Software Communications Architecture Specification

APPENDIX B. SCA APPLICATION ENVIRONMENT PROFILE

Revision Summary

1.0	Initial Release
1.1	no changes
2.0	no changes
2.1	no changes
2.2	no changes

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APPENDIX B SCA APPLICATION ENVIRONMENT PROFILE

B.1 SCOPE.

This appendix defines an application environment profile (AEP) for the SCA, based on Standardized Application Environment Profile - POSIX® Realtime Application Support (AEP), IEEE Std 1003.13-1998.

B.2 STANDARDS.

The following standards are required in whole or in part by the SCA AEP profile.

Table B-1. Required Standards

Standard	SCA AEP
C Standard (ISO/IEC 9899:1990	PRT
POSIX.1 (ISO/IEC 9945 -1):1997	PRT
POSIX.1b (ISO/IEC 9945 -1):1997	PRT
POSIX.1c (ISO/IEC 9945 -1):1997	PRT
POSIX.5b (IEEE 1003.5 - 1992)	OPT

NOTE:
PRT — Partial, only the subset or options or Units of Functionality called out in A.3.
MAN — Mandatory, complete with all options.
OPT — Optional, may be included in the environment.

B.3 CONSTRAINTS.

The real-time profile defined in this standard requires only specific Units of Functionality of the required standards. The absence of particular elements of these standards introduces constraints on the use of some of the features of particular functions. This clause defines the constraints that an application strictly conforming to one of the profiles shall observe when using each of the functions required by that profile.

An Ada AEP has not been explicitly defined. Any Ada application shall be restricted to using the equivalent Ada functionality, as defined in POSIX.5b, designated as mandatory by this profile or may use the C interface.

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B.3.1 POSIX.1.

Table B-2. POSIX.1 Option Requirements

Option	SCA AEP
{NGROUPS_MAX}	-
{_POSIX_CHOWN_RESTRICTED}	NRQ
{_POSIX_JOB_CONTROL}	NRQ
{_POSIX_NO_TRUNC}	PRI
{_POSIX_SAVED_IDS}	NRQ
{_POSIX_VDISABLE}	NRQ

NOTE:
NRQ — Not required for this profile.
PRI — The primary file system shall generate an error for pathname components longer than NAME_MAX. The user is responsible for semantics of other file systems that may be mounted.

B.3.1.1 Single Process Function Behavior.

The functions in Table B-3 shall behave as described in the referenced clauses.

Table B-3. POSIX_SINGLE_PROCESS Functions

Function	Reference in POSIX.1	SCA AEP
sysconf ( )	4.8.1	NRQ
uname( )	4.4.1	NRQ
time()	4.5.1	MAN

NRQ — Not required for this profile.
MAN — Mandatory for this profile.

B.3.1.2 Multi-Process Function Behavior.

The functions listed in Table B-4 shall behave as described in the referenced clauses.

Table B-4. - POSIX_MULTI_PROCESS Functions

Function	Reference in POSIX.1	SCA AEP
execl ( )	3.1.2	NRQ
execv ( )	3.1.2	NRQ
execle ( )	3.1.2	NRQ
execve ( )	3.1.2	NRQ
execlp ( )	3.1.2	NRQ
execvp ( )	3.1.2	NRQ
_exit ( )	3.2.2	NRQ
fork( )	3.1.1	NRQ
getenv ( )	4.6.1	NRQ
getpid ( )	4.1.1	NRQ
getppid ( )	4.1.1	NRQ
sleep ( )	3.4.3	NRQ
times ( )	4.5.2	NRQ
wait( )	3.2.1	NRQ
waitpid ( )	3.2.1	NRQ
assert ( )	8.1, 8.2, 8.3	NRQ
exit ( )	8.1, 8.2, 8.3	NRQ
setlocale ( )	8.1, 8.2, 8.3	MAN

MAN — Mandatory for this profile.
NRQ — Not Required for this profile.

B.3.1.3 Job Control Function Behavior.

The functions listed in Table B-5 shall behave as described in the referenced clauses.

Table B-5. POSIX_JOB_CONTROL Functions

Function*	Reference in POSIX.1	SCA AEP
setpgid()	4.3.3	NRQ
tcgetpgrp()	7.2.3	NRQ
tcsetpgrp()	7.2.4	NRQ
*	7.1.1.4	NRQ

NOTE:
NRQ — Not required for this profile.
* — Further functionality is also defined here.

