

## SDN87 RDK Applications Guide

*This document describes SOME of the applications that run under Singularity and their options. Success is based on building World.proj after completely removing the “base.obj” folder.*

```

... \base> msb Distro\World.proj
... \base> dbg /pipe
... \base> boottest pxe.vmc

```

### 1.1. AppendFormat

AppendFormat takes no parameters. Its output should always be “s=0000” indicating array space is cleared on allocation.

### 1.2. Benchmarks (also Windows\Benchmarks)

#### 1.2.1. Bartok

These are self-host tests of building the Singularity kernel on Singularity. This builds with the standard, single-process version of the Bartok compiler. [BartokH](#) uses the multi-process version of the compiler.

EX: (see Distro\Scripts\bb.script for how to use this and bartokh)

#### 1.2.2. BartokH

These are self-host tests of building the Singularity kernel on Singularity.

[Bartok](#) builds with the standard, single-process version of the Bartok compiler. This uses the multi-process version of the compiler.

EX: (see Distro\Scripts\bb.script for how to use this and bartok)

#### 1.2.3. CreateProcess

The goal of this test is to time how long it takes to create a process.

```
createprocess [-q] [-r=nn]
```

Parameter	Required	Name	Type	Default	Example
-q	no	Quiet Mode	boolean	false	-q

Parameter	Required	Name	Type	Default	Example
-r	no	Repetition count	integer	1	-r=3

Notes:

Ex: Singularity> **createprocess -r=3**

**Status:--Exit code: -1** (internal exception, probably can't find hard-coded "testpe" application component)

#### 1.2.4. Diskreadperf

Raw disk read performance test.

diskreadperf <device> [-mb=nn] [-chunk=nn] [-r=nn]

Parameter	Required	Name	Type	Default	Example
<device>	yes	Raw device to read (must be full path)	text		/dev/disk0
-mb	no	Megabytes to read/write	integer	10	-mb=1
-chunk	no	Chunk size in bytes for each read	integer	65536	-chunk=512
-r	no	Repetition count	integer	1	-r=5

Notes: number of reads will be **mb\*1024\*1024/chunk**

Ex:

```
Singularity> diskreadperf /dev/disk0
Ops/s: 734.88 MB/s: 45.93 Elapsed: 0.22
[AppGC: - cnt 0 bytes 0 Kern: ints 181 swi 184 gcs 0]
```

Status: Operational.

#### 1.2.5. Diskrw

Disk read/write performance test.

diskrw <device> [-r][-w][-x] -b=nn [-g=nn][-l=nn][-m=nn][-n=nn][-p=nn]

Parameter	Required	Name	Type	Default	Example
<device>	yes	Device to read/write (must be full path)	text		/dev/disk0
-b	yes	Set block size to <b>n</b> bytes (must be power of 2 >= 512)	integer		-b=512
-g	no	Repeat test <b>n</b> times	integer	1	-g=5
-l	no	Fix disk size limit at <b>n</b> megabytes	integer	0	-l=3
-m	no	Perform test with <b>n</b> megabytes of data	integer	0	-m=1
-n	no	Perform test with <b>n</b> blocks of data	integer	0	-n=1024
-p	no	Pause <b>n</b> seconds between iterations	integer	0	-p=3
-r	-r OR -w	Perform disk read test	boolean	false	-r

Parameter	Required	Name	Type	Default	Example
-w	-r OR -w	Perform disk write test	boolean	false	-w
-x	no	Perform test with random I/O offsets	boolean	false	-x

Notes:

Ex:

```
Singularity> diskrw /dev/disk0 -b=512 -g=2 -l=3 -m=1 -n=16 -p=3 -r
# Type: Sequential Read
# Disk: 3 MB
# Limit: 3 MB
# Work: 1.00 MB
# Ops: 2048
SR 512 2048 Ops/s: 425.58 MB/s: 0.21 Elapsed: 4.81 Check: 100000
SR 512 2048 Ops/s: 425.58 MB/s: 0.21 Elapsed: 4.81 Check: 100000
[AppGC :- cnt 0 bytes 0 Kern: ints 2427 swi 6204 gcs 0]
  symlink node: full=/dev/disk0, stripped=/dev
SR 512 2048 Ops/s: 435.67 MB/s: 0.21 Elapsed: 4.70 Check: 100000
SR 512 2048 Ops/s: 435.67 MB/s: 0.21 Elapsed: 4.70 Check: 100000
[AppGC :- cnt 0 bytes 0 Kern: ints 2416 swi 6169 gcs 0]
```

Status: Operational

### 1.2.6. Diskrwnull

This is the [Diskrw](#) codebase with some substitutions and an added

```
contract Hack
{
  message Hak();
  state HACK : one { Hak? -> Hak! -> HACK; }
}
```

Notes: **Not sure what this is about.**

Status: Untested.

### 1.2.7. Perfcnt

Hardware performance counter utility.

```
perfcnt [-k][-g][-i][-t][-d][-.][-,][-z][-s][-e=n][-ev=v][-p=n][-c=n][-w=n][-wv=v][-r=n]
```

Parameter	Required	Name	Type	Default	Example
-k	no	Configure for “kompute-bound” counting	boolean	false	-k
-g	no	Configure for general counting	boolean	false	-g
-i	no	Configure for I/O counting	boolean	false	-i
-t	no	Configure for TLB counting	boolean	false	-t
-d	no	Configure for Data Cache counting	boolean	false	-d
-.	no	Simple test	boolean	false	-.
-,	no	Simple test	boolean	false	-,

-z	no	Simple test	boolean	false	-z
-s	no	Show counters	boolean	false	-s
-e=n	no	Configure performance counter <b>n</b>	integer	-1	-e=2 -ev=256
-ev=v	no	Configure event value <b>v</b> (for pc <b>n</b> )	integer	-1	-e=2 -ev=256
-p=n	no	Read performance counter <b>n</b>	integer	-1	-p=2
-c=n	no	Read CPUID function <b>n</b>	integer	-1	-c=0
-w=n	no	Write to MSR <b>n</b>	integer	-1	-w=3 -wv=256
-wv=v	no	Write <b>v</b> (to MSR <b>n</b> )	integer	-1	-w=3 -wv=256
-r=n	no	Read MSR <b>n</b>	integer	-1	-r=3

Notes: If you start xbench.script you may have to kill the VPC or machine to get it to stop.

Ex: (see Distro\Scripts\bb.script, xbench.script, xwebfile.script for examples of how to use this)

```
Singularity> perfcnt '-g'
<tasks>...
Singularity> perfcnt '-s'evt: 0000000000000000 0000000000000000 0000000000000000
0000000000000000
pmc: 0000000000000000 0000000000000000 0000000000000000 0000000000000000
pfc: 0000000000000000 0000000000000000 0000000000000000 0000000000000000
```

Status: Operational. Need some notes on interpreting this.

### 1.2.8. SchedBench

Singularity Scheduling Benchmark Application.

schedbench [-b] [-n] [-w] [-x] [-i=n]

Parameter	Required	Name	Type	Default	Example
-b	no	Break at start of tests	boolean	false	-b
-n	no	No GC between tests	boolean	false	-n
-w	no	Wait for key press between tests	boolean	false	-w
-x	no	XML output	boolean	false	-x
-i=n	no	Iterate tests <b>n</b> times	integer	10,000	-i=3

Notes: Output copied to debugger;

Ex:

```
Singularity> schedbench
Schedbench running at KERNEL privilege
Yield 25          3 x52864158 310441 [swi= 126 int= 7 gc=0/0]
Yield 25:Ticks per yield: 12417.64
Yield 50          3 x32717664 186087 [swi= 271 int= 5 gc=0/0]
Yield 50:Ticks per yield: 3721.75
Yield 100         3 x70280649 382356 [swi= 510 int= 9 gc=0/0]
Yield 100:Ticks per yield: 3823.57
Wait 25           3 x29523240 163633 [swi= 131 int= 4 gc=0/0]
Wait 25:Ticks per wait: 6545.33
```

```

Wait 50          3 x56993952 319548 [swi= 276 int= 7 gc=0/0]
Wait 50:Ticks per wait: 6390.97
Wait 100         3 x113731125 637375 [swi= 550 int= 15 gc=0/0]
Wait 100:Ticks per wait: 6373.76
WaitAny 25       3 x25720629 137711 [swi= 130 int= 3 gc=0/0]
WaitAny 25:Ticks per WaitAny: 32874.00
WaitAny 50       3 x45256431 198659 [swi= 255 int= 4 gc=0/0]
WaitAny 50:Ticks per WaitAny: 4070.33
WaitAny 100      3 x93040671 500346 [swi= 511 int= 13 gc=0/0]
WaitAny 100:Ticks per WaitAny: 96128.66
Context 25       3 x14904885 80399 [swi= 52 int= 1 gc=0/0]
Context 25:Context overhead: Invalid
Context 25:Operations per cycle: 0.00
Context 25:Fairness min:206
Context 25:Fairness max:765
Context 25:Fairness avg:238.48
Context 25:Fairness stddev:112.39
Context 50       3 x34509780 186580 [swi= 103 int= 4 gc=0/0]
Context 50:Context overhead: Invalid
Context 50:Operations per cycle: 0.00
Context 50:Fairness min:209
Context 50:Fairness max:664
Context 50:Fairness avg:219.12
Context 50:Fairness stddev:64.36
Context 100      3 x41595156 182799 [swi= 201 int= 4 gc=0/0]
Context 100:Context overhead: Invalid
Context 100:Operations per cycle: 0.00
Context 100:Fairness min:0
Context 100:Fairness max:494
Context 100:Fairness avg:184.89
Context 100:Fairness stddev:88.61
UnregisterController 309042096, 0
-- Exit code: 1

```

Status: Operational.

### 1.2.9. SharedHeap

Show attributes associated with a file. The goal of this test is to time how long it takes to create a process.

```
sharedheapbench [-q][-r=n]
```

Parameter	Required	Name	Type	Default	Example
-q	no	Quiet Mode	boolean	false	-q
-r	no	Repetition count	integer	1	-r=3

Notes:

Ex:

```

Singularity> sharedheapbench
Time alloc/free ops in the shared heap
Tested 10000 alloc/free iterations of 10 bytes
Total cycles: 1644958422
Tested 10000 alloc/free iterations of 100 bytes
Total cycles: 1582620381
Tested 10000 alloc/free iterations of 1000 bytes

```

Total cycles: 1622824992  
 Tested 10000 alloc/free iterations of 10000 bytes  
 Total cycles: 3134901447

Status: Operational.

### 1.2.10. sharpSAT

Simple SAT (Chaff algorithm for solving instances of the boolean satisfiability problem in programming) solver for C# .”zChaff” was originally written by Dr. Lintao Zhang who is now at Microsoft Research. Requires a file with a problem written in “Conjunctive normal form”. Copy base\Applications\Benchmarks\sharpSAT\ move2distroScripts\sudoku.cnf (and any other CNF file to be processed) to base\ Distro\Scripts and build.

sharpsat <path-file>

Parameter	Required	Name	Type	Default	Example
<path-file>	yes	Path to CNF file	String		/init/solveThis.cnf

Notes: Interpret solutions as vars that are not negative or in parens. Have fun. It’s easy to modify the code to *only* print solutions. Next week: Lotto.

**[4][1][2][3]**    The 3 initial values given in CNF are in bold.  
 [2][3][4][**1**]    “223” means [row2-col2-value3].  
 [3][**2**][1][4]  
 [1][4][3][2]    See sudoku.slv and sudoku.jpg for interpretation of numeric dump below.

Ex:

```
Singularity> sharpsat /init/sudoku.cnf
Solving /init/sudoku.cnf
SAT
(1) (2) (3) (4) (5) (6) (7) (8) (9) (10)
(11) (12) (13) (14) (15) (16) (17) (18) (19) (20)
(21) (22) (23) (24) (25) (26) (27) (28) (29) (30)
(31) (32) (33) (34) (35) (36) (37) (38) (39) (40)
(41) (42) (43) (44) (45) (46) (47) (48) (49) (50)
(51) (52) (53) (54) (55) (56) (57) (58) (59) (60)
(61) (62) (63) (64) (65) (66) (67) (68) (69) (70)
(71) (72) (73) (74) (75) (76) (77) (78) (79) (80)
(81) (82) (83) (84) (85) (86) (87) (88) (89) (90)
(91) (92) (93) (94) (95) (96) (97) (98) (99) (100)
(101) (102) (103) (104) (105) (106) (107) (108) (109) (110)
-111 -112 -113 114 (115) (116) (117) (118) (119) (120)
121 -122 -123 -124 (125) (126) (127) (128) (129) (130)
-131 132 -133 -134 (135) (136) (137) (138) (139) (140)
-141 -142 143 -144 (145) (146) (147) (148) (149) (150)
(151) (152) (153) (154) (155) (156) (157) (158) (159) (160)
(161) (162) (163) (164) (165) (166) (167) (168) (169) (170)
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(191) (192) (193) (194) (195) (196) (197) (198) (199) (200)
(201) (202) (203) (204) (205) (206) (207) (208) (209) (210)
-211 212 -213 -214 (215) (216) (217) (218) (219) (220)
-221 -222 223 -224 (225) (226) (227) (228) (229) (230)
-231 -232 -233 234 (235) (236) (237) (238) (239) (240)
241 -242 -243 -244 (245) (246) (247) (248) (249) (250)
```

```

(251) (252) (253) (254) (255) (256) (257) (258) (259) (260)
(261) (262) (263) (264) (265) (266) (267) (268) (269) (270)
(271) (272) (273) (274) (275) (276) (277) (278) (279) (280)
(281) (282) (283) (284) (285) (286) (287) (288) (289) (290)
(291) (292) (293) (294) (295) (296) (297) (298) (299) (300)
(301) (302) (303) (304) (305) (306) (307) (308) (309) (310)
-311 -312 313 -314 (315) (316) (317) (318) (319) (320)
-321 322 -323 -324 (325) (326) (327) (328) (329) (330)
331 -332 -333 -334 (335) (336) (337) (338) (339) (340)
-341 -342 -343 344 (345) (346) (347) (348) (349) (350)
(351) (352) (353) (354) (355) (356) (357) (358) (359) (360)
(361) (362) (363) (364) (365) (366) (367) (368) (369) (370)
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(381) (382) (383) (384) (385) (386) (387) (388) (389) (390)
(391) (392) (393) (394) (395) (396) (397) (398) (399) (400)
(401) (402) (403) (404) (405) (406) (407) (408) (409) (410)
411 -412 -413 -414 (415) (416) (417) (418) (419) (420)
-421 -422 -423 424 (425) (426) (427) (428) (429) (430)
-431 -432 433 -434 (435) (436) (437) (438) (439) (440)
-441 442 -443 -444
Num Variables          444
Num Orig. Clauses     179
Num Learned Clauses   4
Num Learned Literals  18
Num Garbage Collection 0
Num Deleted Clauses   0
Num Deleted Literals  0
Num Decisions         8
Num Backtracks        4
Num Implications      102
Total Runtime         0.0359268188476563
Instance is           SATISFIABLE

```

Status: Operational.

