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   Attached is a summary of some of the fault processing statistics gleaned

from the initialization process.   Comments, suggestions and questions are

welcome.

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Fault Processing Times for the Initialization Process

The following is a summary of the fault processing times for handling page faults, segment faults and linkage faults in the Initialization Process (see Figs. 3, 4 and 5).

Segment fault times do not include the times spent processing included (nested) page faults.

Linkage fault times do not include the times spent to process included (nested) page or segment faults.

It is virtually certain that the average time to process page faults (86 ms/page fault) and segment faults (95 ms/segment fault) will increase for non-initialization processes. This is in part due to the fact that during the early stages of initialization, core is available for the taking and replenishing need not be invoked. Some evidence of this effort is apparent in the following segment fault data taken for successively longer initialization runs for which successively more segment faults were taken.

	Number of faults	Mean Time/Fault (ms/seg fault)
Case 1	541	33.5
Case 2	912	61.0
Case 3	1095	82.2
Case 4	1293	95.4

Fig. 1. Segment Fault Times vs. Total Number of Segment Faults

If, in fact, one assumes that the segment faults responsible for the two shortest sets of durations in Fig. 4 (536 faults at 26.4 ms/seg fault and 50 faults at 36.9 ms/seg fault) are atypical and reflect the influence of unusual conditions during initialization, then by removing them and recomputing the average segment fault time, one arrives at an average time of about 150 ms/seg fault.   Figure 2 supports the validity of this assumption.

	Number of Faults with the two shortest average durations	Remaining Faults	Total Number of Faults
Case 1	510 (94.3%)	31 (5.7%)	541 (100%)
Case 2	565 (62.0%)	347 (38.0%)	912 (100%)
Case 3	585 (53.4%)	510 (46.6%)	1095 (100%)
Case 4	586 (45.3%)	707 (54.7%)	1293 (100%)

Fig. 2. Table Illustrating that First Two Groups Occur Only During Early States of Initialization

Segment fault measurements in a non-initialization process will be made to check this hypothesis as soon as metering works in a non-initialization environment.

Page Faults

Number	Duration (microsec)	Mean (ms/pf)
582	13,039,021	22.4
1,741	81,566,657	46.8
1,404	108,117,033	77.0
125	21,550,655	172.5
89	32,627,274	367.5
45	34,855,574	775.0
22	30,577,693	1,490.0
4	10,483,626	2,620.0
2	13,003,915	6,500.0
Totals 4,014	345,821,448	

grand average = 86.1 ms/pf

Fig. 3. Page Fault Statistics During Initialization

Segment Faults -- Times Exclude
Page Fault Processing Time Incurred
During Segment Faults

Number	Duration (microsec)	Mean (ms/sf)
536	14,298,523	26.4
50	1,849,758	36.9
632	65,771,121	104.1
40	6,044,978	151.0
16	6,502,198	407.0
10	6,850,744	685.1
6	9,709,764	1,618.2
2	7,099,489	3,549.7
1	5,452,408	5,452.4
Totals 1,293	123,578,983	

grand average = 95.4 ms/sf

Fig. 4.   Segment Fault Statistics During Initialization

Linkage Faults -- Times Exclude
Segment Fault and Page Fault Processing
Times Incurred During Linkage Faults

Number	Duration (microsec)	Mean (ms/lf)
47	122,296	2.6
1	9,094	9.1
98	2,358,304	24.1
49	2,093,059	42.8
5	441,925	88.4
4	665,478	166.4
12	5,842,610	487.0
20	13,241,172	662.1
1	1,075,696	1,075.7
237	25,849,634	

grand average = 109.1 ms/lf

Fig. 5. Linkage Fault Statistics During Initialization

1. 3 peaks?

2. run longer to see if stays that way

3. would also like times for seg + page fault times.