



in collaborazione con

I'Università degli studi di Bergamo

Facoltà d'Ingegneria

presenta:

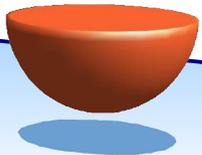




Panoramica del kernel linux



Relatore: Luca Amigoni





Panoramica del kernel linux

Sommario



Presentazione



Processi e scheduling



Gestione della memoria



File systems e reti



Novità del prossimo kernel 2.6





Panoramica del kernel linux

Argomento 1



Presentazione



Tipologia



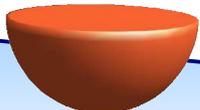
Architetture supportate



Versioni



Documentazione





Panoramica del kernel linux

Presentazione



Tipologia



Monolitico



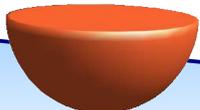
Multitasking, multithread, multiutente



Modulare



Scalabile





Panoramica del kernel linux

Presentazione



Architetture supportate



Intel



X86, IA64, AMD64



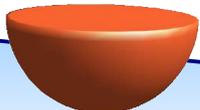
Alpha, Sparc, Mips, PowerPC, M68000



S390



Arm





Panoramica del kernel linux

Presentazione



Versioni



Pari e dispari



2.1->2.2; 2.3->2.4; 2.5->2.6; ...



Famiglia 2.2

stabilità



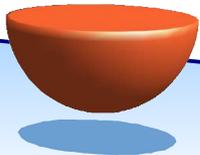
Famiglia 2.4

attualità



Famiglia 2.6

innovazione





Panoramica del kernel linux

Presentazione



Documentazione



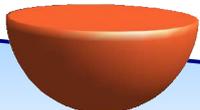
Documentation/



LKML (<http://vger.kernel.org/>)



<http://en.tldp.org/LDP/tlk/tlk.html>





Panoramica del kernel linux

Argomento 2



Processi e scheduling



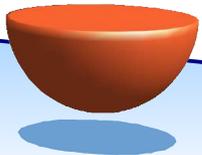
Processi



Threads



Scheduling





Panoramica del kernel linux

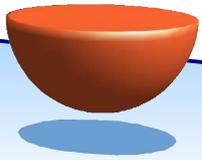
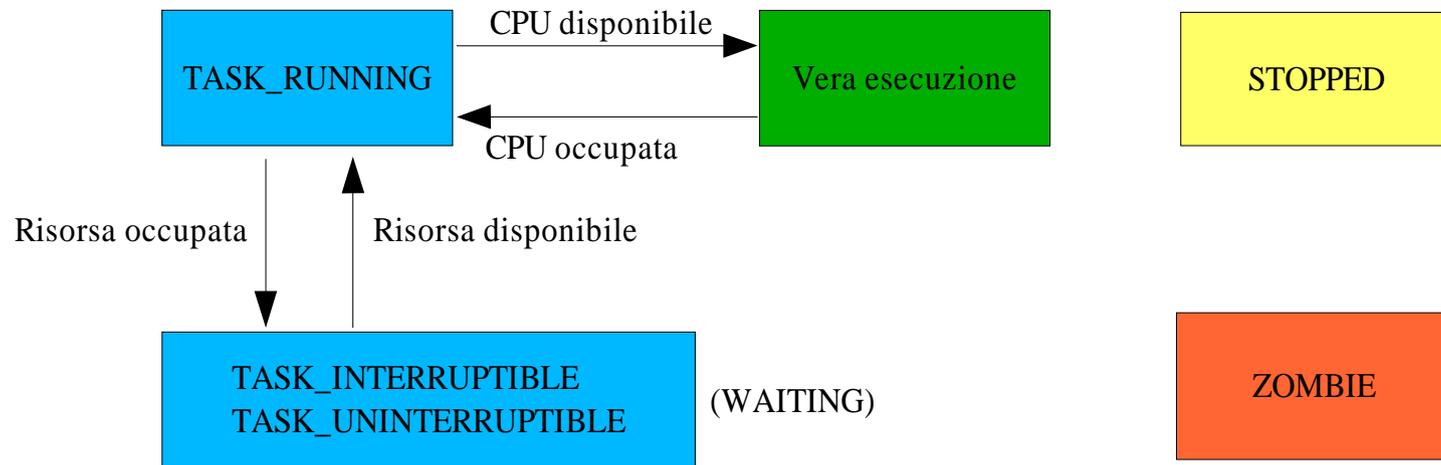
Processi e scheduling



