

Unbreakable Enterprise Kernel

Release Notes for Unbreakable Enterprise Kernel Release 5



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Unbreakable Enterprise Kernel Release Notes for Unbreakable Enterprise Kernel Release 5,
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Preface

[Unbreakable Enterprise Kernel: Release Notes for Unbreakable Enterprise Kernel Release 5](#) provides a summary of the new features, changes, and known issues in the Unbreakable Enterprise Kernel Release 5.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

Documentation Accessibility

For information about Oracle's commitment to accessibility, visit the Oracle Accessibility Program website at <https://www.oracle.com/corporate/accessibility/>.

For information about the accessibility of the Oracle Help Center, see the Oracle Accessibility Conformance Report at <https://www.oracle.com/corporate/accessibility/templates/t2-11535.html>.

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Diversity and Inclusion

Oracle is fully committed to diversity and inclusion. Oracle respects and values having a diverse workforce that increases thought leadership and innovation. As part of our initiative to build a more inclusive culture that positively impacts our employees, customers, and partners, we are working to remove insensitive terms from our products and documentation. We are also mindful of the necessity to maintain compatibility with our customers' existing technologies and the need to ensure continuity of service as Oracle's offerings and industry

standards evolve. Because of these technical constraints, our effort to remove insensitive terms is ongoing and will take time and external cooperation.

1

New Features and Changes

The Unbreakable Enterprise Kernel Release 5 (UEK R5) is a heavily tested and optimized operating system kernel for Oracle Linux 7.5 and later on the x86-64 and 64-bit Arm (aarch64) architectures. It is based on the mainline Linux kernel version 4.14.35. This release also updates drivers and includes bug and security fixes.

Oracle actively monitors upstream check-ins and applies critical bug and security fixes to UEK R5.

UEK R5 is initially released with the 4.14.35-1818 version and build of the kernel.

UEK R5 uses the same versioning model as the mainline Linux kernel version. It is possible that some applications might not understand the 4.14 versioning scheme. However, regular Linux applications are usually neither aware of nor affected by Linux kernel version numbers.

Notable Features and Changes

The following sections describe the major new features of Unbreakable Enterprise Kernel Release 5 (UEK R5) relative to UEK R4.

64-bit Arm (aarch64) architecture

With Unbreakable Enterprise Kernel Release 5, Oracle delivers kernel modifications to enable support for 64-bit Arm (aarch64) architecture. These changes are built and tested against existing Arm hardware and provide support for Oracle Linux for Arm. Features described in this document are available for Arm insofar as the hardware is capable of supporting the feature that is described. Limitations and items beyond the scope of current development work for Arm are described in more detail in [Unusable or Unavailable Features for Arm](#).

Other notable Arm-specific changes that have been made in UEK R5 include:

- **64 KB Base Page Size**

During testing the use of a 64 KB base page size resulted in significant performance gains for workloads that stress memory, such as MySQL and Java middleware, where THP (Transparent Huge Pages) are not used or the application is not configured to use huge pages. This change results in better overall performance and removes complex configuration requirements to configure huge pages manually.
- **Arm port of DTrace code**

Kernel code has been patched to facilitate an Arm (aarch64) port of DTrace on UEK R5. This includes changes to add support for aarch64 in the SDT collection process and to allow SDT to be disabled even when DTrace is enabled. Profile and systrace providers have been updated and tested to be functional on aarch64.
- **Kdump modifications**

Changes were made to `kexec` to ensure that the crashdump kernel runs at exception level 2 (EL2)

- **KVM patches for Arm**

A large number of Arm-related backports are included to help to enable KVM for Arm.
- **CPU topology workaround to resolve missing cache information in ACPI**

Due to lack of an official cache property for Arm64 in ACPI, the CPU cache information is not present in `sysfs`. To resolve this issue, a patch has been applied to display default cache information until such time that ACPI provides better information.

Core Kernel Functionality

The following notable core kernel features are implemented in UEK R5:

- **Ambient Capability Mask included**

When performing privileged tasks, processes can be assigned capabilities in the form of different masks. The ambient capability mask is added to help solve inheritability problems in the current capability model that made capabilities difficult to use.
- **kmod support for PKCS#7**

Previous versions of `kmod`, up through 20-21.0.1, do not support the PKCS#7 signature type. As a result, the `modinfo` command does not display signature information for a signed module. As a workaround, confirmation that a module is signed may be obtained by checking for the label `~Module signature appended~` returned at the end of the module binary. For example:

```
# xzgrep 'Module signature appended' /lib/modules/<kernel_version>/  
kernel/drivers/net/dummy.ko.xz  
Binary file (standard input) matches
```

Starting with `kmod` version 20-21.0.2, basic PKCS#7 signature type support has been added. You can use `modinfo` to display whether a PKCS#7 signature is present. However, note that `signer` and `sig_key` information is still missing and that the algorithm displayed for the `sig_hashalgo` value may incorrectly display as using the `md4` algorithm when the `sha512` algorithm has been used instead. Note that the default algorithm used for module signature hashes in UEK R5 is `sha512`.
- **xz kernel compression enabled**

The `CONFIG_HAVE_KERNEL_XZ` option is enabled in UEK R5. This means that the kernel image and all kernel modules are automatically compressed, using `xz` compression, when compiled. Module file suffixes indicate that they are compressed and differ from the suffix used in UEK R4 and other previous releases of UEK. For example, modules are named in the format: `module.ko.xz`. This change significantly reduces kernel footprint and package size.
- **cgroup updates and changes**

The cgroup mechanism has been updated and improved in UEK R5. Notable upstream changes available in this release include:

 - Berkeley packet filter (BPF) cgroup controller and pids controller configuration enabled in the kernel.
 - Thread mode for cgroup v2 is available to enable thread granularity for some controllers. This update facilitates hierarchical resource distribution across the

threads of a group of processes. By default, all threads of a process belong to the same cgroup, which also serves as the resource domain to host resource consumptions which are not specific to a process or thread. The thread mode allows threads to be spread across a subtree while still maintaining the common resource domain for them.

- The memcontrol cgroup has introduced three new entries in memory.stat: `workingset_refault` (number of refaults of previously evicted pages), `workingset_activate` (number of refaulted pages that were immediately activated), and `workingset_nodereclaim` (number of times a shadow node has been reclaimed).
 - The memcontrol cgroup now also provides shmem statistics.
 - The rdma cgroup controller was added to perform accounting and limit enforcement on RDMA or InfiniBand resources.
 - A new boot option, `cgroup_no_v1`, has been added to make it possible to disable specified controllers in cgroup v1 mounts, so that they remain available for cgroup v2 mounts.
- **Futex scalability improvements**

Several improvements were made to futex code, including the addition of a patch that removes the requirement to lock pages when handling keys for shared futexes. These improvements can boost hashing of shared futexes significantly, resulting in better performance.
 - **Legacy mcelog device enabled**

The kernel configuration option `CONFIG_X86_MCELOG_LEGACY` is enabled in UEK R5. Although support for `/dev/mcelog` is deprecated upstream and this option is usually disabled by default, this device is required for the Oracle Linux FMA Software that is part of the Oracle Hardware Management Pack.

Cryptography

The following notable cryptographic features are implemented in UEK R5:

- **Intel QuickAssist Technology enabled**

UEK R5 enables Intel QuickAssist Technology, which is used to offload cryptographic workloads to hardware capable of optimizing these operations. UEK R5 includes the drivers and firmware required to use this hardware for cryptographic compression and acceleration. No user space packages are provided for this technology at this point.

DTrace

The following notable DTrace features and fixes are implemented in UEK R5:

- **SDT probes enabled for KASLR-enabled kernels**

A fix has been applied to resolve an issue that caused a kernel crash if Kernel Address Space Layout Randomization (KASLR) was enabled and DTrace SDT probes were enabled at the same time. DTrace can now be used with KASLR-enabled kernels.
- **Added dynamic debugging**

Where a kernel is enabled for dynamic debugging (`CONFIG_DYNAMIC_DEBUG` is enabled), DTrace is built with all debugging messages enabled.
- **Array size boundary checking in user space**

An enhancement was applied to the DTrace user space packages to add checking of the bounds of non-associative arrays, both in CTF and in declared arrays. Lvalue arrays used for assignment are also bounds-checked. It is possible to bypass the bounds checking by casting to an untyped pointer type. For example:

```
((char *)curlwpsinfo->pr_name)[500]
```

- **Disassembler prints all actions**

A fix has been applied to the D disassembler to follow the full chain of actions per statement so that it prints out all actions.

- **PID provider added**

A new PID provider has been added to both the DTrace kernel and user space code. It extends the existing fasttrap provider (used for USDT probes) with the ability to set function boundary probes on user space functions, and to probe most arbitrary instructions within user space functions. It is called the 'pid' provider because it is a meta-provider that creates user space tracing providers on demand based on process IDs (pid).

File Systems

The following sections detail the most notable features that have been implemented for file systems in UEK R5:

Btrfs

Several Btrfs improvements and patches have been applied to provide fixes for bugs that may be present in RHCK or in previous UEK releases. These include, but are not limited to:

- A fix for the issue where using `btrfs send` on a large deduped file resulted in a soft lockup or out-of-memory issue.
- A fix for the issue where a kernel panic would occur when freeze and unfreeze operations were performed in multiple threads.
- Fixes for handling of quota groups to resolve leak issues and a problem with reference counts after cloning a file between subvolumes.
- Improvements to quota accounting for quota groups to improve stability and resolve issues when handling missing records when performing a back reference walk.

ext4

The following ext4 features have been implemented:

- **Synchronous DAX faults**

UEK R5 enables use of synchronous DAX faults in the ext4 file system. This includes fixes to the `libnvdimm` code to improve DAX functionality and to introduce a mechanism to enable a user space flush of persistent memory updates by using file system to DAX mappings. Standard ACPI 6.2 label access and error injection methods are also available. Fixes were also applied to simplify error handling for DAX faults.

OCFS2

Several OCFS2 improvements and patches have been applied in this update, including the following notable items:

- **Inode cluster lock set before moving reflinked inodes**
A fix was applied to inode cluster locking to ensure that a cluster lock is taken in EX mode before initializing security ACLs on the orphan inode that is being moved to a reflinked destination. This fix helps to prevent problems from occurring due to missing checks on lock modes.
- **Added feature to attempt to reuse the extent block in `dealloc` without `meta_alloc`**
A feature was added to reuse the extent block cached in `dealloc` after it has been unlinked from the extent tree to resolve an issue where the extent tree needs to grow but no metadata has been reserved ahead of time. By reusing the extents in `dealloc`, where deleted extents are cached, the extent tree can grow without the need to reserve additional metadata. This patch can solve a potential crash issue.

XFS

The following XFS features have been implemented:

- **Support for reflink and deduplication**
Stability fixes and the in-memory extent map redesign for XFS reflink functionality have been backported from the upstream 4.15 kernel. These fixes and enhancements allow for the removal of EXPERIMENTAL warnings that were generated by the kernel at mount time and includes a fix that resolves an issue that was causing file system shutdowns when memory became too fragmented. The support for mapping multiple file logical blocks to the same physical block (reflink/deduplication) that this backport makes available to this release, brings XFS into line with other file systems such as OCFS2 and Btrfs.