### 1.2.11. SingBench

Singularity Benchmark Application (similar to SchedBench above)

Singbench [-b][-n][-w][-x][-i=n]

Parameter	Required	Name	Type	Default	Example
-b	no	Break at start of tests	boolean	false	-b
-n	no	No GC between tests	boolean	false	-n
-w	no	Wait for key press between tests	boolean	false	-w
-x	no	XML output	boolean	false	-x
-i=n	no	Iterate tests <b>n</b> times	integer	10,000	-i=3

Notes:

Ex:

```

Singularity> singbench -i=3
Singbench running at KERNEL privilege
Read CC          1 x 756801 =      756801 [swi=  0 int=  0 gc=0/0]
Lock Inc         1 x 139815 =     139815 [swi=  0 int=  0 gc=0/0]

```

```

Lock Ex Succ          1 x 145017 = 145017 [swi= 0 int= 0 gc=0/0]
Lock Ex Fail         1 x 144864 = 144864 [swi= 0 int= 0 gc=0/0]
Irq SVE/RSTR         1 x 264465 = 264465 [swi= 0 int= 0 gc=0/0]
Nothing               1 x 270495 = 270495 [swi= 0 int= 0 gc=0/0]
ABI Call              1 x 2157687 = 2157687 [swi= 0 int= 1 gc=0/0]
DateTime.Now          1 x 4142637 = 4142637 [swi= 0 int= 1 gc=0/0]
Yield                 1 x 508410 = 508410 [swi= 0 int= 0 gc=0/0]
Wait/Set              1000 x 602688 = 602688222 [swi= 999 int= 25 gc=0/0]
Send/Recv             1024 x 648543 = 664108245 [swi= 1024 int= 28 gc=0/0]
Send/RecvB-1          2 x 3167572 = 6335145 [swi= 3 int= 0 gc=0/0]
Send/RecvB-2          2 x 1256566 = 2513133 [swi= 3 int= 0 gc=0/0]
Send/RecvB-4          2 x 1878201 = 3756402 [swi= 3 int= 0 gc=0/0]
Send/RecvB-8          2 x 1334061 = 2668122 [swi= 3 int= 0 gc=0/0]
Send/RecvB-16         2 x 1924393 = 3848787 [swi= 3 int= 0 gc=0/0]
Send/RecvB-32         2 x 1156860 = 2313720 [swi= 3 int= 0 gc=0/0]
Send/RecvB-64         2 x 2138643 = 4277286 [swi= 3 int= 0 gc=0/0]
Send/RecvB-128        2 x 1231663 = 2463327 [swi= 3 int= 0 gc=0/0]
Send/RecvB-256        2 x 2053552 = 4107105 [swi= 3 int= 0 gc=0/0]
Send/RecvB-512        2 x 1299163 = 2598327 [swi= 3 int= 0 gc=0/0]
Send/RecvB-1K         2 x 1414098 = 2828196 [swi= 3 int= 0 gc=0/0]
Send/RecvB-2K         2 x 1094310 = 2188620 [swi= 3 int= 0 gc=0/0]
Send/RecvB-4K         2 x 1318509 = 2637018 [swi= 3 int= 0 gc=0/0]
Send/RecvB-8K         2 x 1178347 = 2356695 [swi= 3 int= 0 gc=0/0]
Send/RecvB-16K        2 x 1129203 = 2258406 [swi= 3 int= 0 gc=0/0]
Send/RecvB-32K        2 x 1266444 = 2532888 [swi= 3 int= 0 gc=0/0]
Send/RecvB-64K        2 x 1165086 = 2330172 [swi= 3 int= 0 gc=0/0]
Child S/RB-64K        2 x17086936 = 34173873 [swi= 2 int= 1 gc=0/0]
Send/Switch           1000 x 959960 = 959960178 [swi= 1007 int= 43 gc=0/0]
PageAlloc             1000 x 165452 = 165452877 [swi= 0 int= 7 gc=0/0]
                        [alloc=1000/ 3e8000 free=1000/ 3e8000 stack= 0/ 0]
CreateThread           100 x 5252619 = 525261906 [swi= 365 int= 23 gc=0/0]
                        [alloc= 1/ 10000 free= 0/ 0 stack= 100/ 99]
CreateChan             1000 x 2159684 = 2159684460 [swi= 9 int= 96 gc=0/0]
                        [alloc= 12/ c0000 free= 0/ 0 stack= 0/ 0]
NameChan               100 x19339295 = 1933929513 [swi= 470 int= 83 gc=1/0]
                        [alloc= 0/ 0 free= 0/ 0 stack= 100/ 99]
Acquire/rel            1 x 1976778 = 1976778 [swi= 0 int= 0 gc=0/0]
NameBind               1000 x13540963 = 13540963068 [swi= 5024 int=590 gc=0/0]

```

**Caught Arg\_ProcessCreateException**

-- Exit code: 1

Status: Waiting for a fix to testpe.

**no manifest! file=testpe.x86.manifest**

**Caught Arg\_ProcessCreateException**

### 1.2.12. SpecWeb99

Ported from SpecWeb99 source code by Mark Aiken. Tests a range of file sizes on a pseudo-random distribution with *many* threads. To use this, make sure your VPC has a 60G fixed allocation for the virtual disk. See the scripts **xwebfile.init.script** and **xwebfile.script** for how the webfiles benchmark is used. Some guidance may be inferred from the webfiles\Readme.txt.

```
webfiles <path> [-x] [-b=nn] [-c=nn] [-f=nn] [-k=nn] [-r=nn] [-t=nn] [-v=nn] [-w=nn]
```

Parameter	Required	Name	Type	Default	Example
-b=nn	no	Block Size to be read	integer	16384	-b=256



Parameter	Required	Name	Type	Default	Example
-c=nn	no	Set number of connections to simulate	integer	10	-c=5
-f=nn	no	Forced iterations	integer	0	-f=700
-k=nn	no	Restrict files to this class number	integer	-1	-k=3
-r=nn	no	Run time in seconds	integer	10	-r=120
-t=nn	no	Number of threads to use	integer	1	-t=16
-v=nn	no	Verbosity level <0-5>	integer	0	-v=5
-w=nn	no	Warmup time in seconds	integer	2	-w=10
-x	no	no read -- just bind	boolean	false	-x
<path>	yes	path to find wafgen99 data	string		/fs

Notes: SpecWeb99 is a commercial tool available from [www.spec.org/web99/](http://www.spec.org/web99/) externally and internally from the msros depot under main/Projects/GPU/SPECweb99Kit. More documentation is available in the base\Applications\WebApps\SPECweb99 folder. Output verbosity increases at v=2,3,5. See related [wafgen99](#), [Cadgen99](#), [Cassini](#), and [Upfgen99](#).

Ex:

```
Singularity> fatcontrol @format /dev/disk0
Formatted disk /dev/disk0
Label:    NO_NAME
Type:     Fat32
Capacity: 44 GiB
Singularity> fatcontrol @mount /dev/disk0 /fs
Singularity> webfiles /fs -c=2 -k=3 -v=5
  args: content=/fs/file_set dir=25 block size=16384
        verbose=5 FileSizeNum=-1 ClassSizeNum=3
        threads=1 forcedIterations=0
Entering Rampup state
size 102 file=/fs/file_set/dir00008/class0_0
size 409 file=/fs/file_set/dir00000/class0_3
size 921 file=/fs/file_set/dir00004/class0_8
size 819 file=/fs/file_set/dir00006/class0_7
size 614 file=/fs/file_set/dir00000/class0_5
...
size 716 file=/fs/file_set/dir00007/class0_6
size 716 file=/fs/file_set/dir00002/class0_6
size 409 file=/fs/file_set/dir00000/class0_3
Entering Run state
size 512 file=/fs/file_set/dir00004/class0_4
size 921 file=/fs/file_set/dir00000/class0_8
size 512 file=/fs/file_set/dir00008/class0_4
...
size 409 file=/fs/file_set/dir00019/class0_3
size 614 file=/fs/file_set/dir00006/class0_5
size 716 file=/fs/file_set/dir00017/class0_6
Generating class[0] prob=0.35 urlCount=350
size 7168 file=/fs/file_set/dir00006/class1_6
size 5120 file=/fs/file_set/dir00014/class1_4
...
```

```

size 6144 file=/fs/file_set/dir00008/class1_5
size 5120 file=/fs/file_set/dir00019/class1_4
May want to reset Monitoring state -- was active
size 3072 file=/fs/file_set/dir00001/class1_2
size 5120 file=/fs/file_set/dir00000/class1_4
size 5120 file=/fs/file_set/dir00002/class1_4
...
size 1024 file=/fs/file_set/dir00000/class1_0
size 6144 file=/fs/file_set/dir00013/class1_5
Generating class[1] prob=0.50 urlCount=850
size 61440 file=/fs/file_set/dir00006/class2_5
size 51200 file=/fs/file_set/dir00000/class2_4
...
size 61440 file=/fs/file_set/dir00006/class2_5
size 51200 file=/fs/file_set/dir00001/class2_4
Generating class[2] prob=0.14 urlCount=990
size 614400 file=/fs/file_set/dir00007/class3_5
size 409600 file=/fs/file_set/dir00000/class3_3
...
size 204800 file=/fs/file_set/dir00001/class3_1
size 614400 file=/fs/file_set/dir00019/class3_5
Generating class[3] prob=0.01 urlCount=1000
size 819 file=/fs/file_set/dir00022/class0_7
size 204 file=/fs/file_set/dir00015/class0_1
...
size 512000 file=/fs/file_set/dir00000/class3_4
size 512000 file=/fs/file_set/dir00000/class3_4
Generating class[3] prob=0.01 urlCount=1000
reading /fs/file_set/dir00010/class1_3
Thread 2 Outer Exception: Type 'System.Exception', Message ' file missing'.
Assertion failed: Thread 2 failed with Exception Type 'System.Exception', Message
' file missing'.
Break instruction exception - code 80000003 (!!! second chance !!!)

```

Status: (runs out of space) Uncaught exception. Use [wafgen99](#).

More needs to be done with this to craft the scripts to run in a reasonable partition. Not many test boxes have 60G to spare.

### 1.3. BootCount

Display and return the boot count.

Notes: No parameters. Counts soft boots using `ProcessService.GetKernelBootCount()`. Used in `bst.script` and `bvt.script`

Ex: `Singularity> bootcount 0`

Status: Operational.

### 1.4. BounceBackTest

Demonstrates client/server communication.

Notes: No parameters. Use “jobs”, “fg <n>”, “^C” to stop server.

Ex:

```

Singularity> bouncebackserver &
Singularity> bouncebackclient
(check debugger) Every call to bouncebackclient should see:
Loaded process "BounceBackClient" into kernel protection domain "Default"
::: no category
Received new ServerControl
Sending add 0 + 1
Server received add integer request
received 1
Sending add 1 + 2
Server received add integer request
received 3
Sending add 2 + 3
Server received add integer request
received 5
Sending add 3 + 4
Server received add integer request
received 7
Sending add 4 + 5
Server received add integer request
received 9
UnregisterController 271424852, 0

```

Status: Operational.

### 1.5. Cadgen99

Cadgen99 is a server-side sub-component of SpecWeb99 and appears to be deprecated for singularity by [wafgen99](#).

Parameter	Required	Name	Type	Default	Example
-d=str	yes	Directory in which to gen files	String		-d=/fs
-e=nn	yes	ptime	integer	0=>1800	-e=5
-t=nn	yes	max number of threads	integer		-t=700
-exp1=nn	yes	expiredAd1	integer		-exp1=3
-exp2=nn	yes	expiredAd2	integer		-exp2=5

Notes:

Status: Deprecated.

### 1.6. Cassini

Web server shell for running managed stress tests. Used in BVT and benchmark scripts.

```

cassini [-v][-s][-quitURL][-load=nn][-port=<id>][-vpath=<root>][-client=<ip>]
[-apparg=<arg>][-app=<appName>][-nspath=<appPath>]

```

Parameter	Required	Name	Type	Default	Example
-v	no	Verbose	boolean	false	-v
-s	no	Silent	boolean	false	-s

Parameter	Required	Name	Type	Default	Example
-quitURL	no	Allow special URL to terminate	boolean	false	-quitURL
-load=nn	no	Overload timeout threshold (in ms)	integer	1000	-load=3000
-port=<id>	no	Port ID to listen to	string	10	-port=80
-vpath=<root>	no	Root of Virtual Path	string	1	-vpath=webtestqa
-client=<ip>	no	Client IP	string	0	-client=157.54.144.104
-apparg=<arg>	no	Arg to pass to client app	string	2	-apparg=autorun
-app=<appName>	yes	Name of the app to run	string		-app=specweb99
-nspath=<appPath>	no	NS path to app to run	string	<null>	-nspath=/fs

Notes: See **specweb2.script**, **specweb99.script**, **specweball.script**, **startup.script** for examples of use. An entire doc might not do this topic justice. Applications (such as the SpecWeb99.x86 app in the example) frequently require additional setup.

See [WebApps](#) for a list of applications that may be used with [Cassini](#).

Ex:

```
Singularity> fatcontrol @mount /dev/disk0 /fs
FatFs mount disk path = /dev/disk0 mount path = /fs
Starting mount...
  symlink node: full=/dev/disk0, stripped=/dev
  symlink node: full=/dev/disk0, stripped=/dev
  symlink node: full=/dev/disk0, stripped=/dev
  symlink node: full=/dev/disk0, stripped=/dev
BlockCache suggested size = 2048 K, actual size = 2048 K (128 x 32 x 512)
Cache allocated 2097152
BlockCache suggested size = 30720 K, actual size = 30720 K (30 x 32 x 32768)
Cache allocated 31457280
Mounting Fat32 volume
Directory cache size = 256 directories
File cache size = 64 files
...completed.
SectorBytes = 512
SectorsPerCluster = 64 (32768 bytes)Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @verify /dev/nic0
Interface:    /dev/nic0
Adapter:     DE2114x Ethernet
Version:     DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
  Address: 157.54.144.118 NetMask: 255.255.252.0 Gateway: 157.54.144.1
Singularity> cassini -app=SPECWeb99.x86
Running Web Server on port 80.
Application '/' is mapped to '\'.
http://localhost:80/
```

(go to desktop IE and hit URL "[http://157.54.144.118/fs/file\\_set/](http://157.54.144.118/fs/file_set/)")

```
Got Uri: /fs/file_set/
- Incremented m_loadBase to 1
- 659 ms : vs 0
```

In IE:

## Directory Listing

Listing for "file\_set/":

```
(D)[dir00000]
(D)[dir00001]
(D)[dir00002]
(D)[dir00003]
(D)[dir00004]
...
(D)[dir00024]
```

Now run SpecWeb or some other web stress application from another machine to exercise the Singularity web host.

Status: Operational.

### 1.7. CHello

Console ‘Hello World’ app that attempts to make a connection to /dev/disk0 and reports failure.

Notes: No parameters

In CHello.sg, without the assembly attribute:

```
[assembly: Transform(typeof(ApplicationResourceTransform))]
```

...the change to Main() from

```
public static int Main(String[] args)
```

...to

```
internal static int Main(DefaultConfig! config)
```

...and DefaultConfig block:

```
[ConsoleCategory(HelpMessage="Classic Hello World app", DefaultAction=true)]
internal class DefaultConfig {
    [InputEndpoint("data")]
    public readonly TRef<UnicodePipeContract.Exp:READY> Stdin;

    [OutputEndpoint("data")]
    public readonly TRef<UnicodePipeContract.Imp:READY> Stdout;

    reflective internal DefaultConfig();

    internal int AppMain() {
        return CHello.Main(this);
    }
}
```

...applications like this will run but will generate a notification “old style” at the console.

```
Ex: Singularity> chello
If the VPC setup or hardware platform does not have a /dev/disk0 (dir /dev):
Hello World!
Bind of /dev/disk0 failed, Couldn't open disk0
Otherwise
Hello World! Opened disk0
Status: Operational.
```

## 1.8. ChildPing

Ping part of the Ping-Pong Web application benchmarks (used with [ChildPong](#)).

See ...base\Distro\Scripts\startup.script for details on how to start the web diagnostics.

```
Ex:
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @verify /dev/nic0
Hostname: singularity.redmond.corp.microsoft.com
DNS Servers:
    Primary name server 157.54.14.178
    Secondary name server 157.54.14.146
    Secondary name server 157.54.14.162
Interface:    /dev/nic0
Adapter:      DE2114x Ethernet
Version:      DE2114x Ethernet
MAC address:  00:03:ff:1d:10:56
    Address:  157.54.144.118    NetMask: 255.255.252.0    Gateway: 157.54.144.1
Singularity> webserver &
```

From a desktop command prompt, ping the IP that's displayed after "ipconfig @verify..." to make sure the webserver is operational, then browse to:

[http://157.54.144.118/HelloWebApp](http://157.54.144.118>HelloWebApp)

<http://157.54.144.118/DiagnosticsWebApp> – (this should display stats from running the ChildPing/Pong apps).