Processi



Stati di un processo





Panoramica del kernel linux

Processi e scheduling



Threads



Livello utente



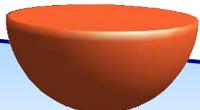
pthread – POSIX thread library



Livello kernel



clone()





Panoramica del kernel linux

Processi e scheduling



Scheduling



Priorità dinamica



(alta) -20 <-> 19 (bassa)



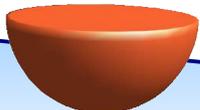
Time-sharing



Processi -> preemptive



syscall -> non preemptive





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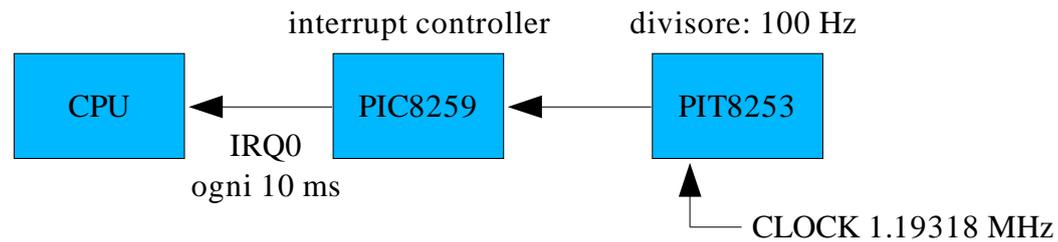
Processi e scheduling



Scheduling



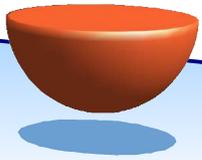
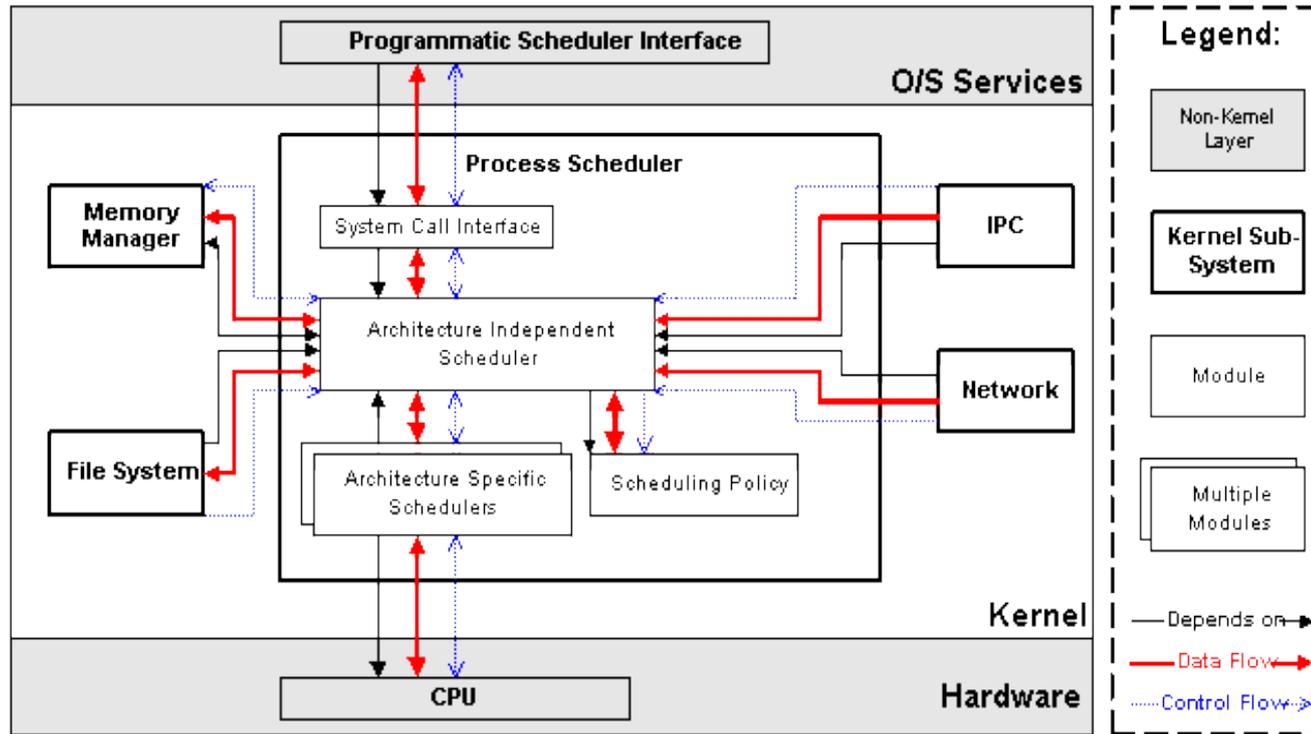
Timeslice: IRQ0