The user space packages for XFS, `xfspgrog`, have been updated to version 4.14 to properly handle XFS reflinking.

DAX is disabled on reflink file systems and attempts to mount a reflink file system with DAX are rejected with an error message.
- **Synchronous DAX faults enabled**
UEK R5 enables use of synchronous DAX faults in the XFS file system. This change includes fixes to the `libnvdimm` code to improve DAX support and to introduce a mechanism to enable a user space flush of persistent memory updates by using file system to DAX mappings. Standard ACPI 6.2 label access and error injection methods are also available. Fixes were also applied to simplify error handling for DAX faults.
- **Realtime subvolume support enabled**
By default, UEK R5 enables XFS realtime subvolume support. This capability makes it possible to mount a realtime subvolume on systems running UEK R5.

Memory Management

The following notable memory management features are implemented in UEK R5:

- **Heterogeneous Memory Management (HMM) support**

UEK R5 introduces HMM, a helper layer that allows device drivers to mirror address space for a process. This new memory management facility includes features to shadow the CPU page table of a process into a device specific page table and to keep both the tables synchronized; to handle DMA mapping for the shadowed page table; and to migrate private anonymous memory to private device memory and vice versa. These features allow device drivers to avoid pinning memory which blocks some kernel features and allows the user space API to decouple from the requirement to manually manage memory copies to and from device memory. The change is transparent to the user space, effectively allowing a library to use GPU, DSP or FPGA without requiring links within the application.

- **hugetlbfs hole punching enhancement**

Updates to the `userfaultfd` mechanism to allow it to deliver a SIGBUS signal to the faulting process, instead of a page-fault event. This update to `userfaultfd` allows an application to prevent pages from being allocated implicitly when a hole in a `hugetlbfs` file is accessed by using the mapped address so that an application can explicitly manage page allocations of `hugetlbfs` files.

Networking

The following notable networking features are implemented in Unbreakable Enterprise Kernel Release 5:

- **TCP-BBR available**

UEK R5 makes available TCP-BBR, a feature that can be used to achieve higher bandwidth and lower latency for internet traffic to offer significant performance improvements for internet based applications. BBR (Bottleneck Bandwidth and Round-Trip Time) is a scheduling algorithm that helps to control the transmit rate of the TCP protocol to reduce buffering by monitoring round trip times against bandwidth bottlenecks to reduce TCP congestion. The TCP-BBR algorithm is not enabled by default in UEK R5 and the default TCP congestion control algorithm is set to `cubic`.

- **net.ipv4.tcp_tw_recycle removed**

The `tcp_tw_recycle` option, for IPv4 connections, is removed from UEK R5. This option was removed from the upstream Linux kernel in version 4.12. The option caused issues for load-balanced connections or connections that made use of network address translation. After the randomization of TCP timestamp offsets, the option created issues with all TCP connections and became non-functional. Its removal is equivalent to setting `net.ipv4.tcp_tw_recycle` to 0, which was the default configuration on previous kernel generations.

NUMA

Many modern multiprocessors have non-uniform memory access (NUMA) memory designs, where the performance of a process can depend on whether the memory range being accessed is attached to the local CPU or to another CPU. As performance is different depending on memory locality, the operating system should ideally schedule a process to run on the CPU whose memory controller is connected to the memory to be accessed.

- **NUMA balancing enabled**

UEK R5 includes improvements and fixes to NUMA balancing to resolve issues that caused high I/O Wait times when this feature was enabled. NUMA balancing is automatically enabled on systems that have multiple NUMA nodes.

RDMA

Remote Direct Memory Access (RDMA) is a feature that allows direct memory access between two systems that are connected by a network. RDMA facilitates high-throughput and low-latency networking in clusters.

Unbreakable Enterprise Kernel Release 5 includes RDMA features that are provided in the upstream kernel, with the addition of Ksplice and DTrace functionality, along with Oracle's own RDMA features, including support for RDS and Shared-PD.

The following RDS protocols are enabled with UEK R5:

- Reliable Datagram Sockets (RDS) is a high-performance, low-latency, reliable connectionless protocol for datagram delivery
- Internet Protocol over InfiniBand (IPoIB)



Note:

Ethernet tunneling over IPoIB (eIPoIB) is not supported with UEK R5.

The following RDS features are enabled with UEK R5:

- Quality of Service (QoS)
- Active Bonding (AB)
- Netfilter (NF)

Oracle provides support for RDMA on InfiniBand on the following Oracle-branded HCAs as delivered inside Oracle Engineered Systems:

- Sun InfiniBand Dual Port 4x QDR Host Channel Adapters M2
- Oracle Dual Port QDR InfiniBand Adapter M3

New RDMA features implemented in UEK R5 include:

- **Mellanox HCA drivers updated**
The Mellanox `m1x4` HCA driver has been updated for Ethernet and InfiniBand. The Mellanox `m1x5` HCA driver has been updated for future functionality.
- **RDMA subsystem updated**
The RDMA subsystem has been updated. This includes an update to `ib_core` and new user land based on upstream RDMA Core libraries.
- **QoS features added**
Quality-of-Service (QoS) technologies such as PFC and CNP Counters and DSCP (including DSCP-to-Priority Mapping) have been added to facilitate QoS.
- **`resilient_rdmaip` module added**

The Active-Active Bonding feature that was previously available in the RDS driver module is moved into a new independent driver module, `resilient_rdmaip`, in UEK R5. This change acknowledges that the Active-Active Bonding feature is more generic and applies more widely to RDMA, as a whole. It also helps to reduce code complexity within the RDS module and brings the UEK RDS driver closer to matching the upstream RDS implementation. Finally, this change facilitates further improvement to the Active-Active Bonding code.

Security

The following notable security features are implemented in Unbreakable Enterprise Kernel Release 5:

- **Secure boot improvements**

Secure boot is designed to protect a system against malicious code being loaded and executed early in the boot process. Secured platforms load only software binaries, such as option ROM drivers, boot loaders, and operating system loaders, that are unmodified and trusted by the platform. While the operating system is loaded, measures have been added to prevent malicious code from being injected on subsequent boots. Although this feature was available in previous releases of UEK, the implementation differed significantly from the approach taken in UEK R5. The new design avoids any relation to the `securelevel` security mechanism used in BSD kernels. These updates and changes help to ensure that the approach that is taken in UEK R5 brings Oracle Linux in line with other mainstream distributions.

Some of the secure boot features that are applied to the kernel when it is locked down are described briefly in the following list:

- Facilitates using keys in the UEFI database when in secure boot mode
- Enforces module signatures
- Disallows access to `/dev/mem`, `/dev/kmem` and `/proc/kcore`
- Disallows `do_kexec_load`, which is used to allocate structs and load initram
- Copies the `secure_boot` flag in the boot parameters across `kexec` reboots
- Disallows images to be loaded into trusted kernels where the signature is not verified in the `kexec_file`
- Disables hibernate and user space software suspend (`uswsusp`)
- Locks down PCIe Base Address Register access
- Locks down IO port access
- Restricts CPU Model Specific Register access
- Restricts the debugfs interface in the ASUS WMI driver
- Restricts access to custom ACPI methods
- Ignores the `acpi_rsdp` kernel parameter
- Disables ACPI table override
- Disables ACPI Platform Error Interface (APEI) error injection
- Disables the EATA SCSI driver
- Prohibits PCMCIA CIS storage

- Prohibits using TIOCSSERIAL to change device addresses, IRQs and DMA channels
- Prevents using module parameters that specify hardware options (such as `ioport`)
- Disables the `testmmiotrace` module
- Disables `debugfs`
- Disables `kprobes` for debugging
- Disables Berkeley Packet Filter functions
- Disables DTrace

Several new kernel configuration options have been added to cater for secure boot:

- `LOCK_DOWN_KERNEL`: Allows the kernel to be locked down under certain circumstances, such as when UEFI secure boot is enabled.
 - `LOCK_DOWN_IN_EFI_SECURE_BOOT`: Allows kernel lockdown to be triggered if EFI Secure Boot is set in an EFI variable provided by system firmware if not indicated by a boot parameter.
 - `LOAD_UEFI_KEYS`: Allows a kernel in secure boot mode to load modules signed with UEFI-stored keys and to reject modules signed with keys that match the blacklist.
- **User space updates to enable FIPS**

The `dracut` package for Oracle Linux 7 has been updated to `dracut-033-535.0.2`. This update enables FIPS support and compatibility with UEK R5. You must install this version or higher of the `dracut` package if you intend to enable FIPS mode on a system running UEK R5. See [Oracle Linux 7: Security Guide](#) for more information.

Storage

The following notable storage features are implemented in Unbreakable Enterprise Kernel Release 5:

- **NBD functionality enabled**

Network Block Device (NBD) functionality is enabled as a loadable kernel module in UEK R5. This allows the operating system to use a remote server as one of its block devices by using TCP.

- **libnvdimm subsystem added to kernel and updated for PMEM and DAX**

The `libnvdimm` kernel subsystem, which is responsible for the detection, configuration, and management of Non-Volatile Dual Inline Memory Modules (NVDIMMs) is enabled in UEK R5. If NVDIMMs are present in the system, they are exposed through the `/dev/pmem*` device nodes and can be configured by using the `ndctl` utility.

PMEM through `libnvdimm`, also makes DAX (Direct Access) functionality available. DAX is a facility that avoids the overhead of traditional buffer I/O on the page cache and produces direct file mappings into user space.

Upstream patches for `libnvdimm` were also backported to introduce a 'flags' attribute that exports the generic DIMM status to indicate whether it is locked or whether it is in an alias state; and to clean up some code for better stability.

ACPI 6.2 allows for named methods to access the label storage area of an NVDIMM. A patch has been applied to ensure that the new standard `_LSI`, `_LSR` and `_LSW` label methods are used, if available, and to fall back to use the `NVDIMM_FAMILY_INTEL`

device-specific methods. This enables interoperability with environments that only implement standardized methods.

- **TCMU functionality backported**

TCMU (Target Core Module in Userspace) features have been backported from the 4.16 release of the upstream kernel to enable this functionality in UEK R5. These features allow Linux I/O iSCSI targets to be run as user space programs and facilitate targets to function in a Highly Available manner, allowing failover and failback of multiple iSCSI target gateways without data corruption.

Virtualization

The following notable virtualization features are implemented in Unbreakable Enterprise Kernel Release 5:

- **KVM updated to include backported bug fixes**

KVM features in the upstream 4.15 and 4.16 kernels are backported into UEK R5. Many of these patches offer better stability and resolve bugs and performance issues.

- **Secure Encrypted Virtualization (SEV) for AMD-V enabled**

AMD's Secure Encrypted Virtualization (SEV) feature that extends the AMD-V architecture has been enabled in UEK R5 and upstream patches from the 4.16 kernel have been backported to ensure that the latest features and functionality are available. Hardware that supports SEV can use this feature to run multiple virtual machines under the control of a hypervisor in a more secure fashion. Private memory space can be encrypted with a guest-specific key, while shared memory space can be encrypted with a hypervisor key. This feature can protect data on guest virtual machines from a potentially compromised hypervisor.