Notes: ChildPing is not a singularity console application. Attempts to run it from the Singularity> prompt result in "Can't start childping: Exception 'this manifest's category is not 'console'" (PingPong) 'caught'".

Status: Operational.

## 1.9. ChildPong

Pong part of the Ping-Pong Web application benchmarks. See [ChildPing](#) above.

Notes: This is not a console application.

Status: Operational.

## 1.10. Contracts

Simple contract template that implements a thread-safe counter supporting BeginCount, Count and Increment messages. Increment may succeed with AckIncrement or fail with NakIncrement;

Notes: This is not a console application.

Output: none

Status: Not referenced. Sample code.

### 1.11. CredentialsControl

Adds credentials (user id and password) to the credentials store.

```
Ex: Singularity> cred -?
    Singularity> cred @listmap
    Singularity> cred @list
    Singularity> cred @add billg n05t3v3j09s -tag=izune
```

Parameter	Required	Name	Type	Default	Example
@cmd	yes	Command: <i>add, del, delall, list, addmap, delmap, delmapall, listmap, testmap</i>	string		@list
<...>		options based on command, use 'cred -?' for details			

Notes: Requires a running /service/credentials, not in default builds. Expand this with detailed command coverage.

Output: none

Status: **Untested**.

### 1.12. Date

Echo the Kernel and UTC date and time.

```
Ex: Singularity> date
```

```
Kernel: 00:32:11.8693557
UTC: 2008/10/28 00:01:43.880
```

Notes: No parameters.

Status: Operational.

### 1.13. DebugPipe

Echo console information to the debugger.

Notes: No parameters.

Some applications like 'echo' do not have an stdin specified in their manifests and generate an error "no stdin data pipe specified in manifest".

Intrinsics like 'dir' will generate the error "'dir' is not a command or has no manifest".

```
Ex: Singularity> debugpipe
this string will appear in the debugger ...
now! and the next line will close debugpipe
@exit
Singularity> cat /init/tgulp.script | debugpipe
```

Output: To the debug window if it's attached.

```
[debugpipe p54 t 0 main ] this string will appear in the debugger...
[debugpipe p54 t 0 main ] now! and the next line will close debugpipe
[shell p11 t 0 main ] Command : cat /init/tgulp.script
[shell p11 t 0 main ] Command : debugpipe
[debugpipe p53 t 0 main ] tcpgulp '157.55.97.48' '9'
```

Status: Operational.

### 1.14. Echo

Copy following text to the console.

Ex:

```
Singularity> echo 'here is the date and time'
Singularity> Date
```

Notes: No parameters. Useful during scripting because script lines are not echoed to the console. Would be more useful if it supported “-d” and copied to the debug window.

Output: To the debug window if it's attached.

Status: Operational.

### 1.15. EmailServer

Complete SMTP mail server composed of AntiVirus, MailStore, Smtplib, and SmtplibNoNet projects.

```
Ex: Singularity> antivirus -??
Singularity> mailstore -??
Singularity> mailstore -account=charless -files=/init/startup.script
Singularity> smtpagent -??
Singularity> smtpagent -mailstore service=/service/services/SmtplibClientService
Singularity> smtpAgentNoNet -?
```

Notes: Build base\Distro\Smtplib.proj and see base\Distro\Scripts\([startup.script](#) and [smtpReset.script](#)) for information on setting up the SMTP mail server.

This section needs to be expanded for each component and to include actual use.

Status: Operational. Largely untested. [Startup.script](#) refers to “smtpd” which must have been renamed.

### 1.16. Eventing

Composed of the following project directories:

**EventActive** – Showcases the [SingUnit](#) unit test harness facility with a framework for a “Simple Active Counter Test”. A sing-# (singsharp) file **EventActive.sg** has a

```
public class TestActiveCounter : ActiveSource
```

...and a test class

```
[TestClass]
public class EventActive : TestClass
{
    [TestMethod]
```



```
public void TestAll()
```

...that is referenced in the resource file **EventActive.tst**:

```
<Profile Name="ProfileEventActive">
  <Module Name="EventActive">
    <Suite Name="EventActive">
      <Test Name="TestAll"/>
    </Suite>
  </Module>
</Profile>
```

To run this test, at the prompt just type:

Ex: Singularity> **singunit eventactive.tst**

Output: (Echoed in the debugger if attached)

Look for: PASSED/FAILED <test name> PROFILE Passed: x Skipped: y Failed: z

```
Binder.LoadImage: application=singunit, folder=/init/singunit, appName=singunit
Loading SingUnit [13beb000...13cfa000 bytes]
Loaded process "SingUnit" into kernel protection domain "Default"
BEGIN eventactive:INIT PROFILE
BEGIN eventactive:EventActive:INIT MODULE
Binder.LoadImage:
application=eventactive, folder=/init/eventactive, appName=eventactive
Loading EventActive [13a52000...13b08000 bytes]
Loaded process "EventActive" into kernel protection domain "Default"
```

#### Testing started

```
PASSED eventactive:EventActive:INIT
BEGIN eventactive:EventActive:EventActive:INIT SUITE
PASSED eventactive:EventActive:EventActive:INIT
BEGIN eventactive:EventActive:EventActive:TestAll:INIT TEST
PASSED eventactive:EventActive:EventActive:TestAll
PASSED eventactive:EventActive:EventActive:CLEANUP
PASSED eventactive:EventActive:EventActive SUITE Passed: 3 Skipped: 0 Failed: 0
```

#### Testing complete

```
PASSED eventactive:EventActive:CLEANUP
INFO eventactive:EventActive MODULE SHUTDOWN TIMED OUT
UnregisterController 330295412, 0
PASSED eventactive:EventActive MODULE Passed: 5 Skipped: 0 Failed: 0
PASSED eventactive PROFILE Passed: 5 Skipped: 0 Failed: 0
UnregisterController 332319412, 0
```

**EventTest** – showcases singunit test harness with Sing# file **EventTest.sg** which JUST has

```
[TestClass]
public class EventTest : TestClass
  [TestMethod]
  public void TestAll()

  [TestMethod]
  public void Test...()
  ...
```

...and a host of other methods called from TestAll() which is *NOT* referenced in **Event.tst**:

```
<Profile Name="Event">
```

```

<Module Name="EventTest">
  <Suite Name="EventTest">
    <Test Name="Test 1"/>
  </Suite>
</Module>
</Profile>

```

To run this test, at the prompt just type:

Ex: Singularity> **singunit event.tst**

Output: Note that “Test 1” was not found; this should have been "TestAll".

```

Binder.LoadImage: application=singunit, folder=/init/singunit, appName=singunit
Loading SingUnit [1395d000...13a6c000 bytes]
Loaded process "SingUnit" into kernel protection domain "Default"
BEGIN event:INIT PROFILE
BEGIN event:EventTest:INIT MODULE
Binder.LoadImage: application=eventtest, folder=/init/eventtest, appName=eventtest
Loading EventTest [137e2000...138a0000 bytes]
Loaded process "EventTest" into kernel protection domain "Default"
Testing started
PASSED event:EventTest:INIT
BEGIN event:EventTest:EventTest:INIT SUITE
register event succeeded
Registering enums
PASSED event:EventTest:EventTest:INIT
BEGIN event:EventTest:EventTest:Test 1:INIT TEST
SKIPPED event:EventTest:EventTest:Test 1 Test not found: Test 1
PASSED event:EventTest:EventTest:CLEANUP
PARTIAL event:EventTest:EventTest SUITE Passed: 2 Skipped: 1 Failed: 0
Testing complete
PASSED event:EventTest:CLEANUP
INFO event:EventTest MODULE SHUTDOWN TIMED OUT
UnregisterController 327773124, 0
PARTIAL event:EventTest MODULE Passed: 4 Skipped: 1 Failed: 0
PARTIAL event PROFILE Passed: 4 Skipped: 1 Failed: 0
UnregisterController 329640628, 0

```

Status:

**EvStress** – showcases the [SingUnit](#) test harness with Sing# file **EvStress.sg** which just has

```

[TestClass]
public class EvStress : TestClass
[TestMethod]
public void TestAll()

```

...and a host of other methods called from TestAll() which is referenced in **EvStress.tst**:

```

<Profile Name="ProfileEvStress">
  <Module Name="EvStress">
    <Suite Name="EvStress">
      <Test Name="TestAll"/>
    </Suite>
  </Module>
</Profile>

```

To run this test, at the prompt just type:

Ex: Singularity> **singunit evstress.tst**

Output: Note how the module and profile are flagged as FAILED since 2 passed but 1 failed, timing out during shutdown.

```
Binder.LoadImage: application=singunit, folder=/init/singunit, appName=singunit
Loading SingUnit [13702000...13811000 bytes]
Loaded process "SingUnit" into kernel protection domain "Default"
BEGIN evstress:INIT PROFILE
BEGIN evstress:EvStress:INIT MODULE
Binder.LoadImage: application=evstress, folder=/init/evstress, appName=evstress
Loading EvStress [1353b000...135f2000 bytes]
Loaded process "EvStress" into kernel protection domain "Default"
Testing started
PASSED evstress:EvStress:INIT
BEGIN evstress:EvStress:EvStress:INIT SUITE
PASSED evstress:EvStress:EvStress:INIT
BEGIN evstress:EvStress:EvStress:TestAll:INIT TEST
register event succeeded
Registering enums
FAILED evstress:EvStress:EvStress:TestAll test timed out
INFO evstress:EvStress MODULE SHUTDOWN TIMED OUT
UnregisterController 324963092, 0
FAILED evstress:EvStress test timed out Passed: 2 Skipped: 0 Failed: 1
FAILED evstress PROFILE Passed: 2 Skipped: 0 Failed: 1
UnregisterController 327170740, 0
```

**Testdef** – base event code referenced in [EventTest](#) and [EvStress](#) above.

### 1.17. Godot

Showcase thread synchronization with Mutex/Waithandle.

Parameter	Required	Name	Type	Default	Example
-d	No	Echo output to debugger	boolean	false	-d
-t nn	No	Number of waiters (threads)	integer	2	-t=5

### 1.18. Hello

Absolute simplest Hello.cs.

Notes: Generates ‘old style’ notification when run. See [CHello](#) for an explanation. Compare to Hello2.cs in [Hello2](#).

Ex:

```
Singularity> hello
old style
Hello World!
```

Status: Operational.

### 1.19. Hello2

New invocation paradigm using:

```
internal class Parameters
```

...and

```
internal static int AppMain(Parameters! config)
```

Compare to [Hello](#).

Ex:

```
Singularity> hello2
```

```
Hello World!
```

Status: Operational.

### 1.20. HelloMp

Place-holder for injected assembler demonstration from [HelloMpAsm](#).

### 1.21. HelloMpAsm

Follow directions in **README** to facilitate a network boot (note ISO update for use with VPC) that includes a HelloMp.cpp-based application that writes directly to the screen.

Status: untested.

### 1.22. Iltest

Sample code ilstart.cpp, iltest.cs. missing .csproj

Status: Unused. Sample code?

### 1.23. IoLibtest

Possibly the smallest demo app. Attempts to delete the path-filename passed as an arg.

Parameter	Required	Name	Type	Default	Example
<path-file>	yes	Path to a file to delete	string		/fs/file_set/dir00000/class0-0

Notes: “old style” application.

Ex:

```
Singularity> fatcontrol @format /dev/disk0
```

```
Formatted disk /dev/disk0
```

```
Label:    NO_NAME
```

```
Type:    Fat32
```

```
Capacity: 44 GiB
```

```
Singularity> fatcontrol @mount /dev/disk0 /fs
```

```
Singularity> wafgen99 /fs -n=1 -c=
```

```
Singularity> iolibtest /fs/file_set/dir00000/class0_0
```

If you pass an invalid path-filename:

```
Bind to <...> failed
```

Otherwise nothing.

Status: Operational.

### 1.24. iso9660

Consisting of the following projects:

#### 1.24.1. cddump

Dump CD device data in hex format with a “more” user interaction (unless -d invoked).

```
cddump <device path-name> <blocks> [-d=true]
```

Parameter	Required	Name	Type	Default	Example
<path-file>	yes	Path to raw device	string	(1 <sup>st</sup> param)	/dev/disk0
-blocks=nn	yes	Number of blocks to dump	integer	(2 <sup>nd</sup> param)	3
-d	no	Dump to debugger, no pause	boolean	false	true

```
Ex: Singularity> cddump /dev/disk0 1
0000: 52 52 61 41 00 00 00 00-00 00 00 00 00 00 00 00 00 RRaA.....
0010: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00 00 .....
...
01e0: 00 00 00 00 72 72 41 61-ad 0f 16 00 1d 00 00 00 00 ....rrAa.....
01f0: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 55 aa .....U.
...
07e0: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00 00 .....
07f0: 00 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00 00 .....
Status: Operational.
```

### 1.24.2. cdmount

Mount a raw device as a CD. In VPC disk1 (the boot device) is usually mapped to the singldr boot CD ISO.

```
ccmount <device path-name> <filesystem-path> [-s=true]
```

Parameter	Required	Name	Type	Default	Example
<path-file>	yes	Path to raw device	string	(1 <sup>st</sup> param)	/dev/disk0
<path-filesys>	yes	Path to desired filesys root	string	(2 <sup>nd</sup> param)	/fs
-s	no	Silent mount	boolean	false	-s=true

Notes: Not much silence when using -s=true.

```
Ex:
Singularity> cdmount /dev/disk1 /fs
mounting /dev/disk1 at /fs
Sending mount request...
Mount succeeded.
Singularity> dir /fs
<file> etfs_bs.bin
<file> fat16_bs.bin
<file> fat32_bs.bin
<file> files.txt
<file> nibfile1.txt
<file> singldr
<dir> singular/
<file> usbfat16.bin
```

Status: Operational.

### 1.24.3. cdunmount

Un-mount a volume that you mounted with [cdmount](#).

```
cdunmount <path-filesys> [-s=true]
```

Parameter	Required	Name	Type	Default	Example
<path-filesys>	yes	Path to filesys to unmount	string	(1 <sup>st</sup> param)	/fs
-s	no	Silent mount	boolean	false	-s=true

Notes: Not much silence when using -s=true.

Ex:

```
Singularity> cdunmount /fs
Sending unmount request...
Unmount succeeded.
```

Status: Operational.

### 1.25. jobtest

Echo stdin to stdout. Test app for ... base\Libraries\Manifest\job.sg: public class ConsoleJob : ITracked. Demonstrates firing a job from code and interacting with events and streaming stdout.

Start this then invoke a command line that processes a stream to stdout.

```
jobtest
```

Notes: No parameters. At 'enter job>' prompt type 'q' to end (or use ^C).

Ex:

```
Singularity> jobtest
enter job> cat /init/tgulpt.script
  ConsoleJob.CreateProcess: cmd=cat /init/tgulpt.script
  ConsoleJob: setting endpoints for cat, action=()
tcpgulp '157.55.97.48'
cat /init/tgulpt.script
enter job>q
```

Status: Operational

### 1.26. Lisp

Interpret a lisp string or file.

```
lisp [-d] [/trace] '<lisp expression>'
```

Parameter	Required	Name	Type	Default	Example
-d	no	Copy output to debugger	boolean	false	-d=true
/trace	no	Verbose expression evaluation	string	false	/trace
'<expression>'	yes	Lisp expression	string		'(+ 1 2)'

Notes: Examine ...\base\Libraries\ProtoLisp\Interpreter.cs to see the list of (only 5) primitives

"cond", "quote", "define", "lambda", "defun" (no "list", **use "quote" instead of single quote**, ...).

