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Sep 19 14:20:18 amd64 sshd[20494]: Accepted rsa for esser from ::ffff:87.234.201.207 port 61557
Sep 19 14:27:41 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 01:00:01 amd64 /usr/sbin/cron[29278]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 20 01:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 02:00:01 amd64 /usr/sbin/cron[30103]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 20 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 12:46:44 amd64 sshd[6534]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62004
Sep 20 12:46:44 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 12:48:41 amd64 sshd[6694]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62004
Sep 20 12:54:44 amd64 sshd[6694]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62004
Sep 20 15:27:35 amd64 sshd[6077]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63375
Sep 20 15:27:35 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 16:37:11 amd64 sshd[10102]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63375
Sep 20 16:37:11 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 20 16:38:10 amd64 sshd[10140]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63546
Sep 21 01:00:01 amd64 /usr/sbin/cron[17055]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 21 01:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 21 02:00:01 amd64 /usr/sbin/cron[17878]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 21 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 21 17:43:26 amd64 sshd[31088]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63397
Sep 21 17:43:26 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 21 17:53:39 amd64 sshd[31268]: Accepted rsa for esser from ::ffff:87.234.201.207 port 64391
Sep 21 18:43:26 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 21 18:43:26 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 22 01:00:01 amd64 /usr/sbin/cron[4674]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 22 01:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 22 02:00:01 amd64 /usr/sbin/cron[5459]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 22 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 22 20:23:21 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 23 01:00:01 amd64 /usr/sbin/cron[24739]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 23 01:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 23 02:00:01 amd64 /usr/sbin/cron[25555]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 23 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 23 18:04:05 amd64 sshd[6554]: Accepted publicKey for esser from ::ffff:192.168.1.5 port 59771 ssh2
Sep 23 18:04:05 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 23 18:04:24 amd64 sshd[6606]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62093
Sep 24 01:00:01 amd64 /usr/sbin/cron[12436]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 24 01:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 24 02:00:01 amd64 /usr/sbin/cron[13253]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 24 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 24 11:15:48 amd64 sshd[20998]: Accepted rsa for esser from ::ffff:87.234.201.207 port 64456
Sep 24 11:15:48 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 24 13:49:08 amd64 sshd[2319]: Accepted rsa for esser from ::ffff:87.234.201.207 port 61330
Sep 24 13:49:08 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 24 15:42:07 amd64 kernel: snd_seq_oss: unsupported module, tainting kernel.
Sep 24 15:42:07 amd64 kernel: snd_seq_oss: unsupported module, tainting kernel.
Sep 24 15:42:07 amd64 kernel: snd_seq_oss: unsupported module, tainting kernel.
Sep 24 20:25:31 amd64 sshd[20399]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62566
Sep 24 20:25:31 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 01:00:02 amd64 /usr/sbin/cron[662]: (root) CMD (/sbin/evlogmgr -c "severity=DEBUG")
Sep 25 01:00:02 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 02:00:01 amd64 /usr/sbin/cron[1484]: (root) CMD (/sbin/evlogmgr -c "age > "30d")
Sep 25 02:00:01 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 10:59:25 amd64 sshd[8889]: Accepted rsa for esser from ::ffff:87.234.201.207 port 64183
Sep 25 10:59:25 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 10:59:47 amd64 sshd[8921]: Accepted rsa for esser from ::ffff:87.234.201.207 port 64253
Sep 25 11:30:02 amd64 sshd[8372]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62029
Sep 25 11:59:25 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 14:05:37 amd64 sshd[11554]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62822
Sep 25 14:05:37 amd64 syslog-ng[7653]: STAMPS: dropped 0
Sep 25 14:06:10 amd64 sshd[11586]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62951
Sep 25 14:07:17 amd64 sshd[11608]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63392
Sep 25 14:08:33 amd64 sshd[11630]: Accepted rsa for esser from ::ffff:87.234.201.207 port 63709
Sep 25 15:25:33 amd64 sshd[12930]: Accepted rsa for esser from ::ffff:87.234.201.207 port 62778