- **User-Mode Instruction Prevention (UMIP) for Intel enabled**

Intel's UMIP feature has been enabled in UEK R5 and upstream patches from the 4.16 kernel have been backported to ensure that the latest features and functionality are available. UMIP is a security feature present in newer Intel processors, that can prevent the execution of certain instructions if the Current Privilege Level (CPL) is greater than 0. UMIP helps to protect access to system-wide settings such as the global and local descriptor tables, the task register and the interrupt descriptor table. UMIP has specifically been integrated with KVM to enable support for UMIP within a virtualized environment.

- **Paravirtual TLB shutdown implemented**

Patches have been applied to implement a KVM paravirtual translation lookaside buffer (TLB) shutdown algorithm. TLB is a memory cache that reduces the time taken to access a memory location. TLB shutdown is an operation that runs on multi-processor machines to flush the TLB on all processors to ensure that page restrictions are respected. Typically, TLB shutdown is managed by the host scheduler. In environments where multi-CPU virtual machines are running, VCPUs are not scheduled simultaneously. This can waste CPU cycles and cause synchronization latency, particularly in oversubscribed situations. The paravirtual TLB shutdown code helps to resolve this and makes TLB invalidation significantly more effective.

Driver Updates

The Unbreakable Enterprise Kernel Release 5 supports a large number of hardware and devices. In close cooperation with hardware and storage vendors, Oracle has updated several device drivers from the versions in mainline Linux 4.14.35.

A complete list of the driver modules included in UEK R5 along with version information is provided in the appendix at [Driver Modules in Unbreakable Enterprise Kernel Release 5 \(x86_64\)](#).

Notable Driver Features

The following new features are noted in the drivers shipped with UEK R5:

- **VXLAN offload support on Mellanox CX-5 HCAs**

The `mlx5e` driver has added netdev support for VXLAN tunneling. This feature reduces CPU overhead by offloading packet processing for VXLAN encapsulation to the HCA hardware directly. This reduces system load for VXLAN tunneling, improves performance and reduces packet throughput.

- **Hyper-V drivers updated**

The Hyper-V storage driver, `hv_storvsc`, has been updated to provide performance improvements for I/O operations on certain workloads by eliminating bounce buffers. The Hyper-V network driver, `hv_netvsc`, has been updated to support transparent SR-IOV on Virtual Function devices to reduce configuration complexity and the use of a dedicated bonding driver and script to handle hot plugging of the required PCI devices.

A large number of other upstream patches from the 4.15 and 4.16 Linux kernel versions have been backported to deliver a full range of expected functionality and features for Hyper-V on UEK R5.

- **QLogic QEDF 25/40/50/100Gb FCoE driver added**

The QLogic QEDF 25/40/50/100Gb FCoE driver, `qedf`, has been added to the driver modules included in this kernel release. The driver introduces FCoE support for QLogic 41000 Series Converged Network Adapters.

- **FC-NVMe transport support for Emulex and QLogic devices enabled**

The NVMe Express drivers, `nvme`, have been patched and updated to support enabling NVMe over Fibre Channel fabrics. This change involved the addition of several new `nvme` modules, updates to other modules, such as the Emulex LightPulse Fibre Channel SCSI driver, `lpfc` and modifications to kernel block layer code such as the multi-queue block I/O queueing mechanism. Note that this functionality is currently available as a technical preview. Hardware vendors are responsible for testing and supporting FC-NVMe transport for their own devices. For more information on FC-NVMe support for your hardware, please contact your hardware vendor.

- **Broadcom/Emulex LightPulse Fibre Channel SCSI driver updated to 12.0.0.2**

The Broadcom/Emulex LightPulse Fibre Channel SCSI driver, `lpfc` has been updated to version 12.0.0.2. This release adds support for Emulex 32/64GB Host Bus Adapters and the initial framework to enable NVMe on Fibre Channel. Note that FC-NVMe in `lpfc` is available as a technical preview.

- **QLogic Fibre Channel HBA driver updated to 10.00.00.06-k1**

The QLogic Fibre Channel HBA driver, `qla2xxx` has been updated to version 10.00.00.06-k1. Changes include many bug fixes for stability and performance. This release also includes a large number of vendor supplied and upstream patches to enable NVMe on Fibre Channel. Note that FC-NVMe in `qla2xxx` is available as a technical preview.

- **LSI MPT Fusion SAS 3.0 device driver updated**

The LSI MPT Fusion SAS 3.0 device driver, `mpt3sas`, has been patched and updated to support NVMe drives and to add support for the Broadcom SAS3616 HBA. Other upstream patches have also been applied for bug fixes.

- **Amazon Elastic Network Adapter driver updated to 1.5.0k**

The Elastic Network Adapter driver, `ena`, has been updated to version 1.5.0k. This version provides a number of upstream bug fixes and improvements. Additional features include additional power management operations, initial support for IPv6 RSS and improved driver robustness.

- **Avago MegaRAID SAS driver updated**

The Avago MegaRAID SAS driver, `megaraid_sas`, has been updated to version 07.704.04.00-rc1 and includes upstream and vendor supplied patches. Additional features include added support for the SAS3.5 generation of MegaRAID SAS controllers. Changes were also applied to cater for the potential to increase the adapter Queue Depth (QD) to 9k.

- **Interface driver for GENEVE encapsulated traffic included**

The interface driver for GENEVE encapsulated traffic, `geneve`, is included in this release of the kernel. Although this driver is provided simply as part of the upstream code used by this kernel release, it is mentioned as its inclusion resolves a known issue in Oracle Linux 7.5.

New and Updated Packages

To support the newly added functionality that the UEK R5 provides, several kernel and user space binary packages have been added or updated from the ones included in the base distribution. For more information about the ULN channels and Oracle Linux yum server repositories in which these packages are available, see [Installation and Availability](#).

Kernel space packages that are added and updated for UEK R5 are labeled with the prefix `kernel-uek`. The `linux-firmware` package is also updated with the latest available firmwares.

The packages listed here are specific to user space functionality and are updated to take advantage of features available in UEK R5. There is no dependency on these packages to use UEK R5. If you use any of these packages and also use UEK R5 you should update the package to the latest version for full compatibility with all of the features available in UEK R5.

- `bcache-tools`
- `btrfs-progs`
- `btrfs-progs-devel`
- `daxctl`
- `daxctl-devel`

- daxctl-libs
- debugmode
- dracut
- dracut-caps
- dracut-config-generic
- dracut-config-rescue
- dracut-fips
- dracut-fips-aesni
- dracut-network
- dracut-tools
- dtrace-utils
- dtrace-utils-devel
- dtrace-utils-testsuite
- initscripts
- iproute
- iproute-devel
- iproute-doc
- iproute-tc
- ixpdimcli
- ixpdimcli-data
- ixpdimcli-devel
- ixpdimcli-monitor
- libdtrace-ctf
- libdtrace-ctf-devel
- libinvm-cim
- libinvm-cim-devel
- libinvm-cli
- libinvm-cli-devel
- libinvm-i18n
- libinvm-i18n-devel
- libixpdimcli
- libixpdimcli-cim
- libixpdimcli-cli
- libpmem
- libpmem-debug

- libpmem-devel
- libpmemblk
- libpmemblk-debug
- libpmemblk-devel
- libpmemcto
- libpmemcto-debug
- libpmemcto-devel
- libpmemlog
- libpmemlog-debug
- libpmemlog-devel
- libpmemobj
- libpmemobj++-devel
- libpmemobj-devel
- libpmempool
- libpmempool-debug
- libpmempool-devel
- librpmem
- librpmem-debug
- librpmem-devel
- libvmem
- libvmem-debug
- libvmem-devel
- libvmmalloc
- libvmmalloc-debug
- libvmmalloc-devel
- libzstd
- libzstd-devel
- ndctl
- ndctl-devel
- ndctl-libs
- pmempool
- rpmemd
- xfsprogs
- xfsprogs-devel

Compatibility

Oracle Linux maintains full user space compatibility with Red Hat Enterprise Linux, which is independent of the kernel version running underneath the operating system. Existing applications in user space will continue to run unmodified on the Unbreakable Enterprise Kernel Release 5 and no re-certifications are needed for RHEL certified applications.

To minimize impact on interoperability during releases, the Oracle Linux team works closely with third-party vendors whose hardware and software have dependencies on kernel modules. The kernel ABI for UEK R5 will remain unchanged in all subsequent updates to the initial release. In this release, there are changes to the kernel ABI relative to UEK R4 that require recompilation of third-party kernel modules on the system. Before installing UEK R5, verify its support status with your application vendor.

Certification of UEK R5 for Oracle products

Note that certification of different Oracle products on UEK R5 may not be immediately available at the time of a UEK R5 release. You should always check to ensure that the product that you are using is certified for use on UEK R5 before upgrading or installing the kernel. Check certification at <https://support.oracle.com/epmos/faces/CertifyHome>.

Oracle Automatic Storage Management Cluster File System (Oracle ACFS) certification for different kernel versions is described in Document ID 1369107.1 available at <https://support.oracle.com/oip/faces/secure/km/DocumentDisplay.jspx?id=1369107.1>.

Oracle Automatic Storage Management Filter Driver (Oracle ASMFD) certification for different kernel versions is described in Document ID 2034681.1 available at <https://support.oracle.com/oip/faces/secure/km/DocumentDisplay.jspx?id=2034681.1>.

2

Security Fixes for CVEs

This chapter lists security vulnerabilities and exposures (CVEs) that are specifically addressed in this release. Note that CVEs are continually handled in patch updates that are made available as errata builds for the current release. For this reason, it is absolutely critical that you keep your system up to date with the latest package updates for this kernel release.

You can keep up to date with the latest CVE information at <https://linux.oracle.com/cve>.

List of CVEs fixed in this release

The following list describes the CVEs that are fixed in this release. The content provided here is automatically generated and includes the CVE identifier and a summary of the issue. The associated internal Oracle bug identifiers are also included to reference work that was carried out to address each issue.

- **CVE-2012-3430**

The `rds_recvmsg` function in `net/rds/recv.c` in the Linux kernel before 3.0.44 does not initialize a certain structure member, which allows local users to obtain potentially sensitive information from kernel stack memory via a (1) `recvfrom` or (2) `recvmsg` system call on an RDS socket. (Bug: 27364391)

See <https://linux.oracle.com/cve/CVE-2012-3430.html> for more information.

- **CVE-2015-6937**

The `__rds_conn_create` function in `net/rds/connection.c` in the Linux kernel through 4.2.3 allows local users to cause a denial of service (NULL pointer dereference and system crash) or possibly have unspecified other impact by using a socket that was not properly bound. (Bug: 27364391)

See <https://linux.oracle.com/cve/CVE-2015-6937.html> for more information.

