Alt-Delete functionality if the system is not located in a controlled access area.

- *(LNX00580: CAT I) (Previously – L222) The SA will disable the Ctrl-Alt-Delete sequence unless the system is located in a controlled access area accessible only by SAs.*

12.15 Pluggable Authentication Module (PAM) Authorization File

The configuration file for PAM is /etc/pam.d/system-auth. The PAM configuration file contains generic authentication requirements. The configuration tool is authconfig. Manual modification to the /etc/pam.d/system-auth file will be overwritten when the authconfig tool is used. The following entries are required to enable the password restrictions referenced earlier.

```
auth required /lib/security/pam_env.so
auth required /lib/security/pam_tally.so onerr=fail no_magic_root
auth sufficient /lib/security/pam_unix.so likeauth nullok
auth required /lib/security/pam_deny.so
account required /lib/security/pam_unix.so
account required /lib/security/pam_tally.so deny=3 no_magic_root reset
password required /lib/security/pam_cracklib.so retry=3 minlen=8 lcredit=-1 ucredit=-1
password sufficient /lib/security/pam_unix.so nullok use_authtok md5 shadow
remember=15
password required /lib/security/pam_deny.so
session required /lib/security/pam_limits.so
session required /lib/security/pam_unix.so
```

12.16 Administrative Controls

A PAM module, pam_console.so, allows some activities normally reserved only for the root user, such as rebooting and mounting removable media to the first user that logs in at the physical console. This method will not be used because it could deny legitimate root access (using the su command) from another terminal.

- *(LNX00600: CAT II) (Previously – L230) The SA will not configure the PAM configuration file to allow the first person to log in at the console sole access to certain administrative privileges.*

12.17 The /etc/securetty File

Linux restricts direct root logon via the /etc/securetty file. The SA will ensure the file has permissions of 640, or more restrictive, is owned by root with a group owner of root.

- *(LNX00620: CAT II) The SA will ensure the group owner of the /etc/securetty file is root, sys, or bin.*

- *(LNX00640: CAT II) The SA will ensure the owner of the /etc/securetty file is root.*

- *(LNX00660: CAT II) The SA will ensure the /etc/securetty file has permissions of 640, or more restrictive.*

12.18 RealPlayer

SUSE Linux includes RealPlayer as both a standalone player and as a plugin for web browsers like Mozilla and Konqueror. RealPlayer may also be downloaded and installed on most Linux platforms. There is an integer overflow vulnerability in the .rm RealMovie stream handling routines that will allow an attacker to execute code as the user running RealPlayer.

Affected SuSE versions;

- SUSE Linux versions up to 9.1 and the SUSE Linux Desktop 1.0 include RealPlayer version 8.

- SUSE Linux 9.2 and the Novell Linux Desktop 9 include RealPlayer version 10 and are NOT affected.

- *(LNX00680: CAT II) The SA will ensureRealPlayer version 8 is removed from SuSE 9.1 and SuSE Linux Desktop 1.0.*

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13. WORLD WIDE WEB SERVER SERVICES AND PROTOCOLS

Guidance for World Wide Web server services and protocols may be found in the *Web Server STIG*.

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14. SYSTEMS HOSTING DATABASE APPLICATIONS

Guidance for systems hosting database applications may be found in the *Database STIG*.

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APPENDIX A. RELATED PUBLICATIONS

Government Publications

Air Force Systems Security Instruction (AFSSI) 5100, "The Air Force Computer Security (COMPUSEC) Program," 2 June 1992.

Air Force Systems Security Memorandum (AFSSM) 5007, "A Methodology for Addressing DOD-Mandated "C2 by 92" for Operational Air Force Systems," 25 March 1991.

Army Regulation (AR) 380-19, "Information Systems Security," 1 August 1990.

Defense Information Systems Agency Instruction (DISAI) 630-230-19, "Security Requirements for Automated Information Systems (AIS)," July 1996.

Defense Information Systems Agency Instruction (DISAI) 630-255-7, "Internet, Intranet, and World Wide Web," September 1996.

Defense Information Systems Agency (DISA) Western Hemisphere (WESTHEM) Naming Convention Standards, February 1996.

Defense Information Systems Agency (DISA) Computing Services Security Handbook, Version 3, 1 December 2000.

Defense Information Systems Agency (DISA) Western Hemisphere (WESTHEM) Security Instruction 360-225-08, "Magnetic Tape Backup and Storage by Defense Megacenters," November 1997.

Defense Information Systems Agency (DISA) OS/390 Security Technical Implementation Guide, Version 4, Release 1 (2 volumes), 4 August 2003.

Defense Information Systems Agency (DISA) Network Infrastructure Security Technical Implementation Guide, Version 5, Release 3, 19 August 2003.

Defense Information Systems Agency (DISA) Web Server Security Technical Implementation Guide, Version 4, Release 1, 29 August 2003.

Defense Logistics Agency Regulation (DLAR) 5200.17, "Security Requirements for Automated Information and Telecommunications Systems," 9 October 1991.

Department of Defense CSC-STD-002-85, "DOD Password Management Guideline," 12 April 1985.