B.3.1.4 Signals Function Behavior.

The functions listed in Table B-6 shall behave as described in the referenced clauses, except for the following constraints:

(1) An application strictly conforming to SCA AEP shall be considered erroneous if any signal results in abnormal termination of the process because these profiles do not support multiple processes.

(2) An application strictly conforming to SCA AEP shall not call the kill() function with a negative argument because these profiles do not require process group functionality.

Table B-6. POSIX_SIGNALS Functions

Function	Reference in POSIX.1	SCA AEP
alarm()*	3.4.1	NRQ
kill()	3.3.2	MAN
pause()	3.4.2	MAN
sigaction()	3.3.4	MAN
sigaddset()	3.3.3	MAN
sigdelset()	3.3.3	MAN
sigemptyset()	3.3.3	MAN
sigfillset()	3.2.3	MAN
sigismember()	3.3.3	MAN
sigpending()	3.3.6	MAN
sigprocmask()	3.3.5	MAN
sigsupend()	3.3.7	MAN
abort()	8.1,8.2,8.3	MAN
siglongjmp()	8.1,8.2,8.3	NRQ
sigsetjmp()	8.1,8.2,8.3	NRQ

NOTE:
MAN — Mandatory for this profile.
NRQ — Not Required for this profile.
*Functionality provided through the POSIX timers.

B.3.1.5 User Group Function Behavior.

The functions listed in Table B-7 shall behave as described in the referenced clauses.

Table B-7. POSIX_USER_GROUPS Functions

Function	Reference in POSIX.1	SCA AEP
getegid()	4.2.1	NRQ
geteuid()	4.2.1	NRQ
getgid()	4.2.1	NRQ
getgroups()	4.2.3	NRQ
getlogin()	4.2.4	NRQ
getpgrp()	4.3.1	NRQ
getuid()	4.2.1	NRQ
setuid()	4.2.2	NRQ
setsid()	4.3.2	NRQ
setgid()	4.2.2	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.6 File System Function Behavior.

The functions listed in Table B-8 shall behave as described in the referenced clauses.

Table B-8. POSIX_FILE_SYSTEM Functions

Function	Reference in POSIX.1	SCA AEP
access()	5.6.3	MAN
chdir()	5.2.1	MAN
closedir()	5.1.2	MAN
creat()	5.3.2	MAN
fpathconf()	5.7.1	MAN
fstat()	5.6.2	MAN
getcwd()	5.2.2	MAN
link()	5.3.4	MAN
mkdir()	5.4.1	MAN
opendir()	5.1.2	MAN
pathconf()	5.7.1	MAN
readdir()	5.1.2	MAN
rename()	5.5.3	MAN
rewinddir()	5.1.2	MAN
rmdir()	5.5.2	MAN
stat()	5.6.2	MAN
unlink()	5.5.1	MAN
utime()	5.6.6	MAN
remove()	8.1, 8.2, 8.3	MAN
rename()	8.1, 8.2, 8.3	MAN
tmpfile()	8.1, 8.2, 8.3	MAN
tmpnam()	8.1, 8.2, 8.3	MAN

NOTE:
MAN — Mandatory for this profile.

B.3.1.7 File Attributes Function Behavior.

The functions listed in Table B-9 shall behave as described in the referenced clauses, except for the following constraint:

(1) An application strictly conforming to SCA AEP shall be guaranteed that the file mode creation mask for any object created by any process is `SS--IIRRWWXXUU`; that is, the object shall be fully accessible to the creator.

Table B-. POSIX_FILE_ATTRIBUTES Functions

Function	Reference in POSIX.1	SCA AEP
chmod()	5.6.4	NRQ
chown()	5.6.5	NRQ
umask()	5.3.3	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.8 File and Directory Management Function Behavior.

The functions listed in Table B-10 shall behave as described in the referenced clauses.

Table B-10. POSIX_FD_MGMT Functions

Function	Reference in POSIX.1	SCA AEP
dup()	6.2.1	NRQ
dup2()	6.2.1	NRQ
fcntl()	6.5.2	NRQ
lseek()	6.5.3	MAN
fseek()	8.1, 8.2, 8.3	MAN
ftell()	8.1, 8.2, 8.3	MAN
rewind()	8.1, 8.2, 8.3	MAN

NOTE:
NRQ — Not required for this profile.
MAN — Mandatory for this profile.