- **CVE-2017-5715**

Systems with microprocessors utilizing speculative execution and indirect branch prediction may allow unauthorized disclosure of information to an attacker with local user access via a side-channel analysis. (Bug: 27445757 27477740 27526549 27601617 27832367 27832383)

See <https://linux.oracle.com/cve/CVE-2017-5715.html> for more information.

- **CVE-2017-5754**

Systems with microprocessors utilizing speculative execution and indirect branch prediction may allow unauthorized disclosure of information to an attacker with local user access via a side-channel analysis of the data cache.

See <https://linux.oracle.com/cve/CVE-2017-5754.html> for more information.

- **CVE-2017-8824**

The `dccp_disconnect` function in `net/dccp/proto.c` in the Linux kernel through 4.14.3 allows local users to gain privileges or cause a denial of service (use-after-free) via an `AF_UNSPEC` connect system call during the `DCCP_LISTEN` state. (Bug: 27220222)

See <https://linux.oracle.com/cve/CVE-2017-8824.html> for more information.

- **CVE-2018-1000004**

In the Linux kernel 4.12, 3.10, 2.6 and possibly earlier versions a race condition vulnerability exists in the sound system, this can lead to a deadlock and denial of service condition.

See <https://linux.oracle.com/cve/CVE-2018-1000004.html> for more information.

- **CVE-2018-10323**

The xfs_bmap_extents_to_btree function in fs/xfs/libxfs/xfs_bmap.c in the Linux kernel through 4.16.3 allows local users to cause a denial of service (xfs_bmap_i_write NULL pointer dereference) via a crafted xfs image. (Bug: 28004007)

See <https://linux.oracle.com/cve/CVE-2018-10323.html> for more information.

- **CVE-2018-1093**

The ext4_valid_block_bitmap function in fs/ext4/balloc.c in the Linux kernel through 4.15.15 allows attackers to cause a denial of service (out-of-bounds read and system crash) via a crafted ext4 image because balloc.c and ialloc.c do not validate bitmap block numbers. (Bug: 27823858)

See <https://linux.oracle.com/cve/CVE-2018-1093.html> for more information.

- **CVE-2018-1095**

The ext4_xattr_check_entries function in fs/ext4/xattr.c in the Linux kernel through 4.15.15 does not properly validate xattr sizes, which causes misinterpretation of a size as an error code, and consequently allows attackers to cause a denial of service (get_acl NULL pointer dereference and system crash) via a crafted ext4 image. (Bug: 27823895)

- **CVE-2018-3639**

Systems with microprocessors utilizing speculative execution and speculative execution of memory reads before the addresses of all prior memory writes are known may allow unauthorized disclosure of information to an attacker with local user access via a side-channel analysis, aka Speculative Store Bypass (SSB), Variant 4. (Bug: 28041775 28063989)

See <https://linux.oracle.com/cve/CVE-2018-3639.html> for more information.

- **CVE-2018-5703**

The tcp_v6_syn_recv_sock function in net/ipv6/tcp_ipv6.c in the Linux kernel through 4.14.11 allows attackers to cause a denial of service (slab out-of-bounds write) or possibly have unspecified other impact via vectors involving TLS. (Bug: 28202897)

3

Known Issues

This chapter describes the known issues for the Unbreakable Enterprise Kernel Release 5.

Unusable or Unavailable Features for Arm

This section calls out specific features that are known to not work, remain untested or which are known to have issues that make the feature unusable.

- **InfiniBand**

InfiniBand hardware is currently not supported for Arm architecture using UEK R5.

- **FibreChannel**

FibreChannel hardware is currently not supported for Arm architecture using UEK R5.

- **RDMA**

RDMA and any sub-features that are described in [RDMA](#) are not supported for Arm.

- **OCFS2**

The OCFS2 file system and all of the features described in [OCFS2](#) are not supported for Arm.

- **Secure Boot**

The Secure Boot feature that is described in [Security](#) is currently not supported or available for Arm.

[aarch64] IOMMU issues

Performance issues, such as increased boot times, soft lockups, and crashes can occur on 64-bit Arm (aarch64) architecture that is running UEK R5 when the input–output memory management unit (IOMMU) feature is active. These issues have been observed on some Arm hardware using Mellanox CX-3 and CX-4 cards. However, note that similar issues could occur with different drivers on different hardware.

UEK R5 is configured to use `swiotlb` by default. To enable the use of the IOMMU feature, use `iommu.passthrough=0` on the kernel command line. (Bug IDs 27687153, 27759954, 27812727, and 27862655)

[aarch64] Kdump issues

Several issues are noted when using Kdump on 64-bit Arm (aarch64) architecture platforms.

- **Kdump fails when using Mellanox ConnectX devices**

On systems with Mellanox hardware devices that use either the `mlx4_core` or the `mlx5_core` driver modules, Kexec fails to load the crash kernel and hangs while the `mlx4_core` or `mlx5_core` driver is initialized.

The workaround is to disable loading the driver in the crash kernel by adding either `rd.driver.blacklist=mlx4_core` or `rd.driver.blacklist=mlx5_core` to the `KDUMP_COMMANDLINE_APPEND` option in `/etc/sysconfig/kdump`. Note that this solution is only possible if you have configured to store the vmcore file locally. If Kdump is configured to save the vmcore to a remote host via the device, this workaround fails. (Bug ID 27915989) (Bug ID 27916214)

- **Kdump fails when configured to use remote dump target over an ixgbe device**

On systems where Kdump is configured to use a remote dump target over an `ixgbe` network device, the Kdump Vmcore Save Service is unable to save the vmcore file to the target destination. (Bug ID 27915827)

- **Kdump fails and hangs when configured to use a remote dump target over an igb device**

On systems where Kdump is configured to use a remote dump target over an `igb` network device, `NETDEV WATCHDOG` returns a timeout error and the network adapter is continually reset, resulting in a system hang when `kexec` attempts to load the crash kernel. (Bug ID 27916095)

[aarch64] CPU hotplug functionality not functional in KVM

Although CPU hotplug functionality is available in QEMU, the Arm64 Linux kernel is not yet able to handle the addition of new virtual CPUs to a running virtual machine. When QEMU is used to add a virtual CPU to a running virtual machine in KVM, an error is returned:

```
kvm_init_vcpu failed: Device or resource busy
```

CPU hotplug functionality is currently unavailable for UEK R5 on 64-bit Arm platforms. (Bug ID 28140386)

File System Issues

The following are known issues that are specific to file systems supported with Unbreakable Enterprise Kernel Release 5.

ext4: Frequent repeated system shutdowns can cause file system corruption

If a system using ext4 is repeatedly and frequently shut down, the file system may be corrupted. This issue is considered to be a corner-case due to the difficulty required to replicate. The issue exists in upstream code and proposed patches are currently under review. (Bug ID 27547113)

RDMA Issues

The following issues are noted for RDMA:

- **ibacm service is disabled by default**

The `ibacm` service is disabled by default immediately after installation. This means that the `ibacm` service does not automatically start after a reboot. You must enable the service if you wish this service to start after reboot:

```
# systemctl enable ibacm
```

(Bug ID 28074471)

- **Issues when Network Manager control is enabled or disabled**

Several issues have been observed when the `NM_CONTROLLED=yes` is set for an interface that is used for RDMA. For these reasons, Oracle recommends setting `NM_CONTROLLED=no` in the interface configuration, however when Network Manager control is disabled, the `CONNECTED_MODE=yes` parameter is ignored for InfiniBand interfaces. It is possible to work around this issue by setting the connected mode manually by running the following command:

```
# echo connected > /sys/class/net/ib0/mode
```

where `ib0` is the interface that you wish to change mode for. You may need to run this command after a reboot. (Bug ID 28074921)

- **Error, some other host already uses address `xxx.xxx.xxx.xxx`**

The following error message might be triggered in certain instances:

```
Error, some other host already uses address xxx.xxx.xxx.xxx
```

The following are the two instances in which this error message might be triggered:

- When active-bonding is enabled, and you run the `ifup ib-interface` command.
- When you run the `systemctl start rdma` command.

You can ignore this message, as in both cases, the InfiniBand interface is brought up successfully. (Bug ID 28097516)

- **Unloading `resilient_rdmaip` can result in issues accessing InfiniBand interfaces**

Unloading the `resilient_rdmaip` module can cause issues accessing and configuring InfiniBand interfaces. Attempts to use the `ifconfig` command on an InfiniBand interface after the module has been unloaded, results in a 'Device not found' message, and no IP information for these interfaces is available. The interfaces need to be re-initialized with the `ifup` command. The active bonding feature is unaffected by this issue. (Bug ID 28123680)

Docker Issues

The following are known Docker issues:

- **Running `yum install` within a container on an overlayfs file system can fail with the following error:**

```
RpmdB checksum is invalid: dCDPT(pkg checksums): package_name
```

This error can break Dockerfile builds but is expected behavior from the kernel and is a known issue upstream (see <https://github.com/docker/docker/issues/10180>.)

The workaround is to run `touch /var/lib/rpm/*` before installing the package.

Note that this issue is fixed in any Oracle Linux images available on the Docker Hub or Oracle Container Registry, but the issue could still be encountered when running any container based on a third-party image. (Bug ID 21804564)

- **Docker can fail where it uses the `overlay2` storage driver on XFS-formatted storage**

A kernel patch has been applied to prevent overlay mounts on XFS if the `f_type` is not set to 1. This fix resolves an issue where XFS did not properly support the whiteout features of an overlay filesystem if `d_type` support was not enabled. If the Docker Engine is already using XFS-formatted storage with the `overlay2` storage driver, an upgrade of the kernel can cause Docker to fail if the underlying XFS file system is not created with the `-n ftype=1` option enabled. The root partition on Oracle Linux 7 is automatically formatted with `-n ftype=0` where XFS is selected as the file system. Therefore, if you intend to use the `overlay2` storage driver in this environment, you must format a separate device for this purpose. (Bug ID 25995797)

LXC Issues

The following are known LXC issues:

- **LXC read-only `ip_local_port_range` parameter**

With `lxc-1.1` or later and UEK R5, `ip_local_port_range` is a read-writable parameter under `/proc/sys/net/ipv4` in an Oracle Linux container rather than being read-only. (Bug ID 21880467)

NVMe device names change across reboots

Since UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names generated by the kernel are not stable. This is similar to the way that other block devices are handled by the kernel. If you use enumerated kernel instance names to handle mounts in your `fstab`, the mounts may fail or behave unpredictably.

Never use enumerated kernel instance names when referring to block devices. Instead, use the UUID, partition label or file system label to refer to any block device, including an NVMe device. If you are uncertain of the device UUID or labels, use the `blkid` command to view this information.

Prior to multipathing, a subsystem number would typically map onto the controller number. Therefore, you could assume that the subsystem at `/dev/nvme0n1` was affiliated with controller `/dev/nvme0`. This is no longer the case. For multipathing to be enabled a subsystem could have multiple controllers. In this case, `/dev/nvme0n1` could just as easily be affiliated with controllers at `/dev/nvme1` and `/dev/nvme2`. There is no specific correlation between the subsystem device name and the controller device name.