To overcome (really short) command line length limits, create a script file

(i.e.: *notepad ...\base\Distro\Scripts\doLisp.script*) with, for instance,

```
lisp '(defun shouldbe () (quote (should be)))
(cons (car (shouldbe)) (cons (quote not) (cdr (shouldbe))))'
...then build. Run the script by name.
```

```
Singularity> dolisp
```

The interpreter parses the /trace flag, singularity parses the '-d'.

Ex:

```
Singularity> lisp '(+ 1 2)'
3
Singularity> lisp -d=true /trace '(+ 1 2) ((lambda (arg) (+ arg 1)) 5)'
** Evaluating: (+ 1 2)
** Evaluating: 1
** Evaluating: 2
** Evaluating the expression "+" as a function
3
** Evaluating: ((lambda (arg) (+ arg 1)) 5)
** Evaluating: 5
** Evaluating the expression "(lambda (arg) (+ arg 1))" as a function
** Evaluating: (lambda (arg) (+ arg 1))
** Executing a closure...
** Evaluating: (+ arg 1)
** Evaluating: arg
** Evaluating: 1
** Evaluating the expression "+" as a function
6
```

Status: Operational

## 1.27. Login

Spawn a shell with credentials. See [CredentialsControl](#) for adding account names.

Notes:

```
Ex: Singularity> login
login: guest
Singularity Shell (PID=7)
Type 'help' to get a list of valid commands.
Welcome to Singularity
Singularity (guest)>
...
Singularity (guest)> exit
```

Status: **BUG: keyboard strokes echoed to console twice (PS #76)**

## 1.28. MapPointProxy

Demonstrates hosting a complete web site that accesses Mappoint data for displaying maps. For use with the web application [MapDemo](#). The "README.txt" has instructions for setting this up using ...\\base\\Distro\\Scripts\\MapDemo.script.

```
mappoint [proxy]
```

Parameter	Required	Name	Type	Default	Example
proxy	no	Proxy IP address if required	string		157.54.144.1

Notes: Must edit the MapDemo script first and replace the proxy address (or remove if you don't use one), then build.

Ex:

```
Singularity> MapDemo
ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
ipconfig @show
Hostname: singularity.redmond.corp.microsoft.com
DNS Servers:
    Primary name server 157.54.14.178
    Secondary name server 157.54.14.146
    Secondary name server 157.54.14.162
Interface: /dev/nic0
Adapter:    DE2114x Ethernet
Version:    DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
    Address: 157.54.144.118    NetMask: 255.255.252.0    Gateway: 157.54.144.1
starting map-point with proxy 157.54.118.18
MapPoint: HTTP Proxy: 157.54.118.18 port 80
MapPoint: Alternate proxy can be set on command line
starting SeattleTraffic
starting cassini web application shell
Running Web Server on port 80.
Application '/' is mapped to '\
http://localhost:80/
```

Go to IE and open <http://157.54.144.118>

You should see:

**In Search of Caffeine**

Caffeinate me, I'm:

- At work at Microsoft Research
- Napping on the couch in Seattle

Clicking on one of the links should take you to a page allowing you to select a map of locations for Starbucks, SBC, Tullys, Tullys with wireless. Clicking these should render a map to the right. This may take quite some time; the mappoint servers are not known for speed.

Status: **BUG: won't render the GIF (PS #77) – empty 'missing' box. Someone put a lot of work into this, let's fix it.**

## 1.29. More

Not as evolved as [DebugPipe](#), this is basically 'cat' with a pager. From the readme.txt:

More - a simple pager



more [filename1 filename2 ... filenameN]

Notes: This is a very simple version of more. At present, it pages on the <ENTER> key (versus spacebar or anything else). It will exit on the "q" or "Q" followed by <ENTER> at the page prompt. Multiple files can be given on the command line; however, I have not implemented wildcard expansion, so you do actually have to give it the real names for now.

It will provide error messages on files that are not found or on directories (which in Singularity, are acting like "files not found" - today, I have left that as is).

The console height and width are being treated as fixed constants for now.

Ex:

```
Singularity> more /init
/init - is a directory.
Singularity> more /init/bb.script
...
-- <more> (57%) --
```

Status: Operational.

## 1.30. NameSpace

A series of tests for the Singularity NameSpace.

### 1.30.1. AtomicTestDSP

Status: Broken. Explicitly excluded from World.proj build.

### 1.30.2. NakService

For testing application response to channel errors. Registers several locations in /service that return various errors when attempts are made to connect to them.

- /service/channelhang
- /service/nakconnect
- /service/nakrunning
- /service/channelclosed

Notes: No parameters. "Old style" application.

Ex:

```
Singularity> nakservice &
  old style
Singularity> jobs
[0]      Active              nakservice
Singularity> cat /service/channelhang
(no response, really hangs, must use ^C)
Singularity> dir /service/channelhang
(no response, really hangs, ^C ineffective, must restart device)
Singularity> cat /service/nakconnect
Nak Service NACKing...
Unable to open file /service/nakconnect
Singularity> dir /service/nakconnect
Nak Service NACKing...
```

```

Unable to open file /service/nakconnect
Singularity> cat /service/channelclosed
Unable to open file /service/channelclosed
Singularity> dir /service/channelclosed
Bind to '/service/channelclosed' failed. reason: ChannelClosed
Returned: -1
Singularity> cat /service/nakrunning
Nak Service NACKing...
NakService Finalizer called.
(“Unknown exception - code 8000001d (first chance)
Exception can't move endpoint imp in state Ack”
must use ^C, ‘jobs’ reveals process still running)
Singularity> dir /service/nakrunning
Nak Service NACKing...
NakService Finalizer called.
(“Unknown exception - code 8000001d (first chance)
Exception can't move endpoint imp in state Ack”
Really hangs, ^C ineffective, must restart device)
Singularity> fg 0
^C (stops nakservice)
Singularity>

```

Status: Operational.

### 1.30.3. SDSTest

Run a host of DirectoryService tests. Requires [TestDSP](#).

```
sdstest <mountPoint> <debug>
```

Notes:

Ex:

```

Singularity> testdsp /dsp &
Singularity> sdstest /dsp -debug=true
PASS: CreateDirectory on /d1 (NoError) ok=true.
PASS: CreateDirectory on /d1 (AlreadyExists) ok=false.
PASS: CreateDirectory on /d2 (NoError) ok=true.
PASS: CreateDirectory on /d1/d1 (NoError) ok=true.
PASS: CreateLink on /d1/Link1 (NoError) ok=true.
CreateDirectory.reparse: pre=/d2/d2, suf=, linkfound =true
link: issuing rebind to/d2/d2
PASS: CreateDirectory on /d1/Link1/d2 (NoError) ok=true.
DeleteDirectory.reparse: pre=/d2/d2, suf=, linkfound =true
link: issuing rebind to/d2/d2
PASS: DeleteDirectory on /d1/Link1/d2 (NoError) ok=true.
DeleteDirectory.reparse: pre=/d2/d2, suf=, linkfound =true
link: issuing rebind to/d2/d2
PASS: DeleteDirectory on /d1/Link1/d2 (NotFound) ok=false.
PASS: CreateLink on /d1/LinkToLink (NoError) ok=true.
PASS: CreateLink on /d2/Link1 (NoError) ok=true.
PASS: CreateDirectory on /d3 (NoError) ok=true.
CreateDirectory.reparse: pre=/d2/Link1/d3, suf=, linkfound =true
link: issuing rebind to/d2/Link1/d3
CreateDirectory.reparse: pre=/d3/d3, suf=, linkfound =true
link: issuing rebind to/d3/d3
PASS: CreateDirectory on /d1/LinkToLink/d3 (NoError) ok=true.
Directory is not empty(3)!
PASS: DeleteDirectory on /d1 (DirectoryNotEmpty) ok=false.
FAIL: DeleteDirectory on /stress. expected=NotDirectory, actual=NotFound. ok=false
PASS: DeleteDirectory on /d2/Link1 (NotDirectory) ok=false.
FAIL: DeleteDirectory on /init/testpe/manifest. expected=NotDirectory, actual=NotFound. ok=false

```

PASS: DeleteDirectory on /dl/dl (NoError) ok=true.  
 PASS: DeleteLink on /dl/Link1 (NoError) ok=true.  
 PASS: DeleteLink on /dl/LinkToLink (NoError) ok=true.  
 PASS: DeleteDirectory on /dl (NoError) ok=true.  
 PASS: DeleteDirectory on /dl (NotFound) ok=false.  
 PASS: DeleteLink on /d2/Link1 (NoError) ok=true.  
 PASS: DeleteDirectory on /d2 (NoError) ok=true.  
 PASS: DeleteDirectory on /d3/d3 (NoError) ok=true.  
 PASS: DeleteDirectory on /d3 (NoError) ok=true.  
 PASS: CreateDirectory on /d1 (NoError) ok=true.  
 PASS: CreateDirectory on /d2 (NoError) ok=true.  
 PASS: CreateLink on /dl/Link1 (NoError) ok=true.  
 CreateDirectory.reparse: pre=/d2/d2, suf=, linkfound =true  
 link: issuing rebind to/d2/d2  
 PASS: CreateDirectory on /dl/Link1/d2 (NoError) ok=true.  
 PASS: GetAttributes on /dl (NoError) ok=true.  
 PASS: GetAttributes on /dl/Link1 (NoError) ok=true.  
 FAIL: GetAttributes on /init/testpe/testpe. expected=NoError, actual=NotFound. ok=false  
 FAIL: GetAttributes on /stress. expected=NoError, actual=NotFound. ok=false  
 link: issuing rebind to/d2/d2  
 PASS: GetAttributes on /dl/Link1/d2 (NoError) ok=true.  
 PASS: GetAttributes on /dl/garbage (NotFound) ok=false.  
 PASS: DeleteLink on /dl/Link1 (NoError) ok=true.  
 PASS: DeleteDirectory on /dl (NoError) ok=true.  
 PASS: DeleteDirectory on /d2/d2 (NoError) ok=true.  
 PASS: DeleteDirectory on /d2 (NoError) ok=true.  
 PASS: Register on /dev/sp1 (NoError) ok=true.  
 replacing provider  
 PASS: Register on /dev/sp1 (AlreadyExists) ok=false.  
 PASS: Register on /notFound/sp1 (NotFound) ok=false.  
 PASS: Deregister on /dev/sp1 (NoError) ok=true.  
 Register.reparse: pre=/dsp, suf=/sp1, linkfound =false  
 PASS: Register on /dsp/sp1 (NoError) ok=true.  
 Register.reparse: pre=/dsp, suf=/sp1, linkfound =false  
 [testdsp p13 t 4 ] replacing provider  
 PASS: Register on /dsp/sp1 (AlreadyExists) ok=false.  
 Deregister.reparse: pre=/dsp, suf=/sp1, linkfound =false  
 PASS: Deregister on /dsp/sp1 (NoError) ok=true.  
 createdir: provider found, index = 4  
 CreateDirectory.reparse: pre=/dsp, suf=dir1, linkfound =false  
 PASS: CreateDirectory on /dsp/dir1 (NoError) ok=true.  
 Register.reparse: pre=/dsp, suf=/dir1/sp1, linkfound =false  
 PASS: Register on /dsp/dir1/sp1 (NoError) ok=true.  
 Deregister.reparse: pre=/dsp, suf=/dir1/sp1, linkfound =false  
 PASS: Deregister on /dsp/dir1/sp1 (NoError) ok=true.  
 DeleteDirectory.reparse: pre=/dsp, suf=dir1, linkfound =false  
 PASS: DeleteDirectory on /dsp/dir1 (NoError) ok=true.  
 PASS: CreateLink on /d2/Link1 (NotFound) ok=false.  
 PASS: CreateDirectory on /d2 (NoError) ok=true.  
 PASS: CreateLink on /d2/Link1 (NoError) ok=true.  
 PASS: CreateLink on /d2/Link1 (AlreadyExists) ok=false.  
 PASS: GetLinkValue on /d2/Link1 (NoError) ok=true.  
 PASS: GetLinkValue on /d2 (NotLink) ok=false.  
 PASS: DeleteLink on /d2/Link1 (NoError) ok=true.  
 PASS: DeleteLink on /d2/Link1 (NotFound) ok=false.  
 PASS: DeleteDirectory on /d2 (NoError) ok=true.  
 CreateLink.reparse: pre=/dsp, suf=rootlink, linkfound =false  
 PASS: CreateLink on /dsp/rootlink (NoError) ok=true.  
 CreateLink.reparse: pre=/dsp, suf=rootlink, linkfound =false  
 PASS: CreateLink on /dsp/rootlink (AlreadyExists) ok=false.  
 createdir: provider found, index = 4  
 CreateDirectory.reparse: pre=/dsp, suf=d1, linkfound =false  
 PASS: CreateDirectory on /dsp/d1 (NoError) ok=true.  
 CreateLink.reparse: pre=/dsp, suf=d1/Link1, linkfound =false  
 PASS: CreateLink on /dsp/d1/Link1 (NoError) ok=true.  
 DeleteLink.reparse: pre=/dsp, suf=d1/Link1, linkfound =false  
 PASS: DeleteLink on /dsp/d1/Link1 (NoError) ok=true.  
 DeleteLink.reparse: pre=/dsp, suf=rootlink, linkfound =false  
 PASS: DeleteLink on /dsp/rootlink (NoError) ok=true.  
 DeleteDirectory.reparse: pre=dsp, suf=d1, linkfound =false  
 PASS: DeleteDirectory on dsp/d1 (NoError) ok=true.

```

FAIL: Bind on /init/testpe/testpe. expected=NoError, actual=NotFound. ok=false
FAIL: Bind on /init/testpe/testpe. expected=ContractNotSupported, actual=NotFound. ok=false
FAIL: Bind on /init/testpe/testpe. expected=ContractNotSupported, actual=NotFound. ok=false
PASS: CreateLink on /link (NoError) ok=true.
  symlink node: full=/link/testpe/testpe, partial=/, stripped=/
FAIL: Bind on /link/testpe/testpe. expected=NoError, actual=NotFound. ok=false
PASS: DeleteLink on /link (NoError) ok=true.
PASS: Bind on /init (ContractNotSupported) ok=false.
FAIL: Bind on /FsCtrl. expected=ContractNotSupported, actual=NotFound. ok=false
  createdir: provider found, index = 4
CreateDirectory.reparse: pre=/dsp, suf=BindTest, linkfound =false
PASS: CreateDirectory on /dsp/BindTest (NoError) ok=true.
CreateLink.reparse: pre=/dsp, suf=BindTest/link, linkfound =false
PASS: CreateLink on /dsp/BindTest/link (NoError) ok=true.
  createdir: provider found, index = 4
CreateDirectory.reparse: pre=/dsp, suf=BindTest/d1, linkfound =false
PASS: CreateDirectory on /dsp/BindTest/d1 (NoError) ok=true.
  createdir: provider found, index = 4
CreateDirectory.reparse: pre=/dsp, suf=BindTest/d2, linkfound =false
PASS: CreateDirectory on /dsp/BindTest/d2 (NoError) ok=true.
PASS: Bind on /dsp/BindTest/d1 (NoError) ok=true.
[testdsp  p13 t 4      ] symlink node: full=/BindTest/link, stripped=/BindTest
PASS: Bind on /dsp/BindTest/link (NoError) ok=true.
DeleteLink.reparse: pre=/dsp, suf=BindTest/link, linkfound =false
PASS: DeleteLink on /dsp/BindTest/link (NoError) ok=true.
DeleteDirectory.reparse: pre=/dsp, suf=BindTest/d1, linkfound =false
PASS: DeleteDirectory on /dsp/BindTest/d1 (NoError) ok=true.
DeleteDirectory.reparse: pre=/dsp, suf=BindTest/d2, linkfound =false
PASS: DeleteDirectory on /dsp/BindTest/d2 (NoError) ok=true.
DeleteDirectory.reparse: pre=/dsp, suf=BindTest, linkfound =false
PASS: DeleteDirectory on /dsp/BindTest (NoError) ok=true

```

Status: Operational, but we should look at FAILures. May be some built-in reliance on using “/dsp” or this may not be the way to invoke it.