Department of Defense (DOD) Instruction Number 8500.2, 6 February 2003, Subject: Information Assurance (IA) Implementation.

Developer's Guide for Using Mobile Code Technologies in Department of Defense and Intelligence Community Information Systems.

DOD CIO Memo, Open Source Software (OSS) in Department of Defense (DOD), 28 May 2003.

DOD Directive 8000.1 (DOD), "Management of DOD Information Resources and Information Technology," 27 February 2002.

DOD Directive 8500.1 (DOD), "Information Assurance" 24 October 2002.

DOD instruction 8500.2 (DOD), "Information Assurance (IA) Implementation" 06 February 2003.

DOD 5025.1-M (DOD), "DOD Directives System Procedures," current edition.

MQSeries System Administration (Second Edition, March 1999).

MQSeries Planning Guide (8th Edition, January 1999).

National Security Agency (NSA), "Information Systems Security Products and Services Catalog" (Current Edition).

National Security Telecommunications and Information Systems Security Instruction (NSTISSI) No. 4009, "National Information Systems Security Glossary," September 2000.

Navy Staff Office Publication (NAVSO Pub) 5239-15, "Controlled Access Protection Guidebook," August 1992.

Public Law 100-235, 100th Congress, an Act cited as the "Computer Security Act of 1987," 8 January 1988.

Secretary of the Navy Instruction (SECNAVINST) 5239.2, "Department of the Navy Automated Information Systems (AIS) Security Program," 15 November 1989.

Hewlett-Packard

Using HP-UX
System Administration Tasks
Using the X Window System

International Business Machines, Inc.

AIX Version 4.3 System Management Guide: Operating System and Devices

Santa Cruz Operation, Inc.

SCO Open Desktop/SCO Open Server System Administrator's Guide - Operating System, Networking, and DOS Services (includes Performance and Troubleshooting)

Sun Microsystems, Inc.

Security, Performance, and Accounting Administration
SunShield Basic Security Module Guide
SunOS Reference Manual (*Section 1M, System Administration Commands*)

Other

Anonymous. *Maximum Linux Security*, 2000, Sams Publishing.

Clyde, Robert A., et al. 1994. *Raxco Security Directives Series, UNIX Standards and Guidelines.* Rockville, MD: Raxco and Company.

Garfinkel, Simon, and Gene Spafford. 1991 and 1994. *Practical UNIX Security.* Sebastopol, CA: O'Reilly and Associates, Inc.

Kirch, Olaf; Dawson, Terry. *Linux Network Administrators Guide, 2nd Ed.*, June 2000, O'Reilly and Associates.

Mann, Scott; Mitchell, Ellen. *Linux System Security*, 2000, Prentice Hall PTR.

McGilton, Henry, and Rachel Morgan, 1983. *Introducing the UNIX System.* New York: McGraw-Hill Book Company.

Peterson, Richard. *Red Hat Linux: The Complete Reference*, 2000, Osborne/MacGraw-Hill.

Siever, Ellen. *Linux in a Nutshell, 2nd Ed.*, February 1999, O'Reilly and Associates.

Woolley, George, Project Manager, et al. 1990. *UNIX Made Easy.* Berkeley, CA Osborne McGraw-Hill.

General Information Sites

http://www.auscert.org.au	Australian Computer Emergency Response Team They maintain security "how to" documents.
http://www.cert.mil	Defense Information Systems Agency (DISA) JTF-GNO (Joint Task Force – Global Network Operations)
http://www.cert.org	A focal point for the computer security concerns of Internet users

http://www.ciac.llnl.gov/	The U.S. Department of Energy's Computer Incident Advisory Capability
http://www.cs.purdue.edu	COAST (Computer Operations, Audit, and Security Technology) focuses on real-world research needs.
http://www.csrc.nist.gov	National Institute of Standards and Technology's Computer Security Resource Clearinghouse
http://www.datahouse.disa.mil	Defense Information Systems Agency (DISA) Home Page
http://www.nsi.org	National Security Institute's Security Resource Net Home Page
http://www.psionic.com	Psionic Software, Inc.
http://www.redbooks.ibm.com/redbooks/homepage.html	Redbooks, named for their red covers, are "how to" books, written by very experienced IBM professionals from all over the world.
http://www.rsa.com	RSA Data Systems (encryption software)
http://www.specbench.org	The Standard Performance Evaluation Corporation
http://www.utexas.edu/cc/unix	University of Texas UNIX Services
https://vms.disa.mil	Vulnerability Management System (VMS)