NVMe device hotplug unplug procedure change

Since UEK R5 adds support for NVMe subsystems and multipathing, enumerated device names generated by the kernel are not stable. This means that the procedure

for identifying and unplugging NVMe devices using hotplug functionality is slightly different to the procedure that you may have followed using other kernel releases. This note describes the steps that you should take to identify, power down and unplug the appropriate device.

1. Use the `lsblk` command to identify the disk that you wish to remove according to its WWN or UUID. For example:

```
# lsblk -o +UUID,WWN,MODEL
```

Take note of the enumerated kernel instance name that has been assigned to the device. For example, this may be `nvme0n1`. It is very important to understand that the device name does not necessarily map onto the controller or PCIe bridge that it is attached to. See [NVMe device names change across reboots](#) for more information.

2. Search for the device path to obtain the PCI domain identifier for the device:

```
# find /sys/devices -iname nvme0n1
```

```
/sys/devices/pci0000:85/0000:85:01.0/0000:8d:00.0/nvme/nvme1/nvme0n1
```

Note that `0000:8d:00.0` in the returned path for the device is the PCI domain identifier for the device. You need this information to proceed.

3. Obtain the physical slot number for the NVMe drive. Under UEK R5, the slot is bound to the NVMe device directly and not to the PCIe controller. You can find the slot number for the NVMe device by running the `lspci` command and querying the PCI domain identifier for the device in verbose mode:

```
# lspci -s 0000:8d:00.0 -vvv
8d:00.0 Non-Volatile memory controller: Intel Corporation Express Flash NVMe
P4500 (prog-if 02 [NVM Express])
    Subsystem: Oracle/SUN Device 4871
    Physical Slot: 104-1
...
```

Note that the Physical Slot number for the device in this example is `104-1`. Take note of this value to proceed.

4. Use the Physical Slot number for the device to find its bus interface:

```
# find /sys -iname "104-1"
/sys/bus/pci/slots/104-1
```

5. Use the returned bus interface path to power off the NVMe drive:

```
# echo 0 > /sys/bus/pci/slots/104-1/power
```

Depending on your hardware, the blue disk LED may display on the front panel of the system may display to indicate that you can safely remove the disk drive.

KVM guest crashes when using memory hotplug operation to shrink available memory

A KVM guest may crash if the guest memory is reduced from 96GB or more to 2GB using a memory hotplug operation. the guest crashes. Although this issue is logged for UEK R5, similar issues have been noted for RHCK. (Bug ID 27968656)

HP DL380 system reboot issue with SD card slot enabled in Legacy mode

A reboot failure can occur on HP DL380 Gen 10 systems where the BIOS is set to Legacy mode and an SD flash device is removed from the onboard SD Reader. A patch is available and being tested but is not included at the time of this release. (Bug ID 28171827)

4

Installation and Availability

You can install Unbreakable Enterprise Kernel Release 5 on Oracle Linux 7.5 or later, running either the Red Hat compatible kernel or a previous version of the Unbreakable Enterprise Kernel. If you are still running an older version of Oracle Linux, first update your system to the latest available update release.

The Unbreakable Enterprise Kernel Release 5 is supported on the x86-64 architecture but not on x86.

Installation Overview

If you have a subscription to Oracle Unbreakable Linux support, you can obtain the packages for Unbreakable Enterprise Kernel Release 5 by registering your system with the Unbreakable Linux Network (ULN) and subscribing it to additional channels. See [Subscribing to ULN Channels](#).

If your system is not registered with ULN, you can obtain most of the packages from Oracle Linux yum server. See [Enabling Access to Oracle Linux Yum Server Repositories](#).

Having subscribed your system to the appropriate channels on ULN or Oracle Linux yum server, upgrade your system. See [Upgrading Your System](#).

Subscribing to ULN Channels

ULN channel requirements differ depending on the platform architecture that you are using.

For Oracle Linux 7 on the 64-bit Arm (aarch64) platform, no RHCK is available and UEK R5 is used by default. Your system must be subscribed to:

- `ol7_aarch64_latest` (latest user space packages for Oracle Linux 7)

For Oracle Linux 7 on the x86 platform, the kernel image and user space packages are available on the following ULN channels:

- `ol7_x86_64_latest` (latest user space packages for Oracle Linux 7)
- `ol7_x86_64_UEKR5` (`kernel-uek*`, `dtrace-utils*`, `ndctl-*`, `btrfs-progs-*` and `xfsprogs-*`)

The following procedure assumes that you have already registered your system with ULN.

To subscribe your system to a channel on ULN:

1. Log in to <https://linux.oracle.com> with your ULN user name and password.
2. On the Systems tab, click the link named for the system in the list of registered machines.
3. On the System Details page, click **Manage Subscriptions**.
4. On the System Summary page, select each required channel from the list of available channels and click the right arrow to move the channel to the list of subscribed channels.

Subscribe the system to the appropriate channels for your platform architecture.

5. Click **Save Subscriptions**.

For information about using ULN, see [Oracle Linux: Unbreakable Linux Network User's Guide for Oracle Linux 6 and Oracle Linux 7](#).

Enabling Access to Oracle Linux Yum Server Repositories

Packages are also available on the Oracle Linux yum server repository at <https://yum.oracle.com/>.

Yum repository requirements differ depending on the platform architecture that you are using.

For Oracle Linux 7 on the 64-bit Arm (aarch64) platform, no RHCK is available and UEK R5 is used by default. Your system must have the following repository enabled:

- `ol7_latest` (latest user space packages for Oracle Linux 7)

For Oracle Linux 7 on the x86 platform, the kernel image and user space packages are available on the following repositories:

- `ol7_latest` (latest user space packages for Oracle Linux 7 other than the RDMA tool packages)
- `ol7_UEKR5` (kernel-uek*, dtrace-utils*, ndctl-*, btrfs-progs-* and xfsprogs-*)

To enable access to the Oracle Linux 7 repositories on the Oracle Linux yum server, use `yum-config-manager`. For example, to enable access to the `ol7_latest` and `ol7_UEKR5` repositories, run the following command:

```
# yum-config-manager --enable ol7_latest,ol7_UEKR5
```

 **Note:**

You can only use `yum-config-manager` to enable or disable repositories after you already have a configuration file for the specified repository. Repository configurations are typically stored in `/etc/yum.repos.d`. The repository configurations that are required to install UEK on Oracle Linux 7 are included in the `oraclelinux-release-el7` package.

See [Oracle Linux 7: Administrator's Guide](#).

Upgrading Your System

To upgrade your system to Unbreakable Enterprise Kernel Release 5:

1. After enabling access to the appropriate ULN channels or repositories on the Oracle Linux yum server, run the following command, which upgrades the system to UEK R5:

```
# yum update
```

2. After upgrading the system, reboot it, selecting the UEK R5 kernel (version 4.14.35) if this is not the default boot kernel.

If you have questions regarding configuring or using `yum` to install updates, refer to [Oracle Linux: Unbreakable Linux Network User's Guide for Oracle Linux 6 and Oracle Linux 7](#).

The kernel's source code is available through a public git source code repository at <https://github.com/oracle/linux-uek>.

Installing Oracle-Supported RDMA Packages

The following procedure describes how to upgrade from the OFED release to the RDMA release. The instructions describe how to remove the `oracle-ofed-release` packages and then install the `oracle-rdma-release` packages.

1. Subscribe your system to the appropriate ULN channels or enable the appropriate yum repositories:
 - If your system is registered with ULN, subscribe the system to the `ol7_x86_64_UEKR5_RDMA`, `ol7_x86_64_UEKR5`, and `ol7_x86_64_latest` channels on ULN.
 - If you want to install the packages from the Oracle Linux yum server, enable the required repositories and make sure your system is using the modular yum repository configuration. If your system is not using the modular yum repository configuration, install the `oraclelinux-release-el7` package and run the `/usr/bin/ol_yum_configure.sh` script.

```
# yum install oraclelinux-release-el7
# /usr/bin/ol_yum_configure.sh
```

Enable the `ol7_latest`, `ol7_UEKR5` and `ol7_UEKR5_RDMA` repositories:

```
# yum-config-manager --enable ol7_latest ol7_UEKR5 ol7_UEKR5_RDMA
```

You can optionally disable the `ol7_UEKR4` repository if you do not intend to use this kernel. Note that the RDMA packages installed from the `ol7_UEKR5_RDMA` repository are not compatible with other UEK releases.

See https://docs.oracle.com/en/operating-systems/oracle-linux/7/admin/ol7_yum.html in [Oracle Linux 7: Administrator's Guide](#) for more information.

2. Stop and then disable the `rdma.service` service.

```
# systemctl stop rdma.service
# systemctl disable rdma.service
```

3. Remove any existing OFED packages.

```
# yum remove 'ibacm*'
# yum remove 'ib-bonding*'
# yum remove 'ibutils*'
# yum remove 'infiniband-diags*'
# yum remove 'libibacl*'
# yum remove 'libibcm*'
# yum remove 'libibmad*'
# yum remove 'libibumad*'
# yum remove 'libibverbs*'
# yum remove 'libmlx4*'
```

```
# yum remove 'librdmacm*'
# yum remove 'libsdp*'
# yum remove 'mstflint*'
# yum remove 'ofed-docs*'
# yum remove 'ofed-scripts*'
# yum remove 'opensm*'
# yum remove 'perftest*'
# yum remove 'qperf*'
# yum remove 'sdpnstat*'
# yum remove 'rdma*'
# yum remove 'rds-tools*'
# yum remove 'rdma-core'
```

4. Clean all yum cached files from all enabled repositories:

```
# yum clean all
```

5. Install the RDMA packages for UEK R5 by running the following command:

```
# yum install oracle-rdma-release
```

Each UEK release requires a different set of RDMA packages. If you change the kernel on your system to a UEK release before UEK R5, remove the existing UEK R5-based RDMA packages before installing the correct packages for the new kernel by running the following command:

```
# yum remove --setopt=clean_requirements_on_remove=1 oracle-rdma-release
```

 **Caution:**

Downgrading UEK versions is not advisable, except for testing purposes.