Panoramica del kernel linux

Processi e scheduling





Panoramica del kernel linux

Argomento 3



Gestione della memoria



Tipologie di memoria



Organizzazione



OOM killer





Panoramica del kernel linux

Gestione della memoria



Tipologie di memoria



Fisica



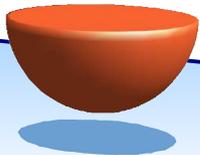
RAM fino a 64 GB su IA32



Virtuale



Partizione di swap





Panoramica del kernel linux

Gestione della memoria



Organizzazione



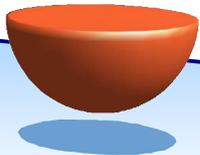
Segmentazione paginata



Solo 4 segmenti: codice/stack KERNEL MODE, codice/stack USER MODE



Cache





Panoramica del kernel linux

Gestione della memoria



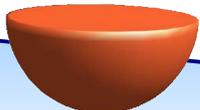
OOM killer



“Out Of Memory” killer



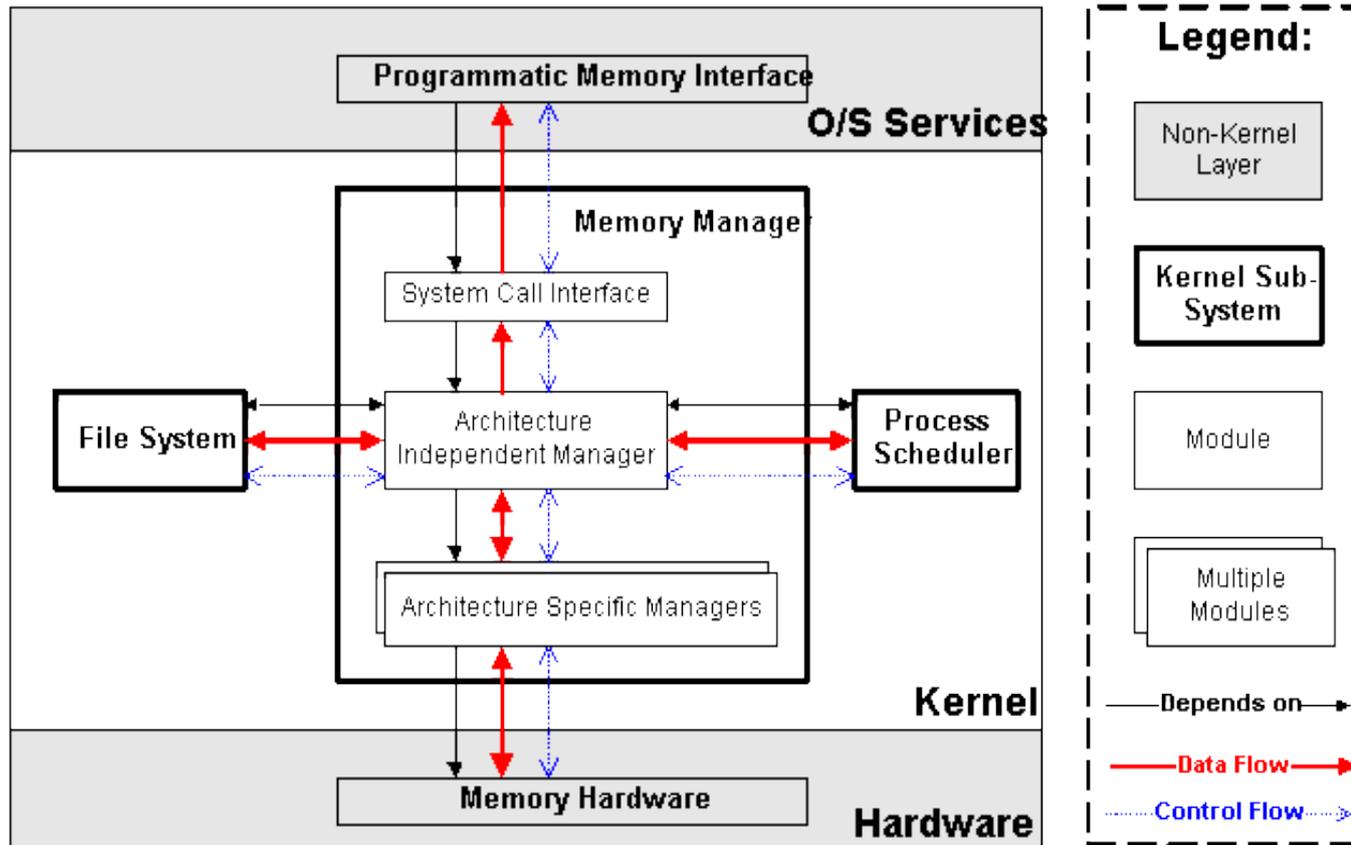
Terminazione del processo recentemente più critico se sono piene sia la memoria fisica che quella virtuale