B.3.1.9 Device I/O Function Behavior.

The functions listed in Table B-11 shall behave as described in the referenced clauses.

Table B-11. POSIX_DEVICE_IO Functions

Function	Reference in POSIX.1	SCA AEP
close()	6.3.1	MAN
open()	5.3.1	MAN
read()	6.4.1	MAN
write()	6.4.2	MAN
clearerr()	8.1, 8.2, 8.3	MAN
fclose()	8.1, 8.2, 8.3	MAN
fdopen()	8.1, 8.2, 8.3	MAN
feof()	8.1, 8.2, 8.3	MAN
ferror()	8.1, 8.2, 8.3	MAN
fflush()	8.1, 8.2, 8.3	MAN
fgetc()	8.1, 8.2, 8.3	MAN
fileno()	8.1, 8.2, 8.3	MAN
fgets()	8.1, 8.2, 8.3	MAN
fopen()	8.1, 8.2, 8.3	MAN
fprintf()	8.1, 8.2, 8.3	MAN
fputc()	8.1, 8.2, 8.3	MAN
fputs()	8.1, 8.2, 8.3	MAN
fread()	8.1, 8.2, 8.3	MAN
freopen()	8.1, 8.2, 8.3	MAN
fscanf()	8.1, 8.2, 8.3	MAN
fwrite()	8.1, 8.2, 8.3	MAN
getc()	8.1, 8.2, 8.3	MAN
getchar()	8.1, 8.2, 8.3	MAN
gets()	8.1, 8.2, 8.3	MAN
perror()	8.1, 8.2, 8.3	MAN
printf()	8.1, 8.2, 8.3	MAN
putc()	8.1, 8.2, 8.3	MAN
putchar()	8.1, 8.2, 8.3	MAN
puts()	8.1, 8.2, 8.3	MAN
scanf()	8.1, 8.2, 8.3	MAN
setbuf()	8.1, 8.2, 8.3	MAN
sprintf()	8.1, 8.2, 8.3	MAN
sscanf()	8.1, 8.2, 8.3	MAN
ungetc()	8.1, 8.2, 8.3	MAN

NOTE:
MAN — Mandatory for this profile.

B.3.1.10 Device-Specific Function Behavior.

The functions listed in Table G-12 shall behave as described in the referenced clauses.

Table B-12. POSIX_DEVICE_SPECIFIC Functions

Function	Reference in POSIX.1	SCA AEP
cfgetispeed()	7.1.3	NRQ
cfgetospeed()	7.1.3	NRQ
cfsetispeed()	7.1.3	NRQ
cfsetospeed()	7.1.3	NRQ
ctermid()	4.7.1	NRQ
isatty()	4.7.2	NRQ
tcdrain()	7.2.2	NRQ
tcflush()	7.2.2	NRQ
tcflow()	7.2.2	NRQ
tcgetattr()	7.2.1	NRQ
tcsendbreak()	7.2.2	NRQ
tcsetattr()	7.2.1	NRQ
ttyname()	4.7.2	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.11 System Database Function Behavior.

The functions listed in Table B-13 shall behave as described in the referenced clauses.

Table B-13. POSIX_SYSTEM_DATABASE Functions

Function	Reference in POSIX.1	SCA AEP
getgrgid()	9.2.1	NRQ
getgrnam()	9.2.1	NRQ
getpwnam()	9.2.2	NRQ
getpwuid()	9.2.2	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.12 Pipe Function Behavior.

The function listed in Table B-14 shall behave as described in the referenced clause.

Table B-14. POSIX_PIPE_Function

Function	Reference in POSIX.1	SCA AEP
pipe()	6.1.1	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.13 FIFO Function Behavior.

The function listed in Table B-15 shall behave as described in the referenced clause.

Table B-15. POSIX_FIFO Function

Function	Reference in POSIX.1	SCA AEP
mkfifo()	5.4.2	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.1.14 C Language-Specific Services Behavior.

The functions listed in Table B-16, Table B-17, Table B-18, Table B-19, Table B-20, and Table B-21 shall behave as described in the referenced clauses.