5

Driver Modules in Unbreakable Enterprise Kernel Release 5 (x86_64)

This appendix presents all of the driver modules and their version information as shipped in the current version of UEK R5 (x86_64). This appendix is generated automatically. Note that driver versions and available drivers may change in subsequent errata releases, but the driver versions will always be the same or later than presented here.

acpi Drivers in UEK R5 (x86_64)

Driver	Version	Description
acpi_extlog		Extended MCA Error Log Driver
acpi_ipmi		ACPI IPMI Opregion driver
acpi_pad		ACPI Processor Aggregator Driver
einj		APEI Error INjection support
erst-dbg		APEI Error Record Serialization Table debug support
custom_method		
ec_sys		ACPI EC sysfs access driver
nfit		
sbs		Smart Battery System ACPI interface driver
sbshc		ACPI SMBus HC driver
video		ACPI Video Driver

ata Drivers in UEK R5 (x86_64)

Driver	Version	Description
acard-ahci	1.0	ACard AHCI SATA low-level driver
ahci	3.0	AHCI SATA low-level driver
ahci_platform		AHCI SATA platform driver
ata_generic	0.2.15	low-level driver for generic ATA
ata_piix	2.13	SCSI low-level driver for Intel PIIX/ICH ATA controllers
libahci		Common AHCI SATA low-level routines

Driver	Version	Description
libahci_platform		AHCI SATA platform library
libata	3.00	Library module for ATA devices
pata_acpi	0.2.3	SCSI low-level driver for ATA in ACPI mode
pata_ali	0.7.8	low-level driver for ALi PATA
pata_amd	0.4.1	low-level driver for AMD and Nvidia PATA IDE
pata_artop	0.4.6	SCSI low-level driver for ARTOP PATA
pata_atiixp	0.4.6	low-level driver for ATI IXP200/300/400
pata_atp867x	0.7.5	low level driver for Artop/Acard 867x ATA controller
pata_cmd64x	0.2.18	low-level driver for CMD64x series PATA controllers
pata_hpt366	0.6.11	low-level driver for the Highpoint HPT366/368
pata_hpt37x	0.6.23	low-level driver for the Highpoint HPT37x/30x
pata_hpt3x2n	0.3.15	low-level driver for the Highpoint HPT3xxN
pata_hpt3x3	0.6.1	low-level driver for the Highpoint HPT343/363
pata_it8213	0.0.3	SCSI low-level driver for the ITE 8213
pata_it821x	0.4.2	low-level driver for the IT8211/IT8212 IDE RAID controller
pata_jmicron	0.1.5	SCSI low-level driver for Jmicron PATA ports
pata_marvell	0.1.6	SCSI low-level driver for Marvell ATA in legacy mode
pata_netcell	0.1.7	SCSI low-level driver for Netcell PATA RAID
pata_ninja32	0.1.5	low-level driver for Ninja32 ATA
pata_oldpiix	0.5.5	SCSI low-level driver for early PIIX series controllers
pata_pcmcia	0.3.5	low-level driver for PCMCIA ATA
pata_pdc2027x	1.0	libata driver module for Promise PDC20268 to PDC20277
pata_pdc202xx_old	0.4.3	low-level driver for Promise 2024x and 20262-20267
pata_piccolo	0.0.1	Low level driver for Toshiba Piccolo ATA
pata_rdc	0.01	SCSI low-level driver for RDC PATA controllers

Driver	Version	Description
pata_sch	0.2	SCSI low-level driver for Intel SCH PATA controllers
pata_serverworks	0.4.3	low-level driver for Serverworks OSB4/CSB5/CSB6
pata_sil680	0.4.9	low-level driver for SI680 PATA
pata_sis	0.5.2	SCSI low-level driver for SiS ATA
pata_via	0.3.4	low-level driver for VIA PATA
pd_c_adma	1.0	Pacific Digital Corporation ADMA low-level driver
sata_inic162x	0.4	low-level driver for Initio 162x SATA
sata_mv	1.28	SCSI low-level driver for Marvell SATA controllers
sata_nv	3.5	low-level driver for NVIDIA nForce SATA controller
sata_promise	2.12	Promise ATA TX2/TX4/TX4000 low-level driver
sata_qstor	0.09	Pacific Digital Corporation QStor SATA low-level driver
sata_sil	2.4	low-level driver for Silicon Image SATA controller
sata_sil24		Silicon Image 3124/3132 SATA low-level driver
sata_sis	1.0	low-level driver for Silicon Integrated Systems SATA controller
sata_svw	2.3	low-level driver for K2 SATA controller
sata_sx4	0.12	Promise SATA low-level driver
sata_uli	1.3	low-level driver for ULI Electronics SATA controller
sata_via	2.6	SCSI low-level driver for VIA SATA controllers
sata_vsc	2.3	low-level driver for Vitesse VSC7174 SATA controller

atm Drivers in UEK R5 (x86_64)

Driver	Version	Description
atmtcp		

auxdisplay Drivers in UEK R5 (x86_64)

Driver	Version	Description
cfag12864b		cfag12864b LCD driver
cfag12864bfb		cfag12864b LCD framebuffer driver
ks0108		ks0108 LCD Controller driver

bcma Drivers in UEK R5 (x86_64)

Driver	Version	Description
bcma		Broadcom's specific AMBA driver

block Drivers in UEK R5 (x86_64)

Driver	Version	Description
aoe	85	AoE block/char driver for 2.6.2 and newer 2.6 kernels
brd		
cryptoloop		loop blockdevice transferfunction adaptor / CryptoAPI
drbd	8.4.10	drbd - Distributed Replicated Block Device v8.4.10
floppy		
loop		
mtip32xx	1.3.1	Micron RealSSD PCIe Block Driver
nbd		Network Block Device
null_blk		
oracleasm	2.0.8	Kernel driver backing the Generic Linux ASM Library.
pktdvd		Packet writing layer for CD/DVD drives
rbd		RADOS Block Device (RBD) driver
skd		STEC s1120 PCIe SSD block driver
sx8	1.0	Promise SATA SX8 block driver
umem		Micro Memory(tm) PCI memory board block driver
virtio_blk		Virtio block driver
xen-blkback		

Driver	Version	Description
xen-blkfront		Xen virtual block device frontend
zram		Compressed RAM Block Device

bluetooth Drivers in UEK R5 (x86_64)

Driver	Version	Description
ath3k	1.0	Atheros AR30xx firmware driver
bcm203x	1.2	Broadcom Blutionium firmware driver ver 1.2
bfusb	1.2	BlueFRITZ! USB driver ver 1.2
bluecard_cs		Bluetooth driver for the Anycom BlueCard (LSE039/LSE041)
bpa10x	0.11	Digianswer Bluetooth USB driver ver 0.11
bt3c_cs		Bluetooth driver for the 3Com Bluetooth PCMCIA card
btbcm	0.1	Bluetooth support for Broadcom devices ver 0.1
btintel	0.1	Bluetooth support for Intel devices ver 0.1
btmrvl	1.0	Marvell Bluetooth driver ver 1.0
btmrvl_sdio	1.0	Marvell BT-over-SDIO driver ver 1.0
btrtl	0.1	Bluetooth support for Realtek devices ver 0.1
btsdio	0.1	Generic Bluetooth SDIO driver ver 0.1
btuart_cs		Bluetooth driver for Bluetooth PCMCIA cards with HCI UART interface
btusb	0.8	Generic Bluetooth USB driver ver 0.8
dtl1_cs		Bluetooth driver for Nokia Connectivity Card DTL-1
hci_uart	2.3	Bluetooth HCI UART driver ver 2.3
hci_vhci	1.5	Bluetooth virtual HCI driver ver 1.5

cdrom Drivers in UEK R5 (x86_64)

Driver	Version	Description
cdrom		

char Drivers in UEK R5 (x86_64)

Driver	Version	Description
hangcheck-timer	0.9.1	Hangcheck-timer detects when the system has gone out to lunch past a certain margin.
amd-rng		H/W RNG driver for AMD chipsets
intel-rng		H/W RNG driver for Intel chipsets
timeriomem-rng		Timer IOMEM H/W RNG driver
tpm-rng		RNG driver for TPM devices
via-rng		H/W RNG driver for VIA CPU with PadLock
virtio-rng		Virtio random number driver
ipmi_devintf		Linux device interface for the IPMI message handler.
ipmi_msghandler	39.2	Incoming and outgoing message routing for an IPMI interface.
ipmi_poweroff		IPMI Poweroff extension to sys_reboot
ipmi_si		Interface to the IPMI driver for the KCS, SMIC, and BT system interfaces.
ipmi_ssif		IPMI driver for management controllers on a SMBus
ipmi_watchdog		watchdog timer based upon the IPMI interface.
lp		
cm4000_cs		
cm4040_cs		
ppdev		
tlclk		
tpm_atmel	2.0	TPM Driver
tpm_infineon	1.9.2	Driver for Infineon TPM SLD 9630 TT 1.1 / SLB 9635 TT 1.2
tpm_nsc	2.0	TPM Driver
uv_mmtimer		SGI UV Memory Mapped RTC Timer
virtio_console		Virtio console driver

cpufreq Drivers in UEK R5 (x86_64)

Driver	Version	Description
acpi-cpufreq		ACPI Processor P-States Driver
amd_freq_sensitivity		AMD frequency sensitivity feedback powersave bias for the ondemand governor.
p4-clockmod		cpufreq driver for Pentium(TM) 4/ Xeon(TM)
pcc-cpufreq	1.10.00	Processor Clocking Control interface driver
powernow-k8		AMD Athlon 64 and Opteron processor frequency driver.
speedstep-lib		Library for Intel SpeedStep 1 or 2 cpufreq drivers.

crypto Drivers in UEK R5 (x86_64)

Driver	Version	Description
ccp-crypto	1.0.0	AMD Cryptographic Coprocessor crypto API support
ccp	1.1.0	AMD Secure Processor driver
padlock-aes		VIA PadLock AES algorithm support
padlock-sha		VIA PadLock SHA1/SHA256 algorithms support.
qat_c62x	0.6.0	Intel(R) QuickAssist Technology
qat_c62xvf	0.6.0	Intel(R) QuickAssist Technology
intel_qat	0.6.0	Intel(R) QuickAssist Technology
qat_dh895xcc	0.6.0	Intel(R) QuickAssist Technology
virtio_crypto		virtio crypto device driver

dax Drivers in UEK R5 (x86_64)

Driver	Version	Description
dax_pmem		
device_dax		

dca Drivers in UEK R5 (x86_64)

Driver	Version	Description
dca	1.12.1	

devfreq Drivers in UEK R5 (x86_64)

Driver	Version	Description
governor_simpleondemand		

dma Drivers in UEK R5 (x86_64)

Driver	Version	Description
dw_dmac		Synopsys DesignWare DMA Controller platform driver
dw_dmac_pci		Synopsys DesignWare DMA Controller PCI driver
ioatdma	4.00	

edac Drivers in UEK R5 (x86_64)

Driver	Version	Description
amd64_edac_mod		MC support for AMD64 memory controllers - 3.5.0
e752x_edac		MC support for Intel e752x/3100 memory controllers
edac_mce_amd		AMD MCE decoder
i3000_edac		MC support for Intel 3000 memory hub controllers
i3200_edac		MC support for Intel 3200 memory hub controllers
i5000_edac		MC Driver for Intel I5000 memory controllers - Ver: 2.0.12
i5100_edac		MC Driver for Intel I5100 memory controllers
i5400_edac		MC Driver for Intel I5400 memory controllers - Ver: 1.0.0
i7300_edac		MC Driver for Intel I7300 memory controllers - Ver: 1.0.0
i7core_edac		MC Driver for Intel i7 Core memory controllers - Ver: 1.0.0

Driver	Version	Description
i82975x_edac		MC support for Intel 82975 memory hub controllers
ie31200_edac		MC support for Intel Processor E31200 memory hub controllers
pnd2_edac		MC Driver for Intel SoC using Pondicherry memory controller
sb_edac		MC Driver for Intel Sandy Bridge and Ivy Bridge memory controllers - Ver: 1.1.2
skx_edac		MC Driver for Intel Skylake server processors
x38_edac		MC support for Intel X38 memory hub controllers

firewire Drivers in UEK R5 (x86_64)