#### 1.30.4. TestDSP

Creates a service point for [SDSTest](#). See above for use.

Status: Operational.

### 1.31. Network

This is where you find all network related configuration and test applications.

#### 1.31.1. BlastServer

Vacuum IP data through a port.

```
blastserver <port> [numBytes=n][chunkSize=nn]
```

Parameter	Required	Name	Type	Default	Example
ipAddressPort	yes	Port to gulp from	integer		80
numBytes	no	Total bytes to send	integer	10000	-numBytes=2048
chunkSize	no	Chunks size to send	integer	256	-chunkSize=1024

Ex:

```

Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @show
Hostname: singularity.redmond.corp.microsoft.com
DNS Servers:

```

```

Primary name server 157.54.14.178
Secondary name server 157.54.14.146
Secondary name server 157.54.14.162
Interface: /dev/nic0
Adapter: DE2114x Ethernet
Version: DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
Address: 157.54.144.118 NetMask: 255.255.252.0 Gateway: 157.54.144.1
Singularity> blastserver 80
BlastServer listening on port 80 for 10000 bytes in 256-byte chunks
(IE 157.54.144.118 from the desktop)
Got connection...

```

Status: SocketException : SocketError: 10057

### 1.31.2. CommandLib

Utilities project for code common to applications under Network.

ConnectEndPoint(), GetNewTcpEndPoint(), GetNewUdpEndPoint(),DNSShow();

### 1.31.3. DNS

DNS console utility. Supports several commands:

- dns <Servers> - Add <list of servers> to domain
- dns @show - Show DNS information
- dns @delete <Servers>- Delete DNS information from <list of servers>
- dns @rotate - Rotate name servers
- dns @query <host> - Query DNS information from <host IP>

Parameter	Required	Name	Type	Default	Example
Servers	yes	Array of servers to (add/delete)	string array		
host	yes	Host IP address	string		

Ex:

```

Singularity> dns @show
No DNS servers configured.
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> dns @show
Primary name server 157.54.14.178
Secondary name server 157.54.14.146
Secondary name server 157.54.14.162

```

Notes:

Status: Using this without an arg defaults to 'Add' but hits breakpoints in the code. Needs some cleanup. @query '157.54.14.178' seems to shut dns down. Add/rotate/delete untested. We need a better slice of sample code and some scripts.

**1.31.4. DomainName**

Get or set the domain name.

domainname [-n=<new name>]

Parameter	Required	Name	Type	Default	Example
n	no	New domain name	string	none	-n=singularity.org

Notes:

Ex:

```
Singularity> domainname
microsoft.com
Singularity> domainname -n=singularity.org
Set domain name successfully
Singularity> domainname
singularity.org
Singularity>
```

Status: Operational.

**1.31.5. HostName**

Get or set host name.

hostname [-n=<new name>]

Parameter	Required	Name	Type	Default	Example
n	no	New host name	string	none	-n=vpc.singularity.org

Notes:

Ex:

```
Singularity> hostname
Singularity.microsoft.com
Singularity> hostname -n=vpc.singularity.org
Success setting host name
Singularity> hostname
vpc.singularity.org
Singularity>
```

Status: Operational.

**1.31.6. IPConfig**

Workhorse application for managing TCP presence on singularity.

```
ipconfig <device> <address> <mask> <gateway> - Manually set all configuration parameters
ipconfig @show - Show current configuration
ipconfig @dhcp <device> <verb> - Start or stop DHCP
ipconfig @verify <device> - Run a check on the device interface
```

Parameter	Required	Name	Type	Default	Example
device	yes	Nic to configure	string		/dev/nic0

address	yes	IP address to give it	string		123.45.54.321
mask	yes	Addressing mask to use	string		255.255.0.0
gateway	yes	Gateway IP	string		157.54.144.1
verb	yes	Action – start or stop	string		Start

Notes:

Ex:

```
Singularity> ipconfig /dev/nic0 157.54.144.118 255.255.252.0 157.54.144.1
Successfully set interface state
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @show
Hostname: singularity.redmond.corp.microsoft.com
DNS Servers:
    Primary name server 157.54.14.178
    Secondary name server 157.54.14.146
    Secondary name server 157.54.14.162
Interface:    /dev/nic0
Adapter:     DE2114x Ethernet
Version:     DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
    Address: 157.54.144.118    NetMask: 255.255.252.0    Gateway: 157.54.144.1
vpc.singularity.org
Singularity> ipconfig @verify /dev/nic0
Interface:    /dev/nic0
Adapter:     DE2114x Ethernet
Version:     DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
    Address: 157.54.144.118    NetMask: 255.255.252.0    Gateway: 157.54.144.1
```

Status: Operational.

### 1.31.7. MonNet

Tool to transfer monitoring log entries over network. MonNet process its own parameters (they behave unlike other Singularity applications).

```
monnet /d /c /w:WARMUP /e /r:RUNTIME /n:MAXEVENTS /s /t:IP:PORT
```

Parameter	Required	Name	Type	Example
/d	no	Disable logging	flag	/d
/c	no	“Clear” log: ie note current end	flag	/c
/w:nn	no	Pause for nn seconds	integer	/w:10
/e	no	Enable logging	flag	/e
/r:nn	no	Set event slurp limit to nn seconds	integer	/r:60
/n:nn	no	Set event slurp limit to nn seconds	integer	/n:256

Parameter	Required	Name	Type	Example
/s	no	Slurp events according to limits		/s
/t:IP:PORT	no	Transfer via TCP to IPADDR:PORT		/t: 157.54.144.104:88

Notes: Without /r or /n options: slurp until log empty or marshal buffer full. All options can occur in any order, zero or more times. They are executed in order.

Ex:

```
Singularity> monnet /d /c /w:300 /e /r:300 /s /d /t:10.99.99.1:5000
Disabling logging
Clearing log
error: clearLog() looped 5000000 times; bailing
Pausing 3secs for warmup
Enabling logging
~~~~~ Start MarkSweep Cleanup [data=0101b000, pid=01f]
~~~~~ Finish MarkSweep Cleanup [data=01019868, pid=01f, ms=80, thds=2]
MonNet: collecting with duration=3secs, maxevents=999999999
Timed out (0ms late)
Got 0 events
Disabling logging
```

Status: Operational.

### 1.31.8. Route

Obtains network routing information from available nodes.

route <destination> <gateway> [ifAddress] - Adds a node

route @show – Dumps current routing information

route @delete <address> <destination> - Removes a route

Parameter	Required	Name	Type	Default	Example
destination	yes	destination to be added/removed	string		157.54.144.1
g	yes	Gateway to destination	string		157.54.144.118
i	no	Interface Address (if different)	string	null	157.54.144.118
address	yes	Address – ignored?	string		

Notes: When adding a route, if an interface address is not provided, calls SendFindHostRoute() to determine current gateway route.

Ex:

```
Singularity> route @show
Network      : 127.0.0.0 / 255.0.0.0
Gateway      : 127.0.0.1
Interface address : 127.0.0.1
Metric       : 0
Tag          : 80000000
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> route @show
```



```

Network      : 127.0.0.0 / 255.0.0.0
Gateway     : 127.0.0.1
Interface address : 127.0.0.1
Metric      : 0
Tag         : 80000000

Network      : 157.54.144.1 / 255.255.255.255
Gateway     : 157.54.144.118
Interface address : 157.54.144.118
Metric      : 1
Tag         : 80000000

Network      : 157.54.144.0 / 255.255.252.0
Gateway     : 157.54.144.118
Interface address : 157.54.144.118
Metric      : 1
Tag         : 80000000

Network      : 0.0.0.0 / 0.0.0.0
Gateway     : 157.54.144.1
Interface address : 157.54.144.118
Metric      : 20
Tag         : 80000000

```

Status: Operational. The @delete address seems to be ignored by the code, update source?

### 1.31.9. TcpBlast

Blast TCP data to an IP address:port being monitored by [TcpGulp](#).

```
tcpblast <address> <port> [numBytes] [chunkSize]
```

Parameter	Required	Name	Type	Default	Example
address	yes	IP Address to send to	string		
port	yes	Port to gulp from	integer		
numBytes	no	Total bytes to send	integer	10000	
chunkSize	no	Chunks size to send	integer	256	

Notes: TcpBlast is evolving so that it both receives while being run on singularity AND sends while being run from the windows desktop.

Ex:

```

Singularity> tcpblast 157.54.144.104 80
Connecting...Failed to connect: TcpError = no response was received

```

Status: Untested. Need to figure out how to get this working with [TcpGulp](#).

### 1.31.10. TcpGulp

Grab TCP data from an IP address:port being sent by [TcpBlast](#).

```
tcpgulp <address> <port>
```

Parameter	Required	Name	Type	Default	Example
address	yes	IP Address to send to	string		

Parameter	Required	Name	Type	Default	Example
port	yes	Port to gulp from	integer		

Notes: TcpGulp is being deprecated in favor of a single-app solution ([TcpBlast](#)).

Ex:

```
Singularity> tcpgulp 157.54.144.104 80
```

```
Connecting...Failed to connect: TcpError = no response was received
```

Status: Untested. Need to figure out how to get this working with [TcpBlast](#).

### 1.31.11. UdpBlast

Like [TcpBlast](#) but using UDP protocol. Send data to client running [UdpGulp](#).

```
udpblast <address> <port> [numBytes] [chunkSize]
```

Parameter	Required	Name	Type	Default	Example
address	yes	IP Address to send to	string		
port	yes	Port to gulp from	integer		
numBytes	no	Total bytes to send	integer	10000	
chunkSize	no	Chunks size to send	integer	256	

Status: Untested. Need to figure out how to get this working with [UdpGulp](#).

### 1.31.12. UdpGulp

Like [TcpGulp](#) but using UDP protocol. Retrieve data from client sending with [UdpBlast](#).

```
udpgulp <address> <port>
```

Parameter	Required	Name	Type	Default	Example
address	yes	IP Address to send to	string		
port	yes	Port to gulp from	integer		

Status: Untested. Need to figure out how to get this working with [UdpBlast](#).

### 1.32. nib

Native image building tool.

Usage:

```
nib /cache:<path> [options] app.manifest [app1.manifest ...]
```

Options:

- /apps:<file> - File containing list of app.manifests.
- /bartok:<file> - Specify Bartok to use.
- /c - Code generation only, don't link.
- /clean - Clean up output only.
- /cache:<path> - Root of file cache.
- /force - Force generation even if output files are newer.
- /link - Link only, don't compile.

/libcache:<path> - Root of Architecture-dependent cache.  
 /machine:<arch> - Binary target architecture.  
 /manifest - Generate reified manifest only.  
 /native:<path> - Root of native files.  
 /options:<file> - Options manifest file.  
 /temp:<path> - Temporary directory.  
 /v - Verbose logging output.  
 /par - Disable parallel builds.  
 /par:<nn> - Set to use <nn> parallel processors.

Summary: Create a native image for each application manifest

Status: Untested. Not sure what can be done here in terms of on-device genesis.

### 1.33. NullRuntime

base\Applications\NullRuntime\makefile.minruntime  
 base\Applications\NullRuntime\NullCorLib.il  
 base\Applications\NullRuntime\System  
 base\Applications\NullRuntime\System\Array.cs

Status: Untested.

### 1.34. NullTest

base\Applications\NullTest>nullasm.asm  
 base\Applications\NullTest>nullstart.cpp  
 base\Applications\NullTest>nulltest.cs

Status: Untested.

### 1.35. perf

Get a snapshot of channel states at regular intervals. Just logs once unless `-r` (repeat) arg provided.

`perf [-r=nn]`

Parameter	Required	Name	Type	Default	Example
<code>-r=nn</code>	no	Repeat every <n> seconds	integer	-1	<code>=r=5</code>

Notes: Would be more useful with a `'-d'` option that caused it to JUST write to debug and not clutter up the console.

Ex:

```
Singularity> perf -r=5 | debugpipe &
```

...

```
swi= 9387, msgsSent=7330, threadsCreated=108, bytesSent=576390K,  
channelsCreated=148, avg bytes/msg=80521.
```

Status: Operational.

### 1.36. Play

Play a given series of sound files.

`play [-count=nn] [<file1.wav> [<file2.wav...]]`

Parameter	Required	Name	Type	Default	Example
-count=nn	no	The number fo times to play the wave files	integer	1	-count=3
<file.wav> ...	no	A list of waveform (audio) files to play	string	null	/init/wav16m.wav

Notes: A few .wav files from base\Applications\Play\Resources are included with the build and appear in /init.

Ex:

```
Singularity> play -count=3 /init/wav16m.wav
```

Status: Not operational on VPC – requires sound device. Untested on hardware.

### 1.37. Pong

Classic game with 2 paddles and a ‘ball’ that bounces across the screen.

Notes: Old-style application. There is a Pong.cs but Pong.sg is built. Requires a graphics display driver like base\Drivers\Vesa.

Status: Untested.

### 1.38. ptest

Simple argument demo application, appears to be derived from [Play](#). Redundant parameters declared.

```
ptest [-count=nn]
```

```
ptest @action1 -numThreads=nn [<filename>] [<EverythingElse>]...
```

Parameter	Required	Name	Type	Default	Example
-count=nn	no	Parameter value echoed to console	integer	1	-count=3

Notes: Not very useful, provided for code demonstration.

Status: Not operational on VPC – “ptest @action1” requires sound device. Untested on hardware.

### 1.39. Runtime

This is compiled into every application that runs on Singularity and includes the supported features of the CLI.

Status: Operational.

### 1.40. SeattleTrafficProxy

Used in MapDemo.script. See [MapPointProxy](#) project for use.

Status: Operational.

### 1.41. Security

Consists of the following projects:

#### 1.41.1. bvt

PerfSnap.sg: a performance measurer for Singularity Benchmark.

SecBVT. Sg: a simple program to test access control functionality.using Microsoft.Singularity.Security.

It tests:

- a) Run the test under a role to ensure that roles work.
- b) Endpoint functionality
  - b1) Obtaining the principal ids of channel endpoints.
  - b2) Obtaining the principal names of channel endpoints
- c) That the acl cache implementation still works.
- d) Basic ACL/SecurityService functionality.a-zA-Z1-90\_

Status: Broken. “unable to set all endpoints for this process”

### 1.41.2. Cachetest

Test function of Cache.sg module.

Notes: No parameters.

Ex:

```
Singularity> cachetest
Populating cache ...
move Key: a, Expiry: 11/10/2008 23:52:17, LastAccess: 2
move Key: f, Expiry: 11/10/2008 23:52:17, LastAccess: 7
move Key: g, Expiry: 11/10/2008 23:52:17, LastAccess: 8
move Key: d, Expiry: 11/10/2008 23:52:17, LastAccess: 5
move Key: e, Expiry: 11/10/2008 23:52:17, LastAccess: 6
move Key: removeMe, Expiry: 11/10/2008 23:52:17, LastAccess: 0
move Key: removeMe2, Expiry: 11/10/2008 23:52:17, LastAccess: 1
move Key: h, Expiry: 11/10/2008 23:52:17, LastAccess: 9
move Key: b, Expiry: 11/10/2008 23:52:17, LastAccess: 3
move Key: c, Expiry: 11/10/2008 23:52:17, LastAccess: 4
move Next add should remove "removeMe*" entries ... OK
move Testing LRU, accessing: f, b, b, i, i, e, h, e, h
move Key: a, Expiry: 11/10/2008 23:52:17, LastAccess: 11
move Key: f, Expiry: 11/10/2008 23:52:17, LastAccess: 20
move Key: g, Expiry: 11/10/2008 23:52:17, LastAccess: 17
move Key: d, Expiry: 11/10/2008 23:52:17, LastAccess: 14
move Key: e, Expiry: 11/10/2008 23:52:17, LastAccess: 27
move Key: h, Expiry: 11/10/2008 23:52:17, LastAccess: 28
move Key: i, Expiry: 11/10/2008 23:52:18, LastAccess: 24
move Key: b, Expiry: 11/10/2008 23:52:17, LastAccess: 22
move Key: c, Expiry: 11/10/2008 23:52:17, LastAccess: 13
move Adding more, to provoke another pruning
move Key: y, Expiry: 11/10/2008 23:52:18, LastAccess: 29
move Key: f, Expiry: 11/10/2008 23:52:17, LastAccess: 20
move Key: g, Expiry: 11/10/2008 23:52:17, LastAccess: 17
move Key: d, Expiry: 11/10/2008 23:52:17, LastAccess: 14
move Key: e, Expiry: 11/10/2008 23:52:17, LastAccess: 27
move Key: h, Expiry: 11/10/2008 23:52:17, LastAccess: 28
move Key: i, Expiry: 11/10/2008 23:52:18, LastAccess: 24
move Key: z, Expiry: 11/10/2008 23:52:18, LastAccess: 30
Key: b, Expiry: 11/10/2008 23:52:17, LastAccess: 22
```

Status: Operational.