Panoramica del kernel linux

Gestione della memoria





Panoramica del kernel linux

Argomento 4



File system e reti



File systems



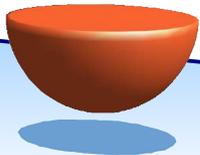
Supporto multi-device



Protocolli di rete



Funzionalità di rete avanzate





Panoramica del kernel linux

File system e reti



File system reali



Ext2, Ext3, ReiserFS, XFS, JFS



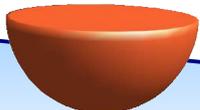
UFS, FAT, NTFS, UDF, QNX, ...



NFS, NCP, SMB (samba)



Coda, Intermezzo





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File system e reti



File system virtuali



/proc



/devfs



/usbfs





Panoramica del kernel linux

File system e reti



Supporto multi-device



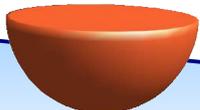
RAID software



Lineare, RAID0 (striping), RAID1(mirroring), RAID4. RAID5



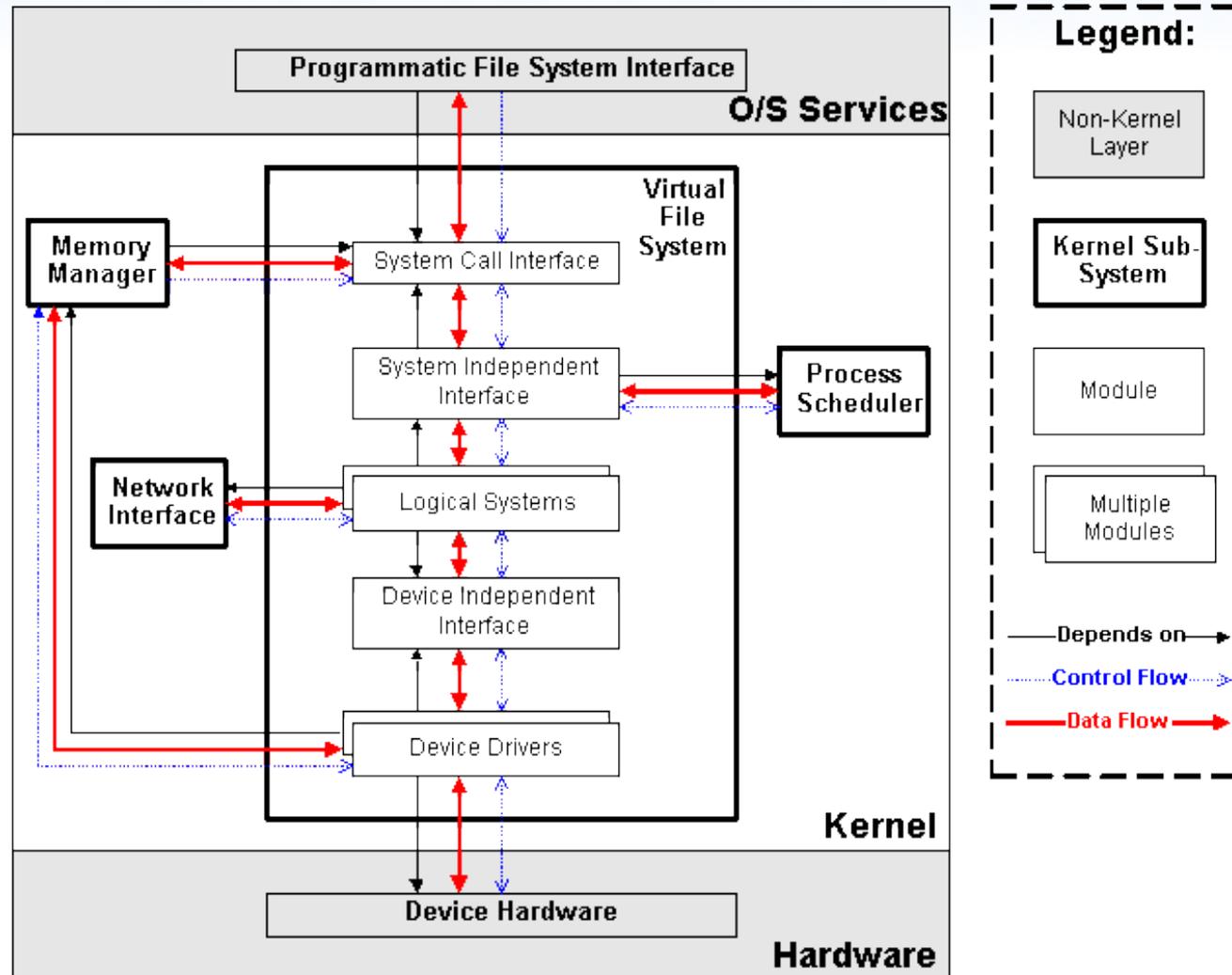
LVM (Logical Volume Manager)





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File system e reti





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File system e reti



Protocolli di rete



IPv4, IPv6



TCP/IP, UDP, ICMP



IPX, Appletalk





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File system e reti



Funzionalità di rete avanzate



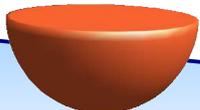
Packet filtering (iptables)



Quality Of Service (QoS)