APPENDIX B. HOME DIRECTORY SECURITY-RELATED FILES

NAME	***DESCRIPTION***
.cshrc	C shell initialization commands. Run at each csh invocation.
.tcshrc	Tcsh shell initialization commands. Run at each tcsh invocation.
.elm	Hidden mail file
.emacs	Startup file for Gnu emacs editor
.esmvalues	Some basic values used by ESM
.exrc	Startup commands for ex and vi editors
.forward	address that tells /usr/lib/sendmail where to forward a user's electronic mail to – prohibited.
.kshrc	Korn Shell initialization commands
.login	C shell initialization commands. Run only on logon.
.logout	C shell commands executed automatically on logout
.netscape	The netscape initialization and configuration directory
.dt	The subdirectory containing CDE related files
.dtprofile	The profile used by CDE in addition to the normal .profile
.Owdefaults	OpenWindows defaults for Solaris
.profile	Bourne shell and Korn Shell initialization commands
.rhosts	Contains the names of the users who can log on to another user's account without providing a password using rsh and rlogin
.ssh2	Contains public/private keys and host information
.TTauthority	ToolTalk security file
.Xauthority	X Window system configuration security file
.Xdefaults, .Xinit, .Xresources, .Xsession	X Windows system startup files

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APPENDIX C. TCP_WRAPPERS PROCEDURES

Configure the TCP_WRAPPERS program prior to compile.

- The Makefile should be refrenced to ensure updates and configuration options are correctly configured.

- If using a compiler other than cc, define the compiler environment by placing a line similar to the following line after line one of the Makefile:

  CC=gcc

- Define where the network services daemons (such as in.telnetd and in.ftpd, or telnetd and ftpd) are normally located. For a Solaris system it will normally be /usr/sbin. For a HP 10.X system it will be /usr/lbin. For instance:

  REAL_DAEMON_DIR=/usr/sbin

- Define required object libraries for the system. If this is a Solaris system, uncomment the following line:

  LIBS = -lsocket –lnsl # SysV.4 Solaris 2.x

- If this is an HP system, uncomment the following line:

  LIBS = -lsyslog -lsocket -lnsl

- Uncomment the following line to enable banners and other extensions:

  STYLE = -DPROCESS_OPTIONS # Enable language extensions

- Set the UMASK to a minimum of 077.

  UMASK = -DDAEMON_UMASK=077

- The following option will disconnect systems whose IP address does not match their host name. This helps protect against host name spoofing:

  KILL_OPT = -DKILL_IP_OPTIONS

The TCP_WRAPPERS program is now ready to be compiled.

- Type make sunos5 or make hpux depending on the system. When compiled, make a directory for banners and badbanners:

  mkdir /banners;mkdir /banners/badbanners

- Copy the Banners.Makefile to /banners and to /banners/badbanners.

- Copy the DOD banners file to /banners/prototype.

- Change directory to /banners and type make.

- Change directory to badbanners.

- Create a short file called prototype that informs the users they are not allowed to log on to this system.

- Type make.

- Change directory to /etc and create the hosts.allow file using the following template:

  ALL: 192.136.137. 198.49.192. : banners/banners

A much more complicated access control list could be created. This file allows the indicated networks to access any network service available on the system.

- Create the hosts.deny file using the following template:

  ALL: ALL : banners/banners/badbanners

This file will disallow access to network services to all networks and hosts not defined in /etc/hosts.allow file.

APPENDIX D. ACKNOWLEDGEMENT OF RISK LETTER TEMPLATE

Unencrypted File Transfer
Unencrypted Terminal Sessions
30 August 2004
Version 1.1

We, the undersigned, acting as the Office of Primary Responsibility for [system/application name] and local Designated Approvinig Authority, have read the appropriate Operating System Security Technical Implementation Guide(s) (STIGs), which discuss the risks inherent in the use of (unencrypted file transfer or unencrypted terminal sessions) to perform (data transfers or terminal sessions) as part of an automated system to system interface. We have evaluated the alternatives to using (FTP or telnet) and have determined there are no currently available alternatives that meet our operational requirements. We have reviewed the risks associated with using unencrypted (file transfer or terminal sessions) and the controls that are in place to mitigate this risk. The primary risks and controls are reiterated in the following paragraphs *(the following are examples, you should detail the risk and controls below)*:

1. Maintaining automated scripts that contain userid/password pairs in a file on a system increases the potential for their compromise. As a mitigating control, we will ensure all scripts; JCL, Executive Control Language (ECL), programs, and/or data files containing one or more userid/password pairs are secured. In addition, we the office responsible for the scripts, JCL, ECL, programs, and/or data files will restrict access to the files to the fewest practical number of personnel.

2. The use of (FTP or terminal sessions) requires the userid/password and application data to be transmitted to/from the host system in clear text, across unsecured communication lines. While some data transfer can encrypt the data from point of source to destination, not all data transfer tools do. This increases the potential for compromise by various means (e.g., a sniffer program). The primary risk to the data source is disclosure of data to unauthorized persons, and the primary risk to the data destination is interception and modification of data by an unauthorized person. There is no direct mitigating control for this risk, but the office responsible for installation and configuration of the userid used for this interface will ensure the userid is configured with the lowest privilege level possible in order to limit the damage that it can do if compromised.

3. The compromise of the userid/password or application data could remain undetected for a long period of time. The password for this data transfer userid can (if justified/documented) be set to " an extended expiration," providing a procedure is developed and implemented, in coordination with the DAA and data owner, to manually change the password at least once a year or when an administrator with knowledge of the password leaves. The use of an extended expiration password increases the window of exposure to the system in the event the userid and password are compromised. This risk can be mitigated by periodic password changes even if the password is set with an extended expiration.

