

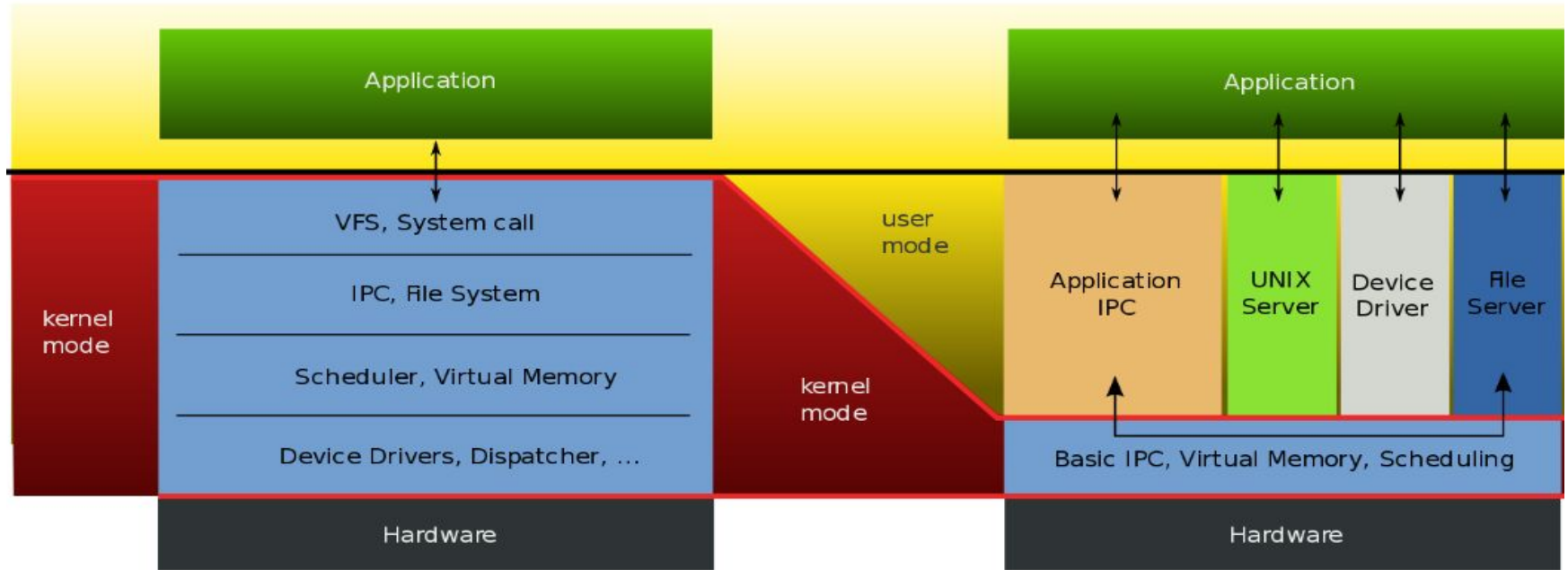
Kernel Modules and Updates

OSCO 2022; Day 3
Petros Markopoulos



MONOLITHIC

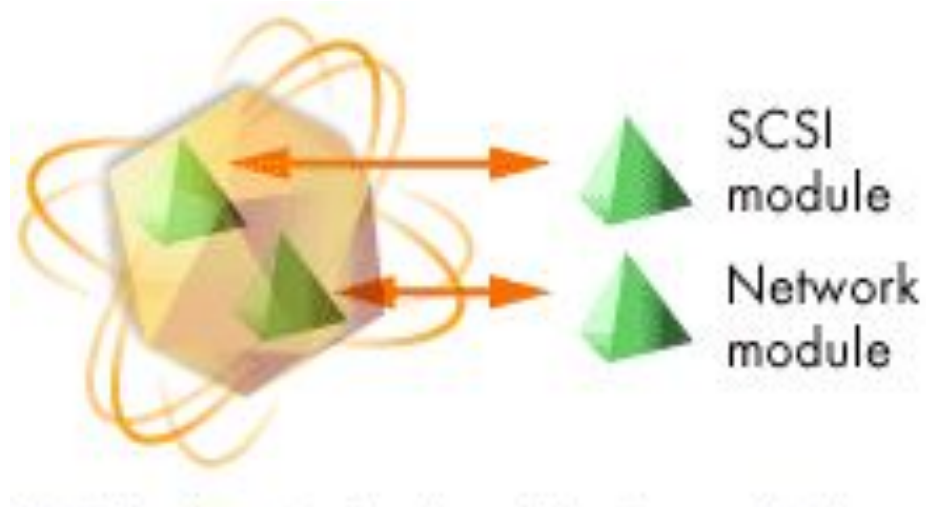
MICROKERNEL



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MODULAR

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lsmdd			auth_rpcgss	94208	2	nfsd, rpcsec_gss_krb5
Module	Size	Used by	nfs_acl	16384	2	nfsd, nfsv3
xt_multiport	20480	2	lp	20480	0	
nfsv3	49152	2	lockd	102400	3	nfsd, nfsv3, nfs
rpcsec_gss_krb5	40960	0	parport	53248	3	parport_pc, lp, ppdev
nfsv4	651264	0	grace	16384	2	nfsd, lockd
nfs	303104	10	sunrpc	393216	34	nfsd, nfsv4, auth_rpcgss, lockd, nfsv3, rpcsec_gss_krb5, nfs_acl, nfs
fscache	372736	2	ip_tables	32768	9	iptables_filter
binfmt_misc	24576	1	x_tables	40960	11	ip6table_filter, xt_conntrack, iptable_filter, xt_LOG, xt_multiport, xt_tcpudp, xt_addrtype, ip6_tables, ipt_REJECT, ip_tables, xt_limit
dm_multipath	32768	0	autofs4	45856	4	
scsi_dh_rdac	16384	0	btrfs	1253376	0	
scsi_dh_emc	16384	0	zstd_compress	167936	1	btrfs
scsi_dh_alua	20480	0	raid10	57344	0	
intel_rapl_msr	20480	0	raid456	155648	0	
ipmi_ssif	36864	0	async_raid6_recov	24576	1	raid456
intel_rapl_common	24576	1	async_memcpy	20480	2	raid456, async_raid6_recov
isst_if_common	16384	0	async_pq	24576	2	raid456, async_raid6_recov
skx_edac	20480	0	async_xor	20480	3	async_pq, raid456, async_raid6_recov
nfit	65536	1	async_tx	20480	5	async_pq, async_memcpy, async_xor, raid456, async_raid6_recov
x86_pkg_temp_thermal	20480	0	xor	24576	2	async_xor, btrfs
intel_powerclamp	20480	0	raid6_pq	114688	4	async_pq, btrfs, raid456, async_raid6_recov
coretemp	20480	0	libcrc32c	16384	3	nf_conntrack, btrfs, raid456