Driver	Version	Description
firewire-core		Core IEEE1394 transaction logic
firewire-net		IP over IEEE1394 as per RFC 2734/3146
firewire-ohci		Driver for PCI OHCI IEEE1394 controllers
firewire-sbp2		SCSI over IEEE1394

firmware Drivers in UEK R5 (x86_64)

Driver	Version	Description
dcdbas	5.6.0-3.2	Dell Systems Management Base Driver (version 5.6.0-3.2)
dell_rbu	3.2	Driver for updating BIOS image on DELL systems
edd	0.16	sysfs interface to BIOS EDD information
iscsi_ibft	0.5.0	sysfs interface to BIOS iBFT information

gpu Drivers in UEK R5 (x86_64)

Driver	Version	Description
amdkfd	0.7.2	Standalone HSA driver for AMD's GPUs
ast		AST

Driver	Version	Description
bochs-drm		
cirrus		qemu Cirrus emulation
drm		DRM shared core routines DRM bridge infrastructure DRM panel infrastructure
drm_kms_helper		DRM KMS helper
gma500_gfx		DRM driver for the Intel GMA500, GMA600, GMA3600, GMA3650
ch7006		Chrontel ch7006 TV encoder driver
sil1164		Silicon Image sil1164 TMDS transmitter driver
tda998x		NXP Semiconductors TDA998X HDMI Encoder
i915		Intel Graphics
mgag200		MGA G200 SE
nouveau		nVidia Riva/TNT/GeForce/Quadro/Tesla
qxl		RH QXL
radeon		ATI Radeon
ttm		TTM memory manager subsystem (for DRM device)
udl		
vgem		Virtual GEM provider
virtio-gpu		Virtio GPU driver
vmwgfx	2.14.0.0	Standalone drm driver for the VMware SVGA device

hid Drivers in UEK R5 (x86_64)

Driver	Version	Description
hid-alps		ALPS HID driver
hid-appleir		HID Apple IR remote controls
hid-aureal		
hid-axff		Force feedback support for ACRUX game controllers
hid-cp2112		Silicon Labs HID USB to SMBus master bridge
hid-dr		
hid-elecom		
hid-emsff		

Driver	Version	Description
hid-gaff		
hid-gyration		
hid-holtek-kbd		
hid-holtek-mouse		
hid-holtekff		
hid-hyperv		
hid-icade		ION iCade input driver
hid-keytouch		
hid-kye		
hid-lcpower		
hid-led		Simple USB RGB LED driver
hid-logitech-dj		
hid-logitech-hidpp		
hid-multitouch		HID multitouch panels
hid-ortek		
hid-petalynx		
hid-picolcd		Minibox graphics PicoLCD Driver
hid-pl		
hid-primax		
hid-prodikeys		
hid-roccat-arvo		USB Roccat Arvo driver
hid-roccat-common		USB Roccat common driver
hid-roccat-isku		USB Roccat Isku/FX driver
hid-roccat-kone		USB Roccat Kone driver
hid-roccat-koneplus		USB Roccat Kone[+]/XTD driver
hid-roccat-konepure		USB Roccat KonePure/Optical driver
hid-roccat-kovaplus		USB Roccat Kova[+] driver
hid-roccat-lua		USB Roccat Lua driver
hid-roccat-pyra		USB Roccat Pyra driver
hid-roccat-ryos		USB Roccat Ryos MK/Glow/Pro driver
hid-roccat-savu		USB Roccat Savu driver
hid-roccat		USB Roccat char device
hid-saitek		
hid-samsung		

Driver	Version	Description
hid-sjoy		
hid-sony		
hid-speedlink		
hid-steelseries		
hid-sunplus		
hid-tivo		
hid-tmff		
hid-topseed		
hid-twinhan		
hid-uclogic		
hid-waltop		
hid-wiimote		Driver for Nintendo Wii / Wii U peripherals
hid-zpff		
hid-zydacron		
i2c-hid		HID over I2C core driver
uhid		User-space I/O driver support for HID subsystem
wacom	v2.00	USB Wacom tablet driver

hv Drivers in UEK R5 (x86_64)

Driver	Version	Description
hv_balloon		Hyper-V Balloon
hv_utils		Hyper-V Utilities
hv_vmbus		

hwmon Drivers in UEK R5 (x86_64)

Driver	Version	Description
abituguru		Abit uGuru Sensor device
abituguru3		Abit uGuru3 Sensor device
acpi_power_meter		ACPI 4.0 power meter driver
ad7414		AD7414 driver
ad7418	0.4	AD7416/17/18 driver
adc128d818		Driver for ADC128D818

Driver	Version	Description
adm1021		adm1021 driver
adm1025		ADM1025 driver
adm1026		ADM1026 driver
adm1029		adm1029 driver
adm1031		ADM1031/ADM1030 driver
adm9240		ADM9240/DS1780/LM81 driver
ads1015		ADS1015 driver
ads7828		Driver for TI ADS7828 A/D converter and compatibles
adt7410		ADT7410/AD7420 driver
adt7411		ADT7411 driver
adt7462		ADT7462 driver
adt7470		ADT7470 driver
adt7475		adt7475 driver
adt7x10		ADT7410/ADT7420, ADT7310/ADT7320 common code
amc6821		Texas Instruments amc6821 hwmon driver
applesmc		Apple SMC
asb100		ASB100 Bach driver
asc7621		Andigilog aSC7621 and aSC7621a driver
asus_atk0110		
atxp1	0.6.3	System voltages control via Attansic ATXP1
coretemp		Intel Core temperature monitor
dell-smm-hwmon		Dell laptop SMM BIOS hwmon driver
dme1737		DME1737 sensors
ds1621		DS1621 driver
ds620		DS620 driver
emc1403		emc1403 Thermal Driver
emc2103		SMSC EMC2103 hwmon driver
emc6w201		SMSC EMC6W201 hardware monitoring driver
f71805f		F71805F/F71872F hardware monitoring driver
f71882fg		F71882FG Hardware Monitoring Driver

Driver	Version	Description
f75375s		F75373/F75375/F75387 hardware monitoring driver
fam15h_power		AMD Family 15h CPU processor power monitor
fschmd		FSC Poseidon, Hermes, Scylla, Heracles, Heimdall, Hades and Syleus driver
g760a		GMT G760A driver
g762		GMT G762/G763 driver
gl518sm		GL518SM driver
gl520sm		GL520SM driver
gpio-fan		GPIO FAN driver
hih6130		Honeywell HIH-6130 humidity and temperature sensor driver
hwmon-vid		hwmon-vid driver
i5500_temp		Intel 5500/5520/X58 chipset thermal sensor driver
i5k_amb		Intel 5000 chipset FB-DIMM AMB temperature sensor
ibmaem		IBM AEM power/temp/energy sensor driver
ibmpex		IBM PowerExecutive power/temperature sensor driver
ina209		INA209 driver
ina2xx		ina2xx driver
it87		IT8705F/IT871xF/IT872xF hardware monitoring driver
jc42		JC42 driver
k10temp		AMD Family 10h+ CPU core temperature monitor
k8temp		AMD K8 core temperature monitor
lineage-pem		Lineage CPL PEM hardware monitoring driver
lm63		LM63 driver
lm73		LM73 driver
lm75		LM75 driver
lm77		LM77 driver
lm78		LM78/LM79 driver
lm80		LM80 driver
lm83		LM83 driver
lm85		LM85-B, LM85-C driver

Driver	Version	Description
lm87		LM87 driver
lm90		LM90/ADM1032 driver
lm92		LM92/MAX6635 driver
lm93		LM93 driver
lm95234		LM95233/LM95234 sensor driver
lm95241		LM95231/LM95241 sensor driver
lm95245		LM95235/LM95245 sensor driver
ltc2945		LTC2945 driver
ltc4151		LTC4151 driver
ltc4215		LTC4215 driver
ltc4222		LTC4222 driver
ltc4245		LTC4245 driver
ltc4260		LTC4260 driver
ltc4261		LTC4261 driver
max16065		MAX16065 driver
max1619		MAX1619 sensor driver
max1668		MAX1668 remote temperature sensor driver
max197		Maxim MAX197 A/D Converter driver
max6639		max6639 driver
max6642		MAX6642 sensor driver
max6650		MAX6650 sensor driver
max6697		MAX6697 temperature sensor driver
mcp3021		Microchip MCP3021/MCP3221 driver
nct6683		NCT6683D driver
nct6775		Driver for NCT6775F and compatible chips
ntc_thermistor		NTC Thermistor Driver
pc87360		PC8736x hardware monitor
pc87427		PC87427 hardware monitoring driver
pcf8591		PCF8591 driver
adm1275		PMBus driver for Analog Devices ADM1275 and compatibles
lm25066		PMBus driver for LM25066 and compatible chips

Driver	Version	Description
ltc2978		PMBus driver for LTC2978 and compatible chips
max16064		PMBus driver for Maxim MAX16064
max34440		PMBus driver for Maxim MAX34440/MAX34441
max8688		PMBus driver for Maxim MAX8688
pmbus		Generic PMBus driver
pmbus_core		PMBus core driver
tps40422		PMBus driver for TI TPS40422
ucd9000		PMBus driver for TI UCD90xxx
ucd9200		PMBus driver for TI UCD922x, UCD924x
zl6100		PMBus driver for ZL6100 and compatibles
powr1220		POWR1220 driver
sch5627		SMSC SCH5627 Hardware Monitoring Driver
sch5636		SMSC SCH5636 Hardware Monitoring Driver
sch56xx-common		SMSC SCH56xx Hardware Monitoring Common Code
sht15		Sensirion SHT15 temperature and humidity sensor driver
sht21		Sensirion SHT21 humidity and temperature sensor driver
shtc1		Sensirion SHTC1 humidity and temperature sensor driver
sis5595		SiS 5595 Sensor device
smm665		SMM665 driver
smc47b397		SMSC LPC47B397 driver
smc47m1		SMSC LPC47M1xx fan sensors driver
smc47m192		SMSC47M192 driver
thmc50		THMC50 driver
tmp102		Texas Instruments TMP102 temperature sensor driver
tmp103		Texas Instruments TMP103 temperature sensor driver
tmp401		Texas Instruments TMP401 temperature sensor driver

Driver	Version	Description
tmp421		Texas Instruments TMP421/422/423/441/442 temperature sensor driver
via-cputemp		VIA CPU temperature monitor
via686a		VIA 686A Sensor device
vt1211		VT1211 sensors
vt8231		VT8231 sensors
w83627ehf		W83627EHF driver
w83627hf		W83627HF driver
w83781d		W83781D driver
w83791d		W83791D driver
w83792d		W83792AD/D driver for linux-2.6
w83793		w83793 driver
w83795		W83795G/ADG hardware monitoring driver
w831785ts		W83L785TS-S driver
w831786ng		w831786ng driver

i2c Drivers in UEK R5 (x86_64)