We will ensure the mitigating controls that must be implemented are accomplished. We will acknowledge any risks associated with not properly implementing these controls. We understand that any security violation traced back to a (FTP or telnet) may result in the suspension of system access for that userid and the security violation will be referred to the proper authorities for further investigation and action. We will ensure a copy of this letter is filed with the System Security Authorization Agreement (SSAA). This letter will be reviewed at least every 18 months or until some or all of the information below becomes outdated, or until the use of (FTP or telnet) is terminated.

Data Transfer Userid Name:	Installed on which system?
Source	Destination
Data Transfer product: (FTP, NDM, NFT, etc.)	
Data Source Information:	Data Destination Information:
System Name/ID:	System Name/ID:
Mission Assurance Category (MAC):	Mission Assurance Category (MAC):
Application Confidentiality Rating:	Application Confidentiality Rating:
Application Name:	Application Name:
File Name:	Access Level Requested:
IP Address:	IP Address:
Node Name:	Node Name:
(for NDM or other such products with Node Names)	
POC Name:	POC Name:
Alternate POC:	Alternate POC:
POC Organization:	POC Organization:
POC Phone:	POC Phone:
POC E-mail:	POC E-mail:
POC Mailing Address:	POC Mailing Address:

<signature PM for the interface data owner>	<signature local DAA>
<minimum GS-14/Military equiv>	<minimum GS-14/Military equiv.>
<typed or printed name>	<typed or printed name>
<typed or printed title>	<typed or printed title>
<typed email address>	<typed email address>
<date signed>	<date signed>

<expiration date: (18 months from date signed>

cc: <Other office involved with the interface>
<DAA for functional system>
<DISA CIO (if applicable)>

APPENDIX E. INSTALL CHECKLIST - CREATING NEW SYSTEMS

- To load or build a normal system, the following items are required. Most can be obtained from the network personnel.
  - The media containing the operating system to be loaded
  - The Internet address and name of the computer
  - The Internet address and name of the default gateway
  - The network mask (e.g., 255.255.255.224) for the network
  - The vendor recommended patches. Vendor patch repositories:
    - sunsolve.sun.com/ for Sun Systems
    - www1.itrc.hp.com/service/patch/mainPage.do? for Hewlett Packard systems
    - techsupport.services.ibm.com/ for AIX systems
    - support.sgi.com/irix/index.html for SGI systems
    - The HP and SGI sites require a free logon. AIX and Sun require a service contract and logon to access some of their material and some of their patches.
    - Some patches may be rejected during the application process because the package they are meant for is not on the system. (*UNIX STIG, Section 3.4, Vendor Recommended and Required Patches*)
    - The IAVAs and IAVA-recommended patches that apply to this system. The IAVAs must be read to determine if they apply. Newer patches may not be listed in older IAVAs, but the vendor systems provide an easy means for obtaining the latest patches. (*UNIX STIG, Section 3.4, Vendor Recommended and Required Patches*)
- Ensure the system is registered with the VMS. Contact DECC-D Chambersburg Help Desk
  - Commercial 405-739-5600 Option 5
  - DSN 570-9488
- Ensure the system SA is registered with the VMS.
  - Locate servers in secure areas that require positive identification for entry. (*UNIX STIG, Section 2.5.1.1, System Equipment*)
  - Connect the system to the network upon incorporation of *UNIX STIG* requirements. *(UNIX STIG, Section 1.1, Background*)
- Use the manufacturer's instructions for creating systems. Allocate sufficient space for /var, for holding mail, log, audit, and vendor patch data. (*UNIX STIG, Section, 3.22, File Systems*)
- Configure the default route.

- Create the /etc/notrouter file for Solaris systems using the command touch /etc/notrouter.

- Set the security mode to command for Solaris servers in secure areas, and set the EEPROM password to prevent the system from being booted to single user without a password. For IRIX, set the PROM password to prevent access to the hardware configuration. For Solaris systems in more open environments, set the security mode to full and make sure the autoboot parameter is set to false. Carefully record and save the EEPROM or PROM password in a secure container. (*UNIX STIG, Section 8.4, The Electrically Erasable Programmable Read-only Memory (EEPROM) Command* and *Section 11.2, Programmable Read-Only Memory (PROM)*)

- Obtain all vendor recommended and required security patches are applied. (*UNIX STIG, Section 3.4, Vendor Recommended and Required Patches*)

- The SA must respond, once the system is on-line, to all pertinent IAVAs on-line with the IAVA database.

- Set up Domain Name Service (DNS) - /etc/resolv.conf and /etc/nsswitch or configure as a dedicated DNS system.