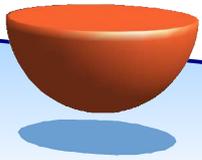
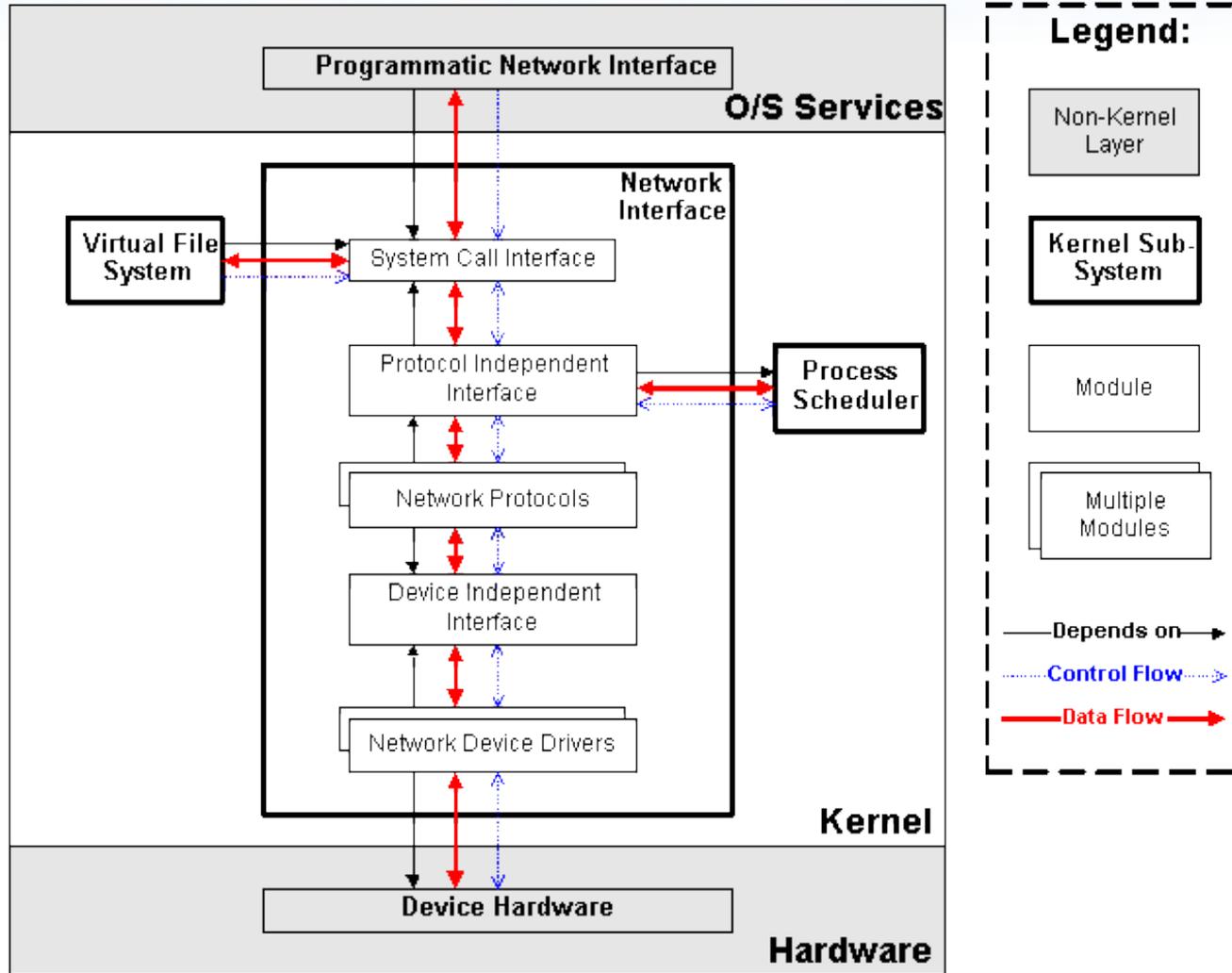
Multicast, tunnelling





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File system e reti





Panoramica del kernel linux

Argomento 5



Novità del prossimo kernel 2.6



Scalabilità



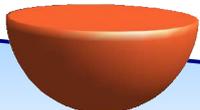
Gestione memoria



Kernel module loader



Preemption delle syscalls, futexes





Panoramica del kernel linux

Argomento 5



Novità del prossimo kernel 2.6



File system: ACL, block devices da 16 TB, LVM2



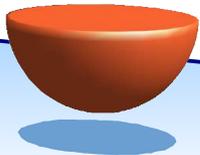
Scheduler O(1), Hyperthreading, SMP migliorato



ALSA



ACPI





Panoramica del kernel linux

Argomento 5



Novità del prossimo kernel 2.6