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Zusammenfassung

3. Interrupts

- Alternative zu Polling
- Interrupt-Handler
- Mehrfach-Interrupts
- I/O-lastige vs. CPU-lastige Prozesse
- Linux: top / bottom halves
- Linux: System Calls

2. Prozesse und Threads

- Single / Multi Tasking
- Process Control Block
- Prozesszustände: laufend, bereit, blockiert
- Zustandsübergänge (durch Scheduler, durch Prozess selbst)
- Prozesshierarchie (Vater / Sohn)
- Prozesse / Jobs unter Linux, fork / exec
- Threads: gemeinsamer Speicher
- User Level vs. Kernel Level Threads
- POSIX Threads unter Linux, pthread_* (*)

4. Scheduling

- Kooperative Scheduler
 - FCFS
 - SJF (Shortest Job First)
- Präemptive Scheduler
 - SRT (Shortest Remaining Time)
 - RR (Round Robin) und VRR (Virtual RR)
 - Prioritäten- und Lotterie-Scheduler
- Scheduling-Ziele
- CPU-Burst-Dauer, Prognose

5.1 Synchronisation

- Race Conditions
- Kritische Abschnitte, gegenseitiger Ausschluss
- Hardware: Test and Set Lock
- Aktives / Passives Warten
- Erzeuger-Verbraucher-Problem
- Mutexe, Semaphore; blockierend / nicht-blockierend
- Monitore (als Abstraktion)
- Linux-Kernel: Spin Locks, Kernel-Semaphore, atomare Operationen

6. Speicherverwaltung

- zusammenhängend, u. a.: variable Partitionen (first fit, best fit, next fit, worst fit)
- nicht-zusammenhängend: Paging (virtueller Speicher)
- virtuelle vs. physikalische Adressen, Übersetzung mit MMU und Seitentabelle
- 1-stufiges vs. mehr-stufiges Paging, Größe der Seitentabelle(n)
- Page Faults und Behandlung, Lokalitätsprinzip, TLB
- Invertierte Seitentabellen
- Seitenersetzung

5.2 Deadlocks

- kleinstes Beispiel mit 2 Prozessen, 2 Ressourcen
- vier Bedingungen
 - gegenseitiger Ausschluss, Hold and Wait
 - Ununterbrechbarkeit der Ress., zyklisches Warten
- Ressourcen-Zuordnungs-Graph (einfache, mehrfache Ressourcen)
- Matrix-Algorithmus zur Deadlock-Erkennung
- Deadlock-Verhinderung: feste Reihenfolge bei Ressourcen-Anforderung

Evaluation: auch bei meinprof.de

meinprof.de/hgesser

The screenshot shows the profile page for Hans-Georg Eßer on MeinProf.de. It includes navigation links, a search bar, and a table of course evaluations. The table lists three courses: 'Betriebssysteme', 'Informatik-Grundlagen', and 'Rechnerarchitektur', each with a number of evaluations, an average score, and a breakdown of individual criteria like 'Fairness', 'Unterstützung', 'Materiale', 'Verständlichkeit', 'Spaß', 'Interesse', 'Noten/Aufwand', and 'Empfehlung'.

Veranstaltung	#	Durchschnitt	Bewertungen:	Gesamt:
Betriebssysteme (Vorlesung + Übung/Tutorium)	16	4.72	Fairness: (?)	4.69
Informatik-Grundlagen (Vorlesung + Übung/Tutorium)	4	-	Fairness: (?)	4.96
Rechnerarchitektur (Vorlesung + Übung/Tutorium)	5	4.67	Unterstützung: (?)	4.88
			Materiale: (?)	4.72
			Verständlichkeit: (?)	4.76
			Spaß: (?)	4.32
			Interesse: (?)	4.52
			Noten/Aufwand: (?)	4.39
			Empfehlung: (?)	100%