input_leds	16384	0	raid1	45056	0	
joydev	24576	0	raid0	24576	0	
kvm_intel	282624	0	multipath	20480	0	
kvm	663552	1	linear	20480	0	
intel_cstate	20480	0	ast	53248	0	
intel_rapl_perf	20480	0	drm_vram_helper	20480	1	ast
mei_me	40960	0	i2c_algo_bit	16384	1	ast
ioatdma	53248	0	ttm	106496	1	drm_vram_helper
mei	106496	1	drm_kms_helper	184320	3	ast
dca	16384	1	crct10dif_pclmul	16384	1	
ipmi_si	65536	0	syscopyarea	16384	1	drm_kms_helper
ipmi_devintf	20480	0	crc32_pclmul	16384	0	
ipmi_msghandler	106496	3	sysfillrect	16384	1	drm_kms_helper
acpi_power_meter	20480	0	sysimgblt	16384	1	drm_kms_helper
acpi_pad	184320	0	ghash_clmulni_intel	16384	0	
mac_hid	16384	0	fb_sys_fops	16384	1	drm_kms_helper
nf_log_ipv4	16384	5	aesni_intel	372736	0	
nf_log_common	16384	1	hid_generic	16384	0	
ipt_REJECT	16384	5	crypto_simd	16384	1	aesni_intel
nf_reject_ipv4	16384	1	usbhid	57344	0	
xt_LOG	20480	5	cryptd	24576	2	crypto_simd, ghash_clmulni_intel
xt_limit	16384	7	i40e	405504	0	
xt_addrtype	16384	4	drm	491520	5	drm_kms_helper, drm_vram_helper, ast, ttm
xt_tcpudp	20480	10	glue_helper	16384	1	aesni_intel
xt_conntrack	16384	8	e1000e	258048	0	
nf_conntrack	139264	1	hid	131072	2	usbhid, hid_generic
nf_defrag_ipv6	24576	1	ahci	40960	2	
nf_defrag_ipv4	16384	1	lpc_ich	24576	0	
sch_fq_codel	20480	2	i2c_i801	32768	0	
ip6table_filter	16384	1	libahci	32768	1	ahci
ip6_tables	32768	1	wmi	32768	0	
iptables_filter	16384	1				
bpfilter	32768	0				
nfsd	401408	13				
parport_pc	40960	0				
ppdev	24576	0				

Manual Loading

Automatic Loading

Update = Get New Version →* Delete Old Version → Run New Version

*When?

Why Not Reboot?

Livepatch