**1.41.3. CryptoBvt**

Run portions of crypto objects through sanity check.

Notes: App is 'old style'. No parameters.

Ex:

```
Singularity> cryptobvt
old style
PASSED: MD4 BVT
Verified 7 known string digests
Verified 64 known binary digests
TEST: Testing all DES implementations against 32 known ciphers:
    PASSED: ManagedDes
TEST: testing interoperability between different implementations.
    PASSED: All interoperability tests succeeded.
DES TEST: Testing implementation on 'Managed Des' for roundtrip encrypt/decrypt.
    PASSED.
    Approx ciphers/sec: 8017.44301288404
DES TEST: All tests complete.
```

Status: Operational.

**1.41.4. dlq**

DlqChild: Simple delegation test (child). Not a console application, don't run this (hangs).

DlqTest: Simple delegation test (parent). Fires off dlqchild.

Notes: Not sure what's expected here yet.

Ex:

```
Singularity> dlqtest
DlqTest : Waiting for child.
WebAppTransform applied
move getting endpoint at 0
Peer is
tty.unknown+Shell.singularity.microsoft.com+dlqtest.unknown@child+dlqchild.unknown
move Child principal is
tty.unknown+Shell.singularity.microsoft.com+dlqtest.unknown
move Child principal is
tty.unknown+Shell.singularity.microsoft.com+dlqtest.unknown+dlqtest.unknown
move Mediated principal is
tty.unknown+Shell.singularity.microsoft.com+dlqtest.unknown+dlqtest.unknown
```

Status: Questionable.

**1.41.5. stats**

Security statistics tracking and logging.

secstats [-c][-d | -e]

Parameter	Required	Name	Type	Default	Example
-c	no	Clean – reset stats	boolean	false	-c
-d	no	Disable Kernel Stats	boolean	false	-d

Parameter	Required	Name	Type	Default	Example
-e	no	Enable Kernel Stats	boolean	false	-e

Ex:

```
Singularity> secstats -e
[PrincipalImpl]
move Acl checks: fast:2, regex:0, expn:1, full:0, fail:0
move Acl cache: Hit:2, Miss:1, N:1, Max:200, T0:900, PP:20
move Expansion Cache: Hit:0, Miss:1, N:1, Max:100, T0:3600, PP:20
move [DS_Acl]
move Acl checks: fast:27, regex:7, expn:1, full:1, fail:0
move Acl cache: Hit:35, Miss:1, N:1, Max:200, T0:900, PP:20
UnregisterController 330683456, 0
move Expansion Cache: Hit:11, Miss:8, N:8, Max:100, T0:3600, PP:20
Kernel ACL checks enabled.
```

Status: Operational.

## 1.42. Seditor

From the readme.txt:

SEditor - a simple Singularity Editor

Syntax: seditor filename

Commands:

**?**; **(h | H)** - prints this message

**[number]** - start editing at line [number]

**(a | A)** - append lines at end of file

**(c | C)[num1],[num2],[destnum]** - copy lines from num1 to num2 to dest num

**(d | D)**; **(d | D)[num]**; **(d | D)[num1],[num2]** - delete current line,  
line at num, lines from num1 to num2

**(e | E)** - exit, saving changes

**(i | I)**; **(i | I)[num]** - insert line above current line, or above line num

**(l | L)**; **(l | L)[num]**; **(l | L)[num1],[num2]** - list the whole file,  
list the line at num, list the lines from num1 to num2

**(m | M)[num1],[num2],[destnum]** - move lines from num1 to num2 to dest num

**(n | N)** - print current line number (location in file)

**(p | P)** - same as l, only displays one page at a time.

**(q | Q)** - quit, saving no changes since last write

**(r | R)[num1],[num2] | ?],[searchstr]^[replacestr]** - replace  
searchstr with replacestr. If ? is used as second param, sub is prompted

**(s | S)[num1],[num2] | ?],[searchstr]** - search for searchstr.

If ? is used as second param, occurrence is displayed with prompt until accepted with y, Y, or newline.

**(t | T)[num],filename** - insert contents of filename above line num.

**(w | W)** - write contents of memory to filename. Original contents will be backed up as for exit command.

Notes: This is a very simple interactive editor, roughly modelled after the MS-DOS "edlin" program. It requires that you provide it a file name (only one) to edit. If it is a new file (i.e., does not exist), seditor will so inform you and will create the file upon exit, if given an exit or write command. It will provide error messages if the name it is given is not a "file" - i.e., if it is a directory or is otherwise not able to be opened and manipulated. Note that it does not attempt to figure out whether the contents of the file, if it exists, are text or not - so if you give it a binary to edit, be prepared for what will likely be erratic (and certainly untested) behavior.

The console height and width are being treated as fixed constants for the moment. Some obvious "todos" include: (see readme.txt)

The syntax has been made simple to parse, though perhaps less obvious to use than that of ed or edlin. The basic form is:

cmd[first line],[second line],[third line]

or

cmd[first line],[second line | interrogative (i.e. ?)],[search-pat[<sup>^</sup>replace-pat]]

SEditor retains a line counter, so commands will frequently act on the "current" line if given no other arguments. The "current" line pointer is generally updated in commands that deal with moving around in the buffer, but that don't modify text; see below in the "Details on Commands" section for more information.

Details on Commands, in order:

**? or h | H:** prints a help message of the form above.

**[number]:** edit at the line given by number. SEditor will print the line out prior to providing you a prompt of the form "> ". It will accept one line of input, which is terminated when you enter a newline. The line pointer will be set to the line you are editing.

**a | A:** append lines at the end of the file. If you are editing a "new" file, this is one of the few commands that will permit you to do something meaningful. The line pointer will be set to the "new" end of the file when you execute this command, which is an exception to the general rule noted above that line pointers normally are not reset on actual edit operations.

**c | C[num1],[num2],[destination number]:** copy the text starting at line num1 and proceeding through line num2 to, and insert it before the line specified by destination number. If you wish to copy text to the end of the file, give it a number that is greater than the number of lines in your buffer. You will be prompted to confirm the copy operation with a message telling you that you are copying past the current end of the file. The copy command does not update the line pointer.

**d | D; d | D[num1]; d | D[num1],[num2]:** the delete command with no arguments will delete the "current" line (i.e. your current position within the buffer). With one argument, it will delete the line you have specified. With two line numbers separated by a comma (no spaces), it will delete the text



starting at num1 and proceeding through the line specified by num2. The delete command will not update the line pointer, unless you have shrunken the file buffer to a point below that of the line pointer, at which point it will be set to the current last line.

**e | E:** exits, saving any text changed since the last save of the file buffer. If no text has been changed, it will exit without saving text. The original file will be backed up to a file in the same directory with the same filename, but with a different extension - namely, the ".bak" extension. If the backup exists under that name, it will be silently replaced.

**i | I; i | I[num]:** insert text before either the "current line" (no arguments), or before the line specified by num. If you wish to append text to the end of the file, use the "a" command, as line numbers out of range of the file will produce an error. Note that the "current" line after this command is executed is whatever you named as the point of insertion.

**l | L; l | L[num1]; l | L[num1],[num2]:** with no arguments, list the entire file (with no paging). With one argument, list the line specified by num1. With two arguments, list the file's contents starting at the line specified by num1 and proceeding through num2. The line pointer will be set to the last line listed.

**m | M[num1],[num2],[destination number]:** move the text starting at line num1 and proceeding through line num2 to, and insert it before the line specified by destination number. The text you are moving will be deleted from its original position. If you wish to move text to the end of the file, give it a number that is greater than the number of lines in your buffer. You will be prompted to confirm the move operation with a message telling you that you are copying past the current end of the file. The move command does not update the line pointer.

**n | N:** print the current line number.

**p | P; p | P[num1]; p | P[num1],[num2]:** with no arguments, list the entire file (with paging). At each page, you may choose to continue paging by hitting <ENTER>, or you may quit by hitting <q> or <Q>, followed by <ENTER>. With one argument, list the line specified by num1. With two arguments, list the file's contents (with paging) starting at the line specified by num1 and proceeding through num2. The line pointer will be set to the last line listed.

**q | Q:** quit, saving no changes since last write. If the file has been changed, you will be prompted in case you wish to abort your "quit" and save your changes.

**r | R[num1],[num2 | ?],[searchstring]^[replacestring]:** search for searchstring, starting at the line specified by num1 and proceeding through num2 (if present), and replace the text described by searchstring with replacestring. If the second argument is "?" (instead of num2), you will be prompted if you want to do the replacement until all of the possible replacements have been queried. The replace command will not update the line pointer.

**s | S[num1],[num2 | ?],[searchstring]:** search for searchstring, starting at the line specified by num1 and proceeding through num2 (if present. If the second argument is "?" (instead of num2), you will be prompted if this is the correct match. If a match is found, the line pointer will be updated to the line where the match was found.

**t | T[num],[filename]:** insert the contents of filename above the line specified by num. If you wish to append the contents of the file being merged to the current file contents, specify a line number that is greater than the current number of lines in the file. You will be prompted, in that case, to proceed (or not) with the transfer. The line pointer will not be changed as a result of this command.

w | **W**: write the contents of the file buffer to a file on disk. The original file will be backed up as for the exit command (e).

Status: Operational.

### 1.43. ServiceManager

Service Manager client program.

```
sc @start <service>
sc @stop <service> [-w(ait)]
sc @list
sc @show <service>
sc @watch <service>
sc @watchall
sc @create <service> [exe(cutable name)] [display(name)] [-disabled]
sc @delete <service>
sc @enable <service>
sc @disable <service>
sc @kill <service>
```

Parameter	Required	Name	Type	Default	Example
service	yes	Service name	string		dns
-w	no	Wait for service to start	boolean	false	-w
-exe	no	Executable name	string	(service name)	-exe=MyService
-display	no	Display name	string	(service name)	-display=secret
-disabled	no	Create but do not enable	boolean	false	-disabled=true

Notes: Lots to be said here...

Ex:

```
Singularity> sc @list
```

```
Name                State      PID      Display Name
-----
CredentialsManager  Stopped
FatService          Stopped
iso9660             Stopped
NetStack            Running   11      NetStack
RamDiskService      Stopped
SmbClientService    Stopped
```

Status: Operational.

### 1.44. Shell

This presents the user with the console UI at the Singularity> prompt.

```
shell
shell @single '<command line directives>' – (args must be in single quotes)
```

Notes:

## Ex:

```
Singularity> shell -??
Help for command: single
    Run a single shell command, then exit
Usage:
```

```
    @single <commandLine>
```

## Parameters:

Name	Type	Req'd?	Description
====	====	=====	=====
commandLine	string	yes	Command string to execute

```
Singularity> shell @single 'dir -d /init'
```

```
Console: dir -d /init
<mem> accounts
<dir> adjusttst/
<dir> antivirus/
<dir> appendformat/
<dir> attr/
<mem> babysitter.tst
<dir> bartok/
<mem> bb.script
<mem> bench.script
<dir> benchchild/
<dir> blastserver/
<dir> bootcount/
<dir> bouncebackclient/
<dir> bouncebackserver/
<dir> browserwebapp/
<mem> bst.script
<dir> bug00013/
<mem> bvt.mandelbrot.script
<mem> bvt.script
<mem> bvt.tst
<mem> bvt.tst.bak
<dir> cachetest/
<dir> cadgen99/
<dir> cassini/
<dir> cast/
<dir> cat/
<dir> cddump/
<dir> cdmount/
<dir> cdunmount/
<dir> channeldemo/
<dir> channelperf/
<dir> chello/
<dir> childping/
<dir> childpong/
<dir> clink/
<dir> clocktest/
<dir> collect/
<dir> consoledemo/
<dir> cping/
<dir> cpong/
<dir> createfile/
<dir> createprocess/
<dir> cred/
<dir> credentialsmanager/
<dir> cryptobvt/
<mem> daily.tst
<dir> date/
<dir> debugpipe/
<dir> delete/
<dir> deletetree/
<dir> deregister/
<mem> diagnostics.contracts.dll
<mem> diagnostics.dll
<dir> diagnosticswebapp/
<mem> directory.contracts.dll
<mem> directory.dll
<dir> diskdrive/
<dir> diskreadperf/
<dir> diskrw/
<dir> diskrwnull/
<dir> dlgchild/
<dir> dlgtest/
<dir> dns/
<dir> domainname/
<mem> drivers.dll
<dir> echo/
<mem> event.tst
<dir> eventactive/
<mem> eventactive.tst
<dir> eventtst/
<dir> evstress/
<mem> evstress.tst
<mem> evtst.script
<dir> fatcontrol/
<dir> fatfs/
<dir> fatservice/
<mem> fibbench.script
<mem> filesystem.contracts.dll
<dir> getacl/
<dir> geteacl/
<dir> getsymlink/
<dir> godot/
<mem> hal.legacyipc.dll
<dir> hello/
<dir> hello2/
<dir> hellomp/
<dir> hellowebapp/
<dir> hog/
<dir> hostname/
```

<mem> hypercall.contracts.dll	<dir> recursion/
<mem> hypercall.dll	<dir> repository/
<mem> ilhelpers.dll	<dir> rmapitest/
<mem> installer.options	<dir> rmdir/
<dir> intelgigethernet/	<dir> route/
<mem> io.contracts.dll	<dir> s3trio64/
<mem> iobench.script	<dir> sb16/
<dir> iolibtest/	<dir> sc/
<mem> iosystem.dll	<dir> schedbench/
<dir> iotestapp/	<dir> sdstest/
<dir> ipconfig/	<dir> sdstiming/
<dir> iso9660/	<dir> seattletraffic/
<dir> jobtest/	<dir> secbvt/
<mem> kernel.exe	<dir> secstats/
<dir> keys/	<mem> security.contracts.dll
<dir> legacykeyboard/	<mem> security.dll
<dir> lisp/	<mem> securityservice.dll
<mem> loader.dll	<dir> seditor/
<dir> login/	<dir> select/
<dir> mailstore/	<dir> servicemanagerwebapp/
<mem> mapdemo.script	<dir> setacl/
<dir> mapdemowebapp/	<dir> sharedheapbench/
<dir> mappoint/	<dir> sharedheaptest/
<dir> mathtest/	<dir> sharpsat/
<dir> memstress/	<dir> shell/
<mem> metadata.xml	<mem> shellbvt.tst
<mem>	<dir> singbench/
microsoft.singsharp.runtime.dll	<dir> singunit/
<dir> mkdir/	<dir> sleep/
<dir> monitortest/	<dir> slides/
<dir> monnet/	<dir> smbclient/
<dir> more/	<dir> smbclientservice/
<dir> mpstress/	<dir> smtpstest/
<dir> muwatomic/	<dir> sms/
<dir> nakservice/	<dir> smtpagent/
<dir> net/	<dir> smtpagentnonet/
<dir> netstack/	<mem> smtpreset.script
<dir> netstackapp/	<mem> smtpptest.script
<mem> netstart.script	<dir> spectest/
<dir> nib/	<mem> specweb2.script
<mem> nib.options	<dir> specweb99/
<dir> ntlmunittest/	<mem> specweb99.script
<dir> null/	<dir> specweb99webapp/
<dir> nvmac/	<dir> specweb99webappin/
<dir> omap3430keyboard/	<mem> specweball.script
<dir> omap3430video/	<dir> spewwebapp/
<dir> perf/	<dir> startprocess/
<dir> perfcnt/	<mem> startup.script
<dir> play/	<mem> stress.contracts.dll
<dir> pong/	<mem> stress.dll
<dir> ptest/	<mem> stress.tst
<dir> ramdisk/	<mem> sv_style.css
<dir> ramdiskcontrol/	<dir> symlink/
<dir> ramdiskservice/	<dir> sync/
<dir> ramdisktest/	<dir> sysinfo/
<mem> ramfat.script	<mem> system.compiler.runtime.dll
<mem> readme.txt	<dir> tasklist/

```

<dir> tasktimes/
<mem> tblast.script
<dir> tcpblast/
<dir> tcpgulp/
<dir> telnetd/
<dir> testapp/
<dir> testdriver/
<dir> testdsp/
<mem> tester.tst
<dir> testpe/
<dir> testutil/
<dir> tftp/
<mem> tgulp.script
<dir> threading/
<mem> threading.tst
<dir> threadtest/
<dir> throw/
<dir> throwwithlinkstack/
<dir> tree/
<dir> tty/
<dir> tulip/
<dir> typetest/

<dir> udpblast/
<dir> udpgulp/
<mem> unit.tst
<dir> upfgen99/
<dir> varargs/
<dir> verify/
<dir> vesa/
<dir> volmgr/
<dir> vqtest/
<dir> wafgen99/
<dir> wait/
<dir> waittest/
<mem> wav16m.wav
<mem> wav16s.wav
<mem> wav8m.wav
<dir> webfiles/
<dir> webhost/
<dir> webserver/
<mem> webstress.script
<mem> xbench.init.script
<mem> xbench.script
Shell exiting w/ 0.