Rete: IPSec, migliorie IPv6



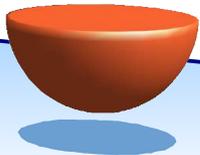
Crypto API, cryptoloop



UML



e molto altro...





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Links



<http://www.kernel.org>



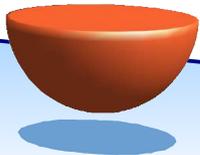
<http://en.tldp.org/LDP/tlk/tlk.html>



<http://plg.uwaterloo.ca/~itbowman/CS746G/a1/>



<http://www.bertolinux.com/kernel/italiano/KernelAnalysis-HOWTO.html>



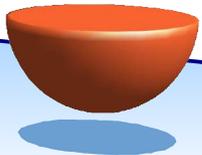
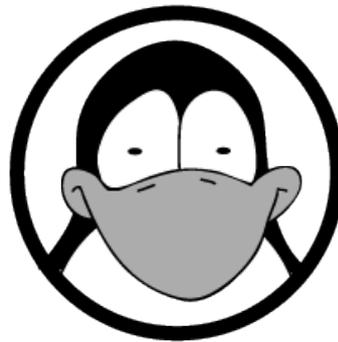


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Domande ...

Domande ?

Mumble.. mumble..





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Relatore: Luca Amigoni

Grazie per l'attenzione.