- Ensure global initialization files contain the command mesg –n. (*UNIX STIG, Section 3.9.1, Global Initialization Files*)

- Set the system defaults using the files in the /etc/default directory for Solaris, and using SAM for HP, SMIT for AIX, etc. Use the *UNIX STIG* as a guide to these settings:

- Ensure root can only log on from the system console. (*UNIX STIG, Section 3.3, Root Account*)

- Configure password requirements to *UNIX STIG* values. (*UNIX STIG, Section 3.2.1, Password Guidelines*)

- Ensure there is cron logging. (*UNIX STIG, Section 3.18, Cron*)

- Set the number of failed logons to three. (*UNIX STIG, Section 3.1.3, Account Access*)

- Set delays between failed logons to 2-4 seconds, depending on the system. (*UNIX STIG, Section 3.1.3, Account Access*)

- Set the system and user's umask to 077. (*UNIX STIG, Section 3.14, Umask*)

- Ensure attempts to su are logged. (*UNIX STIG, Section 3.3, Root Account*)

- Configure network and kernel parameters, where applicable. (*UNIX STIG, Section 3.21, Kernel Tuning*)

- Ensure local initialization files do not contain the command mesg –y or mesg y. (*UNIX STIG, Section 3.9.2, Local Initialization Files*)

- Edit the inetd.conf file. Disable all unneeded network services by commenting out the line that defines them. Also, disable network services started via run control scripts. Document and justify to the IAO the need for any network services that are retained. Ensure the IAO, IAM, and NSO receive copies of the documentation. (*UNIX STIG, Section 4, Network Services*)

- Ensure the /tmp and any world writable public directories have the sticky bit set. (*UNIX STIG, Section 3.13.3, Sticky Bit*)

- Ensure system log files are no more permissive than 644. (*UNIX STIG, Section 3.5, File and Directory Controls*)

- Enable auditing (for HP, use SAM to put the system into trusted mode; for Solaris, use the bsmconv utility after following *UNIX STIG* instructions). (*UNIX STIG, Section 3.17, Audit Requirements*)

- If used, set up special utilities such as NFS, NIS, or NIS+. If they are not used, disable them or remove the software so that it does not get started automatically when rebooting the system. (*UNIX STIG, Section 5, Network Based Authentication* and *Section 4.20, Network Filesytem (NFS)*)

- Create user accounts with passwords. (*UNIX STIG, Section 3.2.1, Password Guidelines*)

- Create home directories with an initial protection of 700. (*UNIX STIG, Section 3.6, Home Directories*)

- Ensure the root search PATH (and the search path of root capable accounts) does not contain '.', '::', or start or end with a ':' or refer to a world writable directory or file. (*UNIX STIG, Section 3.3, Root Account*)

- If not already set by system default, create a home directory for root, other than '**/**', with access permissions of 700. Copy all the root local initialization files and directories (files and directories that begin with a '**.**') to the new directory (using the command from /roothome: cp –r ../.??* .), and change the passwd file to reflect the new home directory. Then delete the local initialization files from the '/' directory. (*UNIX STIG, Section 3.3, Root Account*)

- Ensure logon capability to default system accounts (e.g., bin, lib, uucp, news, sys, guest, daemon, and any default account not normally logged onto) are disabled by making the default shell /bin/false, /usr/bin/false, /sbin/false, /sbin/nologin, or /dev/null, and by locking the password. *(UNIX STIG, Section 3.16, Default Accounts*)

- Ensure there are no duplicate uids of 0. Delete them or change them. (*UNIX STIG, Section 3.3, Root Account*)

- Create files required by the *UNIX STIG* (or verify they already exist) and populate them, if necessary, using the *UNIX STIG* as a guide. The files are as follows:

  - /etc/shells (or equivelant) (*UNIX STIG, Section 3.11, Shells*)

  - cron.allow and/or cron.deny (*UNIX STIG, Section 3.18.3, Restrictions*)

  - at.allow and/or at.deny (*UNIX STIG, Section 3.19.3, Restrictions*)

- Ensure all logon attempts (both successful and unsuccessful) are logged to a system log file. (*UNIX STIG, Section 3.1.3, Account Access*)

- Reference the *UNIX STIG* sections, *UNIX Checklist*, and the system man pages for configuration guidance.

- If using sendmail or an equivalent follow the *UNIX STIG* guidelines for making the necessary configuration changes. If not using sendmail, ensure it does not get started automatically when the system is booted by renaming the associated files in the /etc/rc directories. They are generally named S88sendmail and K36sendmail, but may change depending on the system release. The sendmail daemon does not have to run if the system is not acting as a mail host. Local mail will still work. Sendmail can be run periodically from cron if only needed sporadically. (*UNIX STIG, Section 4.7, Sendmail or Equivalent*)

- Install an access contol program (e.g., TCP_WRAPPERS), if not already supplied with the operating system. Create and configure the hosts.allow and hosts.deny files. Configure the access contol program to display logon banners. (*UNIX STIG, Section 3.1.2, Logon Warning Banner* and *Section 6.6, Access Control Programs and TCP_WRAPPERS*)

- Ensure SSH is configured to work with TCP_WRAPPERS except in cases where the encryption utility can be configured for IP filtering and still display banners before granting access. Set the system clock to ensure proper logging times. (*UNIX STIG, Section 4.15, Secure Shell (SSH) and Equivalents*)

Perform an SRR using Field Security Operations UNIX SRR scripts. Correct or justify deficiencies. Run the scripts again after initial deficiencies are corrected. The scripts are available at **http://iase.disa.mil/**