```

Status: Operational. Bug #76: Invoking Shell doubles kbd output “ttoo ttthee ccoonnssoollee”. See [Login](#).

### 1.45. Sleep

Shell utility to pause execution using Thread.Sleep.

```
sleep <(milli-)seconds> [-m] [-v]
```

Parameter	Required	Name	Type	Default	Example
seconds	yes	Seconds (or milliseconds if -m)	integer		23
-m	no	Treat time as milliseconds	boolean	false	-m
-v	no	Verbose output	boolean	false	-v

Ex:

```

Singularity> sleep 5000 -m -v
pre cycles: 17329253528700
pre 2008/11/12 22:35:51.894
post cycles: 17338988916792
post 2008/11/12 22:35:56.972

```

Status: Operational.

### 1.46. Slides

This requires a graphics display. Stay tuned for how to start the VESA driver and view slides.

Status: Unsupported as of today.

### 1.47. StartProcess

Status: Untested.

**1.48. SysInfo**

Status: Untested.

**1.49. TaskList**

Singularity task manipulation tool.

tasklist [-c] [-d] [-t] [-r=nn]

Parameter	Required	Name	Type	Default	Example
-c	no	Displays channels per process	boolean	false	-c
-d	no	Dumps output and PageTable to Debugger	boolean	false	-d
-t	no	Displays ThreadIds per process	boolean	false	-t
-r=nn	no	Repeat every <n> seconds (default no repeat)	integer	-1	-r=5

Notes:

Ex:

```
Singularity> tasklist -c -d -t
PID Task Name          Mem Usage Peak Mem Shared Mem Chan Imp Exp HP  Parent
==== =====
  1 kernel              19244 K   19308 K           0 K      15  30   1  -1
    tid -> 3
    tid -> 4
    tid -> 5
    tid -> 6
    tid -> 7
    tid -> 8
    tid -> 9
    tid -> 10
    tid -> 52
    tid -> 49
    tid -> 13
    tid -> 14
    tid -> 15
    tid -> 53
    tid -> 54
    tid -> 55
    tid -> 60
    tid -> 94
    tid -> 95
    -> Shell (cid=112, msgs=0)
    -> Shell (cid=111, msgs=33)
    -> kernel (cid=64, msgs=0)
    -> kernel (cid=62, msgs=1)
    -> kernel (cid=60, msgs=1)
    -> kernel (cid=59, msgs=1)
    -> kernel (cid=57, msgs=0)
    -> sms (cid=55, msgs=1)
    -> kernel (cid=11, msgs=1)
    -> kernel (cid=9, msgs=0)
    -> kernel (cid=6, msgs=0)
    -> kernel (cid=4, msgs=1)
```

```

-> kernel (cid=3, msgs=66)
-> kernel (cid=2, msgs=21)
-> kernel (cid=1, msgs=104)
<- NetStack (cid=107, msgs=0)
<- NetStack (cid=104, msgs=0)
<- NetStack (cid=102, msgs=0)
<- NetStack (cid=100, msgs=0)
<- NetStack (cid=98, msgs=0)
<- kernel (cid=64, msgs=0)
<- kernel (cid=62, msgs=1)
<- kernel (cid=60, msgs=1)
<- kernel (cid=59, msgs=1)
<- kernel (cid=57, msgs=0)
<- sms (cid=56, msgs=0)
<- LegacyKeyboard (cid=51, msgs=1)
<- LegacyKeyboard (cid=49, msgs=1)
<- Tulip (cid=45, msgs=1)
<- Tulip (cid=42, msgs=1)
<- DiskDrive (cid=38, msgs=1)
<- DiskDrive (cid=36, msgs=0)
<- DiskDrive (cid=32, msgs=0)
<- DiskDrive (cid=26, msgs=1)
<- DiskDrive (cid=24, msgs=1)
<- DiskDrive (cid=21, msgs=1)
<- VolMgr (cid=17, msgs=0)
<- VolMgr (cid=15, msgs=2)
<- kernel (cid=11, msgs=1)
<- kernel (cid=9, msgs=0)
<- kernel (cid=6, msgs=0)
<- kernel (cid=4, msgs=2)
<- kernel (cid=3, msgs=66)
<- kernel (cid=2, msgs=22)
<- kernel (cid=1, msgs=104)

```

PID	Task Name	Mem Usage	Peak Mem	Shared Mem	Chan	Imp	Exp	HP	Parent
2	idle	128 K	128 K	0 K	0	0	0	0	-1
3	VolMgr	1276 K	1276 K	0 K	2	0	1	1	1
	tid -> 19								
	tid -> 20								
	tid -> 22								
	-> kernel (cid=17, msgs=1)								
	-> kernel (cid=15, msgs=2)								
4	DiskDrive	1356 K	1356 K	0 K	3	0	1	1	1
	tid -> 24								
	tid -> 28								
	tid -> 29								
	-> kernel (cid=26, msgs=0)								
	-> kernel (cid=24, msgs=2)								
	-> kernel (cid=21, msgs=1)								
5	DiskDrive	1292 K	1292 K	0 K	3	0	1	1	1
	tid -> 32								
	tid -> 37								
	tid -> 38								
	-> kernel (cid=38, msgs=0)								
	-> kernel (cid=36, msgs=1)								
	-> kernel (cid=32, msgs=0)								
6	Tulip	1560 K	1560 K	4 K	2	0	1	1	1

```

tid -> 40
tid -> 43
tid -> 93
tid -> 97
-> kernel (cid=45, msgs=0)
-> kernel (cid=42, msgs=1)
7 LegacyKeyboard      1212 K   1212 K       0 K       2  0  1  1
tid -> 45
tid -> 47
tid -> 70
-> kernel (cid=51, msgs=0)
-> kernel (cid=49, msgs=1)
8 sms                  2400 K   3500 K       1 K       2  2  1  1
tid -> 50
tid -> 51
-> NetStack (cid=84, msgs=0)
-> kernel (cid=56, msgs=0)
<- NetStack (cid=83, msgs=1)
<- kernel (cid=55, msgs=2)
PID Task Name          Mem Usage Peak Mem Shared Mem Chan Imp Exp HP Parent
=== =====
9 tty                  1664 K   2720 K       1 K       7  7  1  1
tid -> 64
tid -> 67
tid -> 75
tid -> 77
tid -> 78
-> tty (cid=91, msgs=0)
-> tty (cid=90, msgs=1)
-> tty (cid=89, msgs=1)
-> tty (cid=88, msgs=2358)
-> Shell (cid=87, msgs=2358)
-> tty (cid=79, msgs=2448)
-> tty (cid=75, msgs=794)
<- tty (cid=91, msgs=0)
<- tty (cid=90, msgs=0)
<- tty (cid=89, msgs=1)
<- tty (cid=88, msgs=2358)
<- Shell (cid=86, msgs=417)
<- tty (cid=79, msgs=2449)
<- tty (cid=75, msgs=794)
PID Task Name          Mem Usage Peak Mem Shared Mem Chan Imp Exp HP Parent
=== =====
10 NetStack            5016 K   5016 K   132616 K       13  8  1  8
tid -> 72
tid -> 73
tid -> 80
tid -> 81
tid -> 82
tid -> 83
tid -> 84
tid -> 85
tid -> 96
-> NetStack (cid=114, msgs=20389)
-> kernel (cid=107, msgs=0)
-> NetStack (cid=106, msgs=9808)
-> kernel (cid=104, msgs=0)

```



```

-> kernel (cid=102, msgs=0)
-> kernel (cid=100, msgs=0)
-> kernel (cid=98, msgs=0)
-> NetStack (cid=96, msgs=0)
-> NetStack (cid=95, msgs=0)
-> NetStack (cid=94, msgs=0)
-> NetStack (cid=93, msgs=0)
-> NetStack (cid=92, msgs=0)
-> sms (cid=83, msgs=0)
<- NetStack (cid=114, msgs=20390)
<- NetStack (cid=106, msgs=9809)
<- NetStack (cid=96, msgs=0)
<- NetStack (cid=95, msgs=0)
<- NetStack (cid=94, msgs=0)
<- NetStack (cid=93, msgs=0)
<- NetStack (cid=92, msgs=0)
<- sms (cid=84, msgs=0)

```

PID	Task Name	Mem Usage	Peak Mem	Shared Mem	Chan	Imp	Exp	HP	Parent
-----	-----------	-----------	----------	------------	------	-----	-----	----	--------

11	Shell	4720 K	5336 K	1 K		4	11	1	9
	tid -> 74								
	tid -> 79								
	tid -> 92								
	tid -> 177								
	-> Shell (cid=270, msgs=0)								
	-> Shell (cid=110, msgs=10)								
	-> Shell (cid=109, msgs=1304)								
	-> tty (cid=86, msgs=417)								
	<- Shell (cid=270, msgs=0)								
	<- TaskList (cid=269, msgs=0)								
	<- TaskList (cid=268, msgs=0)								
	<- TaskList (cid=266, msgs=1)								
	<- TaskList (cid=264, msgs=48)								
	<- TaskList (cid=262, msgs=37)								
	<- kernel (cid=112, msgs=1)								
	<- kernel (cid=111, msgs=34)								
	<- Shell (cid=110, msgs=10)								
	<- Shell (cid=109, msgs=1304)								
	<- tty (cid=87, msgs=2358)								

PID	Task Name	Mem Usage	Peak Mem	Shared Mem	Chan	Imp	Exp	HP	Parent
-----	-----------	-----------	----------	------------	------	-----	-----	----	--------

23	TaskList	1076 K	1076 K	1 K		5	0	1	11
	tid -> 173								
	tid -> 178								
	-> Shell (cid=269, msgs=0)								
	-> Shell (cid=268, msgs=1)								
	-> Shell (cid=266, msgs=1)								
	-> Shell (cid=264, msgs=49)								
	-> Shell (cid=262, msgs=38)								

PageTable.Dump (PageTable) :

1:	free=	3,	use=	3194,	stk=	506,	fix=	4051,	shr=	1090,	unk=	0
2:	free=	0,	use=	0,	stk=	32,	fix=	0,	shr=	0,	unk=	0
3:	free=	2,	use=	28,	stk=	48,	fix=	224,	shr=	0,	unk=	17
4:	free=	15,	use=	31,	stk=	48,	fix=	228,	shr=	0,	unk=	17
5:	free=	0,	use=	30,	stk=	48,	fix=	228,	shr=	0,	unk=	17
6:	free=	6,	use=	72,	stk=	64,	fix=	231,	shr=	0,	unk=	17

```

7: free= 11, use= 35, stk= 48, fix= 192, shr= 0, unk= 17
8: free= 14, use= 208, stk= 32, fix= 329, shr= 0, unk= 17
9: free= 14, use= 80, stk= 80, fix= 241, shr= 0, unk= 17
10: free= 6, use= 680, stk= 144, fix= 407, shr= 0, unk= 17
11: free= 10, use= 724, stk= 64, fix= 365, shr= 0, unk= 17
23: free= 1, use= 61, stk= 32, fix= 190, shr= 0, unk= 17
65535: free= 75640, use= 0, stk= 0, fix= 0, shr= 0, unk= 1178
===== free= 75722, use= 5143, stk= 1146, fix= 6686, shr= 1090, unk= 1348

```

Status: Operational.

## 1.50. TaskTimes

Displays snapshot of CPU times for all processes.

tasktimes [-f] [-s][-v][-q][-i=nn][-r=nn] [-w=nn]

Parameter	Required	Name	Type	Default	Example
-f	no	Run forever	boolean	false	-f
-s	no	Summary mode	boolean	false	-s
-v	no	Verbose output	boolean	false	-v
-q	no	Quiet mode (output to debug)	boolean	false	-q
-i=nn	no	Perform <nn> iterations	boolean	1	-i=3
-r=nn	no	Repeat every <nn> seconds	boolean	1	-r=5
-w=nn	no	Warmup (wait) time = <nn> seconds	boolean	0	-w=7

Notes:

Ex:

```

Singularity> tasktimes -v -i=2
TaskTimes: now:119771304643, span=1282ms int=102, swi=240

```

```

PID Task Name      deltaTotal  deltaGC %total  %GC  GCs  GcBytes(K)  total (ms)  dead (ms)  dead thd
=====
  1 kernel          0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  2 idle            0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  3 VolMgr          0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  4 DiskDrive       0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  5 DiskDrive       0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  6 Tulip           0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  7 LegacyKeyboard  0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  8 sms             0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
  9 tty             0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
 10 NetStack        0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
 11 Shell           0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
 29 TaskTimes      0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
 30 DebugPipe      0.00      0.00 0.00 0.00  0      0      0.00      0.00  0
=====
                                00.00 accounted for
cycles= 3119310549
notHalted= 0(%0.00)
retired= 0(%0.00)
int masked= 0(%0.00)
cycles halted= 3119310549(%1.00)

```

Intel processor, PMC values will be zero.

TaskTimes: now:119790888969, span=1232ms int=95, swi=264

PID	Task Name	deltaTotal	deltaGC	%total	%GC	GCs	GcBytes(K)	total (ms)	dead(ms)	dead thd
1	kernel	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
2	idle	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
3	VolMgr	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
4	DiskDrive	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
5	DiskDrive	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
6	Tulip	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
7	LegacyKeyboard	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
8	sms	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
9	tty	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
10	NetStack	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
11	Shell	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
29	TaskTimes	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0
30	DebugPipe	0.00	0.00	0.00	0.00	0	0	0.00	0.00	0

00.00 accounted for

```

cycles=      3055207275
notHalted=   0(%0.00)
retired=     0(%0.00)
int masked=  0(%0.00)
cycles halted= 3055207275(%1.00)
Intel processor, PMC values will be zero.

```

Status: Operational.

## 1.51. Telnetd

Telnet daemon allowing remote access to Singularity shell.

```
telnetd
```

Notes: No parameters. Hardwired to port 23.