Driver	Version	Description
i2c-algo-bit		I2C-Bus bit-banging algorithm
i2c-algo-pca		I2C-Bus PCA9564/PCA9665 algorithm
i2c-amd756-s4882		S4882 SMBus multiplexing
i2c-amd756		AMD756/766/768/8111 and nVidia nForce SMBus driver
i2c-amd8111		AMD8111 SMBus 2.0 driver
i2c-cbus-gpio		CBUS I2C driver
i2c-designware-core		Synopsys DesignWare I2C bus adapter core Synopsys DesignWare I2C bus master adapter
i2c-designware-pci		Synopsys DesignWare PCI I2C bus adapter
i2c-diolan-u2c		i2c-diolan-u2c driver
i2c-gpio		Platform-independent bitbanging I2C driver
i2c-i801		I801 SMBus driver
i2c-isch		Intel SCH SMBus driver

Driver	Version	Description
i2c-ismt		Intel SMBus Message Transport (iSMT) driver
i2c-nforce2-s4985		S4985 SMBus multiplexing
i2c-nforce2		nForce2/3/4/5xx SMBus driver
i2c-ocores		OpenCores I2C bus driver
i2c-parport-light		I2C bus over parallel port (light)
i2c-parport		I2C bus over parallel port
i2c-pca-platform		I2C-PCA9564/PCA9665 platform driver
i2c-piix4		PIIX4 SMBus driver
i2c-robotfuzz-osif		RobotFuzz OSIF driver
i2c-scmi		ACPI SMBus CMI driver
i2c-simtec		Simtec Generic I2C Bus driver
i2c-sis5595		SIS5595 SMBus driver
i2c-sis630		SIS630 SMBus driver
i2c-sis96x		SiS96x SMBus driver
i2c-taos-evm		TAOS evaluation module driver
i2c-tiny-usb		i2c-tiny-usb driver v1.0
i2c-via		i2c for Via vt82c586b southbridge
i2c-viapro		vt82c596 SMBus driver
i2c-viperboard		I2C master driver for Nano River Techs Viperboard
i2c-xiic		Xilinx I2C bus driver
i2c-dev		I2C /dev entries driver
i2c-mux		I2C driver for multiplexed I2C busses
i2c-smbus		SMBus protocol extensions support
i2c-stub		I2C stub driver

iio Drivers in UEK R5 (x86_64)

Driver	Version	Description
industrialio		Industrial I/O core

infiniband Drivers in UEK R5 (x86_64)

Driver	Version	Description
ib_cm		InfiniBand CM
ib_core		core kernel InfiniBand API
ib_ucm		InfiniBand userspace Connection Manager access
ib_umad		InfiniBand userspace MAD packet access
ib_uverbs		InfiniBand userspace verbs access
iw_cm		iWARP CM
rdma_cm		Generic RDMA CM Agent
rdma_ucm		RDMA Userspace Connection Manager Access
resilient_rdmaip		Resilient RDMA IP
bnxt_re		Broadcom NetXtreme-C/E RoCE Driver Driver
iw_cxgb3		Chelsio T3 RDMA Driver
iw_cxgb4		Chelsio T4/T5 RDMA Driver
i40iw		Intel(R) Ethernet Connection X722 iWARP RDMA Driver
mlx4_ib		Mellanox ConnectX HCA InfiniBand driver
mlx5_ib		Mellanox Connect-IB HCA IB driver
ib_mthca		Mellanox InfiniBand HCA low-level driver
iw_nes		NetEffect RNIC Low-level iWARP Driver
ocrdma		Emulex OneConnect RoCE Driver 11.0.0.0
qedr		QLogic 40G/100G ROCE Driver
ib_qib		Intel IB driver
usnic_verbs		Cisco VIC (usNIC) Verbs Driver
rdmavt		RDMA Verbs Transport Library
rdma_rxe		Soft RDMA transport
ib_ipoib		IP-over-InfiniBand net driver
ib_iser		iSER (iSCSI Extensions for RDMA) Datamover
ib_isert		iSER-Target for mainline target infrastructure
ib_srp		InfiniBand SCSI RDMA Protocol initiator

Driver	Version	Description
ib_srpt		InfiniBand SCSI RDMA Protocol target v2.0.0 (2011-02-14)

input Drivers in UEK R5 (x86_64)

Driver	Version	Description
input-polldev	0.1	Generic implementation of a polled input device
gpio_keys		Keyboard driver for GPIOs
gpio_keys_polled		Polled GPIO Buttons driver
matrix_keypad		GPIO Driven Matrix Keypad Driver
mcs_touchkey		Touchkey driver for MELFAS MCS5000/5080 controller
qt1070		Driver for AT42QT1070 QTouch sensor
qt2160		Driver for AT42QT2160 Touch Sensor
tca6416-keypad		Keypad driver over tca6146 IO expander
matrix-keymap		
apanel	1.3.1	Fujitsu Application Panel driver
ati_remote2	0.3	ATI/Philips USB RF remote driver
atlas_btms		Atlas button driver
cm109		CM109 phone driver
keyspan_remote		Driver for the USB Keyspan remote control.
pcspkr		PC Speaker beeper driver
powermate		Griffin Technology, Inc PowerMate driver
uinput	0.3	User level driver support for input subsystem
xen-kbdfont		Xen virtual keyboard/pointer device frontend
yealink		Yealink phone driver
appletouch		Apple PowerBook and MacBook USB touchpad driver
bcm5974		Apple USB BCM5974 multitouch driver
cyapatp		Cypress APA I2C Trackpad Driver
gpio_mouse		GPIO mouse driver
sermouse		Serial mouse driver

Driver	Version	Description
synaptics_i2c		Synaptics I2C touchpad driver
synaptics_usb		Synaptics USB device driver
vsxxxxaa		Driver for DEC VSXXX-AA and -GA mice and VSXXX-AB tablet
altera_ps2		Altera University Program PS2 controller driver
arc_ps2		ARC PS/2 Driver
hyperv-keyboard		
ps2mult		TQC PS/2 Multiplexer driver
serio_raw		Raw serio driver
sparse-keymap	0.1	Generic support for sparse keymaps
acecad		USB Acecad Flair tablet driver
aiptek		Aiptek HyperPen USB Tablet Driver (Linux 2.6.x)
gtco		GTCO digitizer USB driver
hanwang		USB Hanwang tablet driver
kbtabs		USB KB Gear JamStudio Tablet driver
ad7879-i2c		AD7879(-1) touchscreen I2C bus driver
ad7879		AD7879(-1) touchscreen Driver
atmel_mxt_ts		Atmel maXTouch Touchscreen driver
bu21013_ts		bu21013 touch screen controller driver
cy8ctmg110_ts		cy8ctmg110 TouchScreen Driver
dynapro		Dynapro serial touchscreen driver
eeti_ts		EETI Touchscreen driver
elo		Elo serial touchscreen driver
fujitsu_ts		Fujitsu serial touchscreen driver
gunze		Gunze AHL-51S touchscreen driver
hampshire		Hampshire serial touchscreen driver
inexio		iNexio serial touchscreen driver
mk712		ICS MicroClock MK712 TouchScreen driver
mtouch		MicroTouch serial touchscreen driver
penmount		PenMount serial touchscreen driver

Driver	Version	Description
touchit213		Sahara TouchIT-213 serial touchscreen driver
touchright		Touchright serial touchscreen driver
touchwin		Touchwindow serial touchscreen driver
tsc2007		TSC2007 TouchScreen Driver
usbtouchscreen		USB Touchscreen Driver
wacom_i2c		WACOM EMR I2C Driver
wacom_w8001		Wacom W8001 serial touchscreen driver

iommu Drivers in UEK R5 (x86_64)

Driver	Version	Description
amd_iommu_v2		

isdn Drivers in UEK R5 (x86_64)

Driver	Version	Description
capi		CAPI4Linux: Userspace /dev/capi20 interface
capidrv		CAPI4Linux: Interface to ISDN4Linux
kernelcapi		CAPI4Linux: kernel CAPI layer
dss1_divert		ISDN4Linux: Call diversion support
bas_gigaset		USB Driver for Gigaset 307x
gigaset		Driver for Gigaset 307x
ser_gigaset		Serial Driver for Gigaset 307x using Siemens M101
usb_gigaset		USB Driver for Gigaset 307x using M105
avm_cs		CAPI4Linux: PCMCIA client driver for AVM B1/M1/M2
b1		CAPI4Linux: Common support for active AVM cards
b1dma		CAPI4Linux: DMA support for active AVM cards
blpci		CAPI4Linux: Driver for AVM B1 PCI card

Driver	Version	Description
blpcmcia		CAPI4Linux: Driver for AVM PCMCIA cards
c4		CAPI4Linux: Driver for AVM C2/C4 cards
t1pci		CAPI4Linux: Driver for AVM T1 PCI card
avmfritz	2.3	
hfcmulti	2.03	
hfcpci		
hfcusb		
mISDNinfineon	1.0	
mISDNipac	2.0	
mISDNisar	2.1	
netjet	2.0	
speedfax	2.0	
w6692	2.0	
avma1_cs		ISDN4Linux: PCMCIA client driver for AVM A1/Fritz!PCMCIA cards
elsa_cs		ISDN4Linux: PCMCIA client driver for Elsa PCM cards
hfc4s8s_l1		ISDN layer 1 for Cologne Chip HFC-4S/8S chips
hisax		ISDN4Linux: Driver for passive ISDN cards
hisax_fcpcipnp		AVM Fritz!PCI/PnP ISDN driver
hisax_isac		ISAC/ISAC-SX driver
hisax_st5481		ISDN4Linux: driver for ST5481 USB ISDN adapter
sedlbauer_cs		ISDN4Linux: PCMCIA client driver for Sedlbauer cards
teles_cs		ISDN4Linux: PCMCIA client driver for Teles PCMCIA cards
hysdn		ISDN4Linux: Driver for HYSND cards
isdn		ISDN4Linux: link layer
isdnhdlc		General purpose ISDN HDLC decoder
lloip		
mISDN_core		
mISDN_dsp		

leds Drivers in UEK R5 (x86_64)

Driver	Version	Description
leds-blinkm		BlinkM RGB LED driver
leds-clevo-mail		Clevo mail LED driver
leds-lm3530		Back Light driver for LM3530
leds-lp3944		LP3944 Fun Light Chip
leds-lp5521		LP5521 LED engine
leds-lp5523		LP5523 LED engine
leds-lp5562		Texas Instruments LP5562 LED Driver
leds-lp55xx-common		LP55xx Common Driver
leds-lp8501		Texas Instruments LP8501 LED driver
leds-ss4200		Intel NAS/Home Server ICH7 GPIO Driver
ledtrig-backlight		Backlight emulation LED trigger
ledtrig-camera		LED Trigger for Camera Flash/Torch Control
ledtrig-default-on		Default-ON LED trigger
ledtrig-heartbeat		Heartbeat LED trigger
ledtrig-oneshot		One-shot LED trigger
ledtrig-timer		Timer LED trigger