- Create a system baseline (all device files, sgid and suid files, and system libraries and binaries), to include cryptographic hashes of files in the baseline. (*UNIX STIG, Section 2.5.3.1, File Integrity*)

APPENDIX F. XRESOURCES AND XCONFIG FILE EXTRACTS FOR BANNERS

Locate the string Dtlogin*greeting.labelString in the Xresources file. Whatever is there, replace it with something similar to the following:

Dtlogin*greeting.labelString: Hello \THIS IS A DEPARTMENT OF DEFENSE COMPUTER SYSTEM FOR WHICH MONITORING IS\nAUTHORIZED AT ALL TIMES. THIS COMPUTER SYSTEM, INCLUDING ALL RELATED\nEQUIPMENT, NETWORKS AND NETWORK DEVICES (SPECIFICALLY INCLUDING INTERNET\nACCESS), ARE PROVIDED ONLY FOR AUTHORIZED U.S. GOVERNMENT USE. DOD COMPUTER\nSYSTEMS ARE SUBJECT TO MONITORING FOR ALL LAWFUL PURPOSES, INCLUDING TO\nENSURE THEIR USE IS AUTHORIZED, FOR MANAGEMENT OF THE SYSTEM, TO\nFACILITATE PROTECTION AGAINST UNAUTHORIZED ACCESS, AND TO VERIFY SECURITY\nPROCEDURES, SURVIVABILITY AND OPERATIONAL SECURITY. MONITORING INCLUDES\nACTIVE ATTACKS BY AUTHORIZED DOD ENTITIES TO TEST OR VERIFY THE SECURITY\nOF THIS SYSTEM. DURING MONITORING, INFORMATION MAY BE EXAMINED, RECORDED,\nCOPIED AND USED FOR AUTHORIZED PURPOSES. ALL INFORMATION, INCLUDING\nPERSONALINFORMATION, PLACED ON OR SENT OVER THIS SYSTEM IS SUBJECT TO\nMONITORING. USE OF THIS DOD COMPUTER SYSTEM, AUTHORIZED OR UNAUTHORIZED,\nCONSTITUTES CONSENT TO MONITORING OF THIS SYSTEM. UNAUTHORIZED USE MAY\nSUBJECT YOU TO CRIMINAL PROSECUTION. EVIDENCE OF UNAUTHORIZED USE COLLECTED\nDURING MONITORING MAY BE USED FOR ADMINISTRATIVE, CRIMINAL OR OTHER ADVERSE\nACTION. USE OF THIS SYSTEM CONSTITUTES CONSENT TO MONITORING FOR THESE\nPURPOSES.
Dtlogin*greeting.persLabelString: Hello %s\n\n\n\n\nIF YOU ARE NOT A VALID SYSTEM USER ON THIS SYSTEM GET OUT NOW!
Dtlogin*greeting.alignment: ALIGNMENT_RIGHT

Additionally, there is one change in the Xconfig file. Comment out the line shown and replace it with the line following it:

#Dtlogin*resources: %L/Xresources
Dtlogin*resources: Xresources

Then, the files must be located together in the configuration directory. For this example, the file is; /etc/dt/config. This, or something similar, will work on OpenWindows, Motif, etc. This particular example is for the Common Desktop Environment.

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APPENDIX G. SECURITY REQUIREMENTS MODIFIABLE BY USERS

The SA and system users must recognize that user accounts have certain permissions and access rights that allow them to make changes within their environment that can degrade the security of a UNIX system. The SA has the access to ensure these STIG requirements are properly configured, but the user additionally has the access to modify the required settings, which may lead to an insecure UNIX system. These requirements and the sections these requirements can be located are listed below:

Section 3.1, User Account Controls

- *(GEN000280: CAT II) (Previously – G007) The IAO will ensure shared account logons are accomplished by invoking the su - (switch user) command from the individual user's UNIX session; the shared account will not be logged into directly.*

Section 3.4, File and Directory Controls

- *(GEN001140: CAT II) (Previously – G034) The SA will ensure there are no uneven file permissions. The exception will be in WWW server directory trees where write access may be granted to the group but denied to the owner.*

Section 3.5, Home Directories

- *(GEN001480: CAT II) (Previously – G053) The SA will ensure user home directories have initial permissions of 700, and never more permissive than 750.*

Section 3.6, User Files

- *(GEN001540: CAT III) (Previously – G067) The user, application developers, and the SA will ensure files and directories (excluding a limited set of local initialization files) in user home directory trees will be owned by the user who owns the home directory.*

- *(GEN001560: CAT II) (Previously – G068) The user, application developers, and the SA will ensure user files and directories will have an initial permission no more permissive than 700, and never more permissive than 750.*

Section 3.8.2, Local Initialization Files

- *(GEN001860: CAT II) (Previously – G056) The SA will ensure the owner of users local initialization files is the user or root.*

- *(GEN001880: CAT II) (Previously – G057) The SA will ensure local initialization files have permissions of 740, or more restrictive.*
  The following files/directories are to be excluded from GEN001880;
  .dt (a directory, this should have permissions of 755)

.dtprofile (a file, this should have permissions of 755)

- *(GEN001900: CAT II) The user and SA will ensure the PATH variable definition in local initialization files does not contain a* ***'.'*** *or '::', or start with a ':'.*

- *(GEN001920: CAT II) (Previously – G060) The SA will ensure local initialization files do not have the suid or sgid bit set.*

- *(GEN001940: CAT II) (Previously – G609) The SA will ensure local initialization files do not execute world writable programs.*

- *(GEN001960: CAT III) (Previously – G610) The SA will ensure local initialization files do not contain the command mesg –y or mesg y.*

Section 3.9, Trusted System/System Access Control Files

- *(GEN001980: CAT II) The SA will ensure .rhosts, .shosts, hosts.equiv, shosts.equiv, /etc/passwd, /etc/shadow, and /etc/group files will not contain a plus (+) unless defining entries for NIS+ netgroups.*

- *(GEN002000: CAT II) (Previously – G066) The SA will ensure .netrc files do not exist.*

- *(GEN002020: CAT II) (Previously – G614) The SA will ensure, if .rhosts, .shosts, hosts.equiv, and/or shosts.equiv files exist, will contain only lines with host-user pairs (e.g., host2 root) except in cases where they are defining netgroups for NIS+. These files will also to be justified and documented with the IAO.*

- *(GEN002040: CAT I) The SA will ensure .rhosts, .shosts, hosts.equiv, nor shosts.equiv are used, unless justified and documented with the IAO.*

- *(GEN002060: CAT II) (Previously – G615) The SA will ensure, if .rhosts, .shosts, hosts.equiv, and/or shosts.equiv files exist, they will not be accessible by anyone other than the owner or root.*

- *(GEN002080: CAT II) (Previously – G616) The IAO will not allow a trusted relationship with any system that is not also under the control of a security program that is acceptable to DOD.*

Section 3.12.1, Set User ID (suid)

- *(GEN002380: CAT II) (Previously – G082) The IAO will document the ownership, permissions, and location of any files having the suid bit set.*

Section 3.12.2 Set Group ID (sgid)

- *(GEN002440: CAT II) (Previously – G083) The IAO will document the ownership, permissions, and location of any files having the sgid bit set.*

Section 3.12.3, Sticky Bit

- *(GEN002480: CAT II) (Previously – G079) The SA will ensure no world writable files exist and world writable directories are public directories.*

Section 3.13, Umask

- *(GEN002560: CAT II) (Previously – G089) The SA will ensure the system and user umask is 077.*

- *(GEN002580: CAT III) (Previously – G090) The SA will ensure applications requiring a umask more permissive than 077, will be no more permissive than 022 and will be justified and documented with the IAO.*

Section 3.17.3, Restrictions

- *(GEN003000: CAT II) (Previously – G203) The SA and cron users will ensure crontabs do not execute group or world writable programs.*

- *(GEN003020: CAT II)) (Previously – G204) The SA and cron users will ensure crontabs do not execute programs located in, or subordinate to, world writable directories.*

- *(GEN003040: CAT II) The SA will ensure the owner of crontabs is root or the crontab creator.*

- *(GEN003080: CAT II) (Previously – G205) The SA will ensure crontabs have permissions of 600, or more restrictive, (700 for some Linux crontabs, which is detailed in the UNIX Checklist).*

- *(GEN003140: CAT II) (Previously – G208) The SA will ensure the group owner of the cron and crontab directories is root, sys, or bin.*

- *(GEN003220: CAT III) (Previously – G621) The SA will ensure cron jobs will not execute a program that sets the umask to a value more permissive than 077, unless justified and documented with the IAO.*

Section 3.18.3, Restrictions

- *(GEN003360: CAT II) (Previously – G215) The SA and at users will ensure programs executed via at are not group or world writable.*

- *(GEN003380: CAT II) (Previously – G216) The SA and at users will ensure at jobs do not execute programs in, or subordinate to, world writable directories.*

- *(GEN003440: CAT II) (Previously – G627) The SA will ensure at jobs will not execute a program that sets the umask to a value more permissive that 077, unless justified and documented with the IAO.*

Section 8.7, Extended File Attributes

- *(SOL00420: CAT II) The SA will ensure hidden extended file attributes do not exist.*