Table B-16. POSIX_C_LANG_SUPPORT Character Handling Functions

Function	Reference in the C Standard	SCA AEP
isalnum()	4.3.1.1	MAN
isalpha()	4.3.1.2	MAN
iscntrl()	4.3.1.3	MAN
isdigit()	4.3.1.4	MAN
isgraph()	4.3.1.5	MAN
islower()	4.3.1.6	MAN
isprint()	4.3.1.7	MAN
ispunct()	4.3.1.8	MAN
isspace()	4.3.1.9	MAN
isupper()	4.3.1.10	MAN
isxdigit()	4.3.1.11	MAN
tolower()	4.3.2.1	MAN
toupper()	4.3.2.2	MAN

NOTE:
MAN — Mandatory for this profile.

Table B-17. POSIX_C_LANG_SUPPORT Mathematical Functions

Function	Reference in the C Standard	SCA AEP
acos()	4.5.2.1	MAN
asin()	4.5.2.2	MAN
atan()	4.5.2.3	MAN
atan2()	4.5.2.4	MAN
ceil()	4.5.6.1	MAN
cos()	4.5.2.5	MAN
cosh()	4.5.3.1	MAN
exp()	4.5.4.1	MAN
fabs()	4.5.6.2	MAN
floor()	4.5.6.3	MAN
fmod()	4.5.6.4	MAN
frexp()	4.5.4.2	MAN
ldexp()	4.5.4.3	MAN
log()	4.5.4.4	MAN
log10()	4.5.4.5	MAN
modf()	4.5.4.6	MAN
pow()	4.5.5.1	MAN
sin()	4.5.2.6	MAN
sinh()	4.5.3.2	MAN
sqrt()	4.5.5.2	MAN
tan()	4.5.2.7	MAN
tanh()	4.5.3.3	MAN

NOTE:
MAN — Mandatory for this profile.

Table B-18. POSIX_C_LANG_SUPPORT Non-Local Jump Functions

Function	Reference in the C Standard	SCA AEP
longjmp()	4.6.2.1	MAN
setjmp()	4.6.1.1	MAN

NOTE:
MAN — Mandatory for this profile.

Table B-19. POSIX_C_LANG_SUPPORT General Functions

Function	Reference in the C Standard	SCA AEP
abs()	4.10.6.1	MAN
atof()	4.10.1.1	MAN
atoi()	4.10.1.2	MAN
atol()	4.10.1.3	MAN
bsearch()	4.10.5.1	MAN
calloc()	4.10.3.1	MAN
free()	4.10.3.2	MAN
malloc()	4.10.3.3	MAN
qsort()	4.10.5.2	MAN
rand()	4.10.2.1	MAN
realloc()	4.10.3.4	MAN
srand()	4.10.2.2	MAN

NOTE:
MAN — Mandatory for this profile.

Table B-20. POSIX_C_LANG_SUPPORT String Handling Functions

Function	Reference in the C Standard	SCA AEP
strcat()	4.11.3.1	MAN
strchr()	4.11.5.2	MAN
strcmp()	4.11.4.2	MAN
strcpy()	4.11.2.3	MAN
strcspn()	4.11.5.3	MAN
strlen()	4.11.6.3	MAN
strncpy()	4.11.2.4	MAN
strncat()	4.11.3.2	MAN
strncmp()	4.11.4.4	MAN
strpbkr()	4.11.5.4	MAN
strrchr()	4.11.5.5	MAN
strspn()	4.11.5.6	MAN
strstr()	4.11.5.7	MAN
strtok()	4.11.5.8	MAN

NOTE:
MAN — Mandatory for this profile.

Table B-21. POSIX_C_LANG_SUPPORT Data and Time Functions

Function	Reference in the C Standard	SCA AEP
asctime()	4.12.3.1	MAN
ctime()	4.12.3.2	MAN
gmtime()	4.12.3.3	MAN
localtime()	4.12.3.4	MAN
mktime()	4.12.2.3	MAN
strftime()	4.12.3.5	MAN
time()	4.12.2.4	MAN
tzset()	4.12.2.4	NRQ

NOTE:
MAN — Mandatory for this profile.
NRQ — Mandatory for this profile.

B.3.2 POSIX.1b.

Table B-22 contains the required options, limits, and any other constraints on POSIX.1b.