Ex:

```

Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @verify /dev/nic0
Interface:    /dev/nic0
Adapter:     DE2114x Ethernet
Version:     DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
Address:     157.54.144.118 NetMask: 255.255.252.0 Gateway: 157.54.144.1
Singularity> telnetd &
Singularity Telnet Daemon - starting
(go to desktop command prompt and 'telnet -a 157.54.144.118')
Singularity Telnet Daemon - accepting connection

```

Status: Operational. On the desktop you may have to follow return <cr> with another key before a command is responded to. Disengaging from the session with 'exit' can crash the VPC console as well.

## 1.52. Tester

Registered as **SingUnit**, the singularity unit-test harness. Demonstrated above in [Eventing](#).

```
singunit <TestProfile> [-FailFast][{-Verbose}][{-Timings}][{-TestTimeout=nn}]
```

[-Iterations=nn][-Pass=nn]

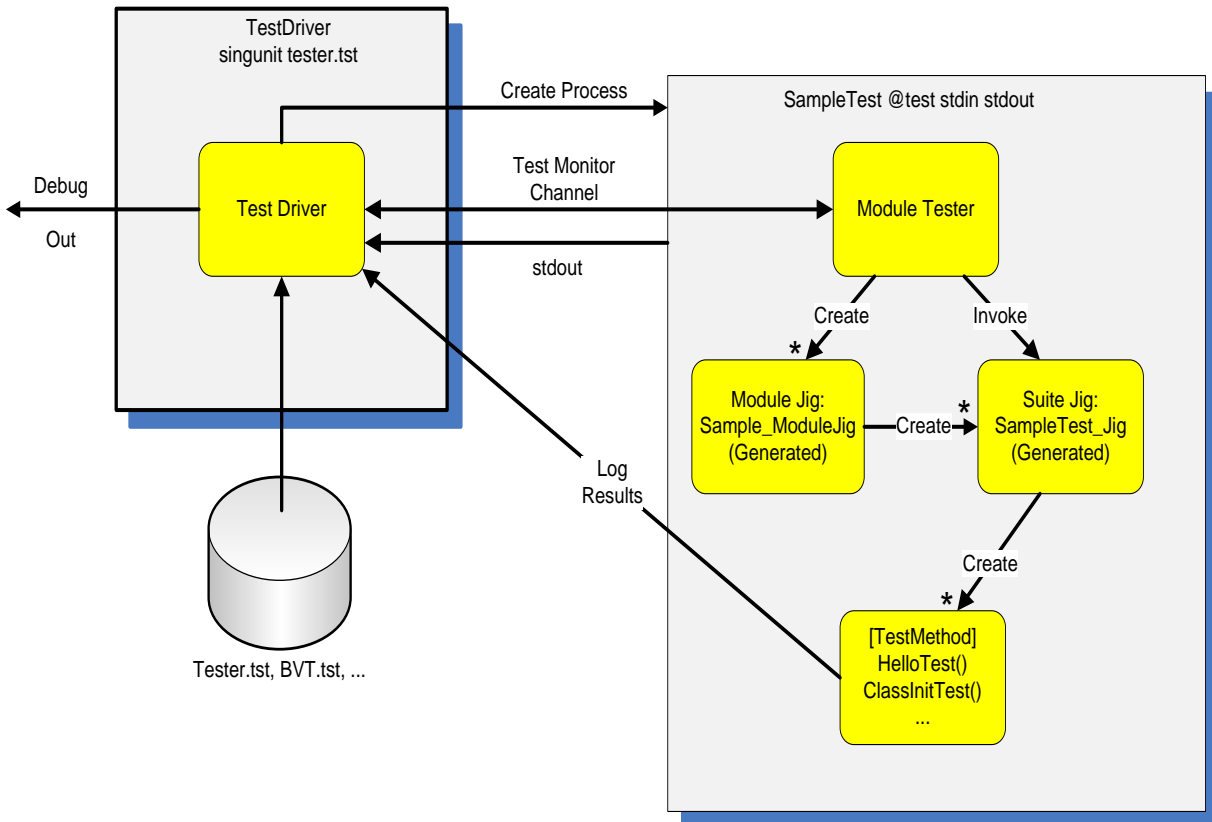
Parameter	Required	Name	Type	Default	Example
<TestProfile>	yes	Name of test profile to run	string		bvt.tst
-FailFast	no	Terminate testing on first failure	boolean	false	-FailFast
-Verbose	no	Report assertions even when they pass	boolean	false	-Verbose
-Timings	no	Prepend a fixed prefix and timing information	boolean	false	-Timings
-TestTimeout=nn	no	Default timeout in millisecond for each test (default=60 seconds)	integer	60000	-TestTimeout=1000
-Iterations=nn	no	Number of times to run the profiles (default = 1)	integer	1	- iterations=5
-Pass=nn	no	Only run tests from the profile that are designated for this pass (default Pass 0)	integer	0	-pass=3

The test framework includes support for creating, managing, and running tests.

- The SingUnit test driver will launch tests either manually from the command line or according to a test profile (and XML file) included in the Distro.
- Test cases are listed and managed in Product Studio, which supports assigning particular tests cases to particular suites (e.g. BVT, Stress), and features such as test-specific timeouts, and marking known failures.
- Test profiles are generated automatically from the test cases in Product Studio and checked into the source tree. For example, base\Distro\Files\BVT.tst enumerates all the BVT test cases.
- Test cases are implemented as normal C# or Sing# methods, annotated with specific attributes (see below).
- The build system provides support for registering test cases in Product studio for newly-developed test cases.

The test framework has been designed to minimize the amount of code that needs to be added, in part by providing an auto-generated test stub or “jig”. Pending completion of the code generation part as part of the on-going Phoenix work this needs to be added manually, but will eventually become part of the build phase.

The diagram below outlines the various components of the framework, and how data flows between them:



Notes: Ignores ^C in most situations, you'll need to restart.

Output: Lots of screen dumping from tests. From **bvt.tst**:

Ex:

```

Singularity> singunit bvt.tst -Verbose -Timings
Testing started
TEST>250164# 2008/10/30T19:48:49:165 PASSED bvt:EventTest:INIT
TEST>250180# 2008/10/30T19:48:49:180 BEGIN bvt:EventTest:EventTest:INIT SUITE
register event succeeded
Registering enums
TEST>253414# 2008/10/30T19:48:52:414 PASSED bvt:EventTest:EventTest:INIT
TEST>253422# 2008/10/30T19:48:52:423 BEGIN bvt:EventTest:EventTest:TestPermStack1M:INIT TEST
TEST>262368# 2008/10/30T19:49:01:368 PASSED bvt:EventTest:EventTest:TestPermStack1M
TEST>262408# 2008/10/30T19:49:01:408 BEGIN bvt:EventTest:EventTest:TestRecNoStack4:INIT TEST
TEST>265729# 2008/10/30T19:49:04:729 PASSED bvt:EventTest:EventTest:TestRecNoStack4
TEST>265766# 2008/10/30T19:49:04:766 BEGIN bvt:EventTest:EventTest:TestRecStack64:INIT TEST
TEST>273206# 2008/10/30T19:49:12:206 PASSED bvt:EventTest:EventTest:TestRecStack64
TEST>273251# 2008/10/30T19:49:12:251 PASSED bvt:EventTest:EventTest:CLEANUP
TEST>273267# 2008/10/30T19:49:12:267 PASSED bvt:EventTest:EventTest SUITE Passed: 5 Skipped: 0 Failed:
0
Testing complete
TEST>273298# 2008/10/30T19:49:12:298 PASSED bvt:EventTest:CLEANUP
TEST>273372# 2008/10/30T19:49:12:372 INFO bvt:EventTest MODULE SHUTDOWN TIMED OUT
UnregisterController 331471696, 0
TEST>273423# 2008/10/30T19:49:12:423 PASSED bvt:EventTest MODULE Passed: 7 Skipped: 0 Failed: 0
TEST>273454# 2008/10/30T19:49:12:454 BEGIN bvt:FibTest:INIT MODULE

```

(etc...)

Status: Operational

**1.53. TestMpAbi**

Status: Untested.

**1.54. Tests**

Status: Untested.

**1.55. TestUtil**

Status: Untested.

**1.56. TftpClient**

FTP client application.

```
tftp <server> [-v] <put|get> <getfilename> [ <putfilename> ]
```

Notes: ‘Old style’.

Ex:

```
Singularity> fatcontrol @format /dev/disk0
Formatted disk /dev/disk0
Label:    NO_NAME
Type:     Fat32
Capacity: 44 GiB
Singularity> fatcontrol @mount /dev/disk0 /fs
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @verify /dev/nic0
Interface: /dev/nic0
Adapter:   DE2114x Ethernet
Version:   DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
          Address: 157.54.144.118 NetMask: 255.255.252.0 Gateway: 157.54.144.1
Singularity> tftp 157.54.144.184 -v get winter.jpg /fs/winter.jpg
```

Status: Broken. Attempts to connect, repeats “Sent 1 30569 rc 19”. May just be a network protocol missing.

**1.57. Transforms**

Status: Untested.

**1.58. tty**

Terminal emulator. Old-style app, uses deprecated direct keyboard input. Not currently functional for unknown reason.

Status: Broken. Exit code: -1

**1.59. TypeTest**

Looks up objects in the namespace with various contracts. Not currently functional, due to modified security restrictions.

Status: Broken. “bind failed!”.

## 1.60. Upfgen99

“Ported literally SpecWeb99 source code. Strongly avoid writing programs like this. This file compiles under CSC for testing on Windows and SGC on Singularity.” – Hippocrates.

Generate files for Specweb. Single file output goes to <path>/User.Personality.

```
upfgen99 -n=nn -t=nn -c=<path>
```

Parameter	Required	Name	Type	Default	Example
-n=nn	yes	Maximum load	integer		-n=7
-t=nn	yes	Number of threads	integer		-t=1
-c=<path>	yes	Output directory	string		-c=/fs

Notes:

Ex:

```
Singularity> fatcontrol @format /dev/disk0
Formatted disk /dev/disk0
Label:    NO_NAME
Type:    Fat32
Capacity: 44 GiB
Singularity> fatcontrol @mount /dev/disk0 /fs
Singularity> upfgen99 -n=10 -t=1 -c=/fs
Singularity> cat /fs/User.Personality
0 18820080
1 18140200
2 21408040
3 12101008
4 24480001
5 18110080
6 18208080
7 21801010
8 12204080
9 24800810
```

Notes: See related [SpecWeb99](#), [Cadgen99](#), [Cassini](#), and [wafgen99](#).

Status: Operational.

## 1.61. utilities

Status: Untested.

## 1.62. wafgen99

Modified from [Cadgen99](#) code by Mark Aiken. Produces huge numbers of test files for [SpecWeb99](#) and related throughput tests.

Creates large numbers of directories and files (of varying sizes) in <directory>/file\_set.

```
wafgen99 <directory> [-v] [-V] [-t] [-p] [-n=nn] [-c=nn]
```

Parameter	Required	Name	Type	Default	Example
directory	yes	Destination for files generated	string		/fs
-v	no	Verbose output	boolean	false	-v

Parameter	Required	Name	Type	Default	Example
-V	no	Validate files only	boolean	false	-V
-t	no	Test mode	boolean	false	-t
-p	no	Purge files on exit	boolean	false	-p
-n=nn	no	Number of files generated per class	integer	9	-n=3
-c=nn	no	Number of connections	integer	10	-c=3

Notes: See related [SpecWeb99](#), [Cadgen99](#), [Cassini](#), and [Upfgen99](#).

See Disto\Scripts\specweb99.script for examples of use.

Ex:

```
Singularity> fatcontrol @format /dev/disk0
Formatted disk /dev/disk0
Label:    NO_NAME
Type:     Fat32
Capacity: 44 GiB
Singularity> fatcontrol @mount /dev/disk0 /fs
Singularity> wafgen99 /fs -v -n=3 -c=2
Creating file_set/dir00000/class0_0 [ 102 bytes ]
Verifying file_set/dir00000/class0_0 [ 102 bytes ]
Creating file_set/dir00000/class0_1 [ 204 bytes ]
Verifying file_set/dir00000/class0_1 [ 204 bytes ]
Creating file_set/dir00000/class0_2 [ 307 bytes ]
Verifying file_set/dir00000/class0_2 [ 307 bytes ]
...
Creating file_set/dir00025/class3_1 [ 204800 bytes ]
Verifying file_set/dir00025/class3_1 [ 204800 bytes ]
Creating file_set/dir00025/class3_2 [ 307200 bytes ]
Verifying file_set/dir00025/class3_2 [ 307200 bytes ]
Verifying file_set/dir00000/class0_0 [ 102 bytes ]
Verifying file_set/dir00000/class0_1 [ 204 bytes ]
Verifying file_set/dir00000/class0_2 [ 307 bytes ]
Verifying file_set/dir00000/class1_0 [ 1024 bytes ]
...
Verifying file_set/dir00025/class2_2 [ 30720 bytes ]
Verifying file_set/dir00025/class3_0 [ 102400 bytes ]
Verifying file_set/dir00025/class3_1 [ 204800 bytes ]
Verifying file_set/dir00025/class3_2 [ 307200 bytes ]
Success.
Singularity> dir /fs/file_set
<dir> dir00000/
<dir> dir00001/
<dir> dir00002/
...
<dir> dir00024/
<dir> dir00025/
Singularity> dir /fs/file_set/dir00000
<file> class0_0
<file> class0_1
<file> class0_2
<file> class1_0
<file> class1_1
```



```
<file> class1_2
<file> class2_0
<file> class2_1
<file> class2_2
<file> class3_0
<file> class3_1
<file> class3_2
```

Status: Untested.

### **1.63. WebApps**

Web applications can't be run from the command line but are used with the web application shell [Cassini](#).

#### **1.63.1. Browser**

Status: Untested.

#### **1.63.2. Diagnostics**

Status: Untested.

#### **1.63.3. Driver**

Status: Untested.

#### **1.63.4. FSUtils**

Status: Untested.

#### **1.63.5. Hello**

Status: Untested.

#### **1.63.6. MapDemo**

Status: Untested.

#### **1.63.7. ServiceManager**

Status: Untested.

#### **1.63.8. SPECweb99**

Status: Untested.

#### **1.63.9. SPECweb99in**

Status: Untested.

#### **1.63.10. Spew**

Status: Untested.

#### **1.63.11. WebShell**

Status: Untested.

### **1.64. WebHost**

Status: Untested.

## 1.65. WebServer

Web server for singularity.

```
webserver [-port:nn] [-silent] [-mapping:<mapping>] [-client:< IP>] [-debug]
```

Parameter	Required	Name	Type	Default	Example
-port=nn	no	Port number	integer	80	-port=120
-silent	no	Silent mode	boolean	false	-silent
-mapping	no	Mapping information	string	"/"	-mapping:/secretRoot
-client	no	Client IP address	string	localhost	-client:157.54.144.118
-debug	no	Debug mode	boolean	false	-debug

Ex:

```
Singularity> ipconfig @dhcp /dev/nic0 start
Successfully started DHCP
Singularity> ipconfig @verify /dev/nic0
Hostname: singularity.redmond.corp.microsoft.com
DNS Servers:
    Primary name server 157.54.14.178
    Secondary name server 157.54.14.146
    Secondary name server 157.54.14.162
Interface: /dev/nic0
Adapter: DE2114x Ethernet
Version: DE2114x Ethernet
MAC address: 00:03:ff:1d:10:56
    Address: 157.54.144.118 NetMask: 255.255.252.0 Gateway: 157.54.144.1
Singularity> webserver &
    old style
Singularity>
```

From desktop command prompt, ping the IP that's displayed after "ipconfig @verify..." to make sure the netstack is operational, then browse to:

```
http://157.54.144.118/HelloWebApp
http://157.54.144.118/DiagnosticsWebApp
```

Notes: 'Old style'.

Status: Operational.