APPENDIX H. LIST OF ACRONYMS

ACL	Access Control List
AFSSI	Air Force Systems Security Instruction
AFSSM	Air Force Systems Security Memorandum
AIX	Advanced Interactive Executive
AORL	Acceptance of Risk Letter
API	Application Program Interface
AR	Army Regulation
ARP	Address Resolution Protocol
AS	Audit Server
ASDC3I	Assistant Secretary of Defense for Command, Control, Communications, and Intelligence
ASET	Automated Security Enhancement Tool
BIND	Berkeley Internet Name Daemon
BIOS	Basic Input Output System
BSD	Berkeley Software Distribution
BSM	Basic Security Module
C3I	Command, Control, Communication, and Intelligence
CIA	Confidentiality, Integrity, and Availibility
CIFS	Common Internet Filesystem
CIS	Center for Internet Security
CMOS	Complementary Metal-Oxide Semiconductor
COAST	Computer Operations, Audit, and Security Technology
COE	Common Operating Environment
COMPUSEC	Computer Security
COOP	Continuity of Operations Plan
COPS	Computer Oracle and Password System
COTS	Commercial-Off-The-Shelf
CPU	Central Processing Unit
DAA	Designated Approving Authority
DAC	Discretionary Access Control
DBMS	Database Management System
DES/3DES	Data Encryption Standard/Trible Data Encryption Standard
DHCP	Dynamic Host Configuration Protocol
DISA	Defense Information Systems Agency
DISAI	Defense Information Systems Agency Instruction
DISA WESTHEM	Defense Information Systems Agency - Western Hemisphere (formerly the Defense Information Services Organization; now the Computer Services Agency)
DLAR	Defense Logistics Agency Regulation
DLQ	Dead Letter Queue
DNS	Domain Name Service/Domain Name System

DOD	Department of Defense
DODD	Department of Defense Directive
DODI	Department of Defense Instruction
DODIG	DOD Inspector General
EEPROM	Electrically Erasable Programmable Read-only Memory
E-mail	Electronic Mail
ESM	Enterprise Security Manager
FAT	File Allocation Table
FSO	Field Security Operations
FSP	File Service Protocol
FTP	File Transfer Protocol: Defines how to transfer data from system to system.
GID	Group Identification
GOTS	Government-Off-The-Shelf
GRUB	Grand Unified Boot Loader
GUI	Graphical User Interface
HID	Host Based Intrusion Detection
HP-UX	Hewlett-Packard UNIX
HTTP	Hyper Text Transport Protocol
IAM	Information Assurance Manager
IAO	Information Assurance Officer
IASE	Information Assurance Support Environment
I&A	Identification and Authentication
IAVA	Information Assurance Vulnerability Alert
IAVM	Information Assurance Vulnerability Management
ICMP	Internet Control Message Protocol
IM	Instant Messaging
INFOCON	Information Operations Condition
INFOSEC	Information Security
INN	Internet Network News
IP	Internet Protocol
IRC	Internet Relay Chat
ITA	Intruder Alert
JTF-GNO	Joint Task Force – Global Network Operations
KDE	K Desktop and Environment
LAN	Local Area Network
LILO	Linux Loader

MCA	Message Channel Agent
MD5	A commonly used message digest hashing algorithm
MQID	Message Queue Identification
M-Time	Modification time of a file
MVS	Multiple Virtual Storage
NAVSO	Navy Staff Office
NetBIOS	Network Basic Input/Output System
NFS	Network Filesystem
NIAP	National Information Assurance Partnership
NID	Network Intrusion Detection
NIPRNet	Non-classified (but Sensitive) Internet Protocol Routing Network
NIS	Network Information Service
NIS+	Network Information Service Plus
NNTP	Network News Transfer Protocol
NSA	National Security Agency
NSO	Network Security Officer
NSTISSP	National Security Telecommunications and Information Systems Security Policy
NTFS	New Technology Filesystem
OAM	Object Authority Manager
OASD	Office of the Assistant Secretary of Defense
OS	Operating System
OSPF	Open Shortest Path First
PC	Personal Computer
PCF	Programmable Command Format
PDF	Product Description File
PDI	Potential Discrepancy Item
PKI	Public Key Infrastructure
P2P	Peer-to-Peer
RAS	Remote Access Service
RCERT	Regional CERT
rcp	Berkeley UNIX: remote copy program
REM	Remote Enterprise Management
RIP	Routing Information Protocol
RPC	Remote Procedure Call
RPM	Red Hat Package Manager
RSA	Rivest, Shamir, and Adleman
SA	System Administrator
SAM	Security Administration Manager
SAMI	Sournce and Methods Intelligence
SATAN	Security Administrator Tool for Analyzing Networks

SCCVI	Secure Configuration Compliance Validation Initiative
SCO	Santa Cruz Operation
SCRI	Secure Configuration Remediation Initiative
SCTS	Secure Configuration Tool Suite
SDID	Short Description Identifier
SECNAVINST	Secretary of the Navy Instruction
SGI	Silicon Graphics Inc.
SGID	Set Group ID
SIPRNet	Secret Internet Protocol Router Network
SM	Security Manager
SMB	Server Message Block
SMC	Solaris Management Console
SMTP	Simple Mail Transfer Protocol
SNMP	Simple Network Management Protocol
SOP	Standard Operating Procedure
SPARC	Scalable Processor Architecture
SRR	Security Readiness Review
SSH	Secure Shell
SSL	Secure Sockets Layer
SSAA	System Security Authorization Agreement
SSO	Systems Support Office
STIG	Security Technical Implementation Guide
SUID	Set User ID
TCB	Trusted Computing Base
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
UDP	User Datagram Protocol
UID	User Identification
UUCP	UNIX to UNIX copy program
VMS	Vulnerability Management System
VPN	Virtual Private Network
WESTHEM	Western Hemisphere
WWW	World Wide Web
XDM	X Display Manager