Table B-22. POSIX.1b Option Requirements

9	SCA AEP
{_POSIX_ASYNCHRONOUS_IO}	MAN
{_POSIX_MAPPED_FILES}	NRQ
{_POSIX_MEMLOCK}	MAN
{_POSIX_MEMLOCK_RANGE}	MAN
{_POSIX_MEMORY_PROTECTION}	NRQ
{_POSIX_MESSAGE_PASSING}	MAN
{_POSIX_PRIORITIZED_IO}	NRQ
{_POSIX_PRIORITY_SCHEDULING}	NRQ
{_POSIX_REALTIME_SIGNALS}	MAN
{_POSIX_SEMAPHORES}	MAN
{_POSIX_SHARED_MEMORY_OBJECTS}	NRQ
{_POSIX_SYNCHRONIZED_IO}	PRT*
{_POSIX_TIMERS}	MAN
{_POSIX_FSYNC}	PRT**

NOTE:
NRQ — Not required for this profile.
MAN — Mandatory for this profile.
PRT — Partial
* fdatasync not required
** fsync not required

B.3.3 POSIX.1c.

Table B-23, Table B-24, Table B-25, Table B-26, Table B-27 and Table B-28 contain the required options, limits, and any other constraints on POSIX.1c.

Table B-23. POSIX.1c Option Requirements

Option	SCA AEP
{_POSIX_THREADS}	MAN
{_POSIX_THREAD_ATTR_STACKADDR}	MAN
{_POSIX_THREAD_ATTR_STACKSIZE}	MAN
{_POSIX_THREAD_PRIO_INHERIT}	MAN
{_POSIX_THREAD_PRIO_PROTECT}	MAN
{_POSIX_THREAD_PRIORITY_SCHEDULING}	MAN
{_POSIX_THREAD_PROCESS_SHARED}	NRQ
{_POSIX_THREAD_SAFE_FUNCTIONS}	PRT

NOTE:
NRQ — Not required for this profile.
MAN — Mandatory for this profile.
PRT — Partial, only the subset of units of functionality called out in A.3.3.

B.3.3.1 Re-entrant User Group Function Behavior.

The function listed in Table A-25 shall behave as described in the referenced clause.

Table B-24. POSIX_USER_GROUPS_R Function

Function	Reference in POSIX.1c	SCA AEP
getlogin_r()	4.2.4	NRQ

NOTE:
NRQ — Not required for this profile.

Table B-25. POSIX_DEVICE_SPECIFIC_R Function

Function	Reference in POSIX.1c	SCA AEP
ttyname_r()	4.7.4	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.3.2 File Locking Function Behavior.

The functions listed in Table B-26 shall behave as described in the referenced clauses.

Table B-26. POSIX_FILE_LOCKING Functions

Function	Reference in POSIX.1c	SCA AEP
getc_unlocked()	8.2.7	NRQ
getchar_unlocked()	8.2.7	NRQ
flockfile()	8.2.6	NRQ
ftrylockfile()	8.2.6	NRQ
funlockfile()	8.2.6	NRQ
putc_unlocked()	8.2.7	NRQ
putchar_unlocked()	8.2.7	NRQ

NOTE:
NRQ — Not required for this profile.

B.3.3.3 Reentrant C Language Support Function Behavior.

The functions listed in Table B-27 shall behave as described in the referenced clauses.

Table B-27. POSIX_C_LANG_SUPPORT_R Functions

Function	Reference in POSIX.1c	SCA AEP
asctime_r()	8.3.5	MAN
ctime_r()	8.3.6	MAN
gmtime_r()	8.3.7	MAN
localtime_r()	8.3.8	MAN
rand_r()	8.3.9	MAN
strtok_r()	8.3.4	MAN

NOTE:
MAN — Mandatory for this profile.

B.3.3.4 Reentrant System Database Function Behavior.

The functions listed in Table B-28 shall behave as described in the referenced clauses.

Table B-28. POSIX_SYSTEM_DATABASE_R Functions

Function	Reference in POSIX.1c	SCA AEP
getgrgid_r()	9.2.1	NRQ
getgrnam_r()	9.2.1	NRQ
getpwnam_r()	9.2.2	NRQ
getwuid_r()	9.2.2	NRQ

NOTE:
NRQ — Not required for this profile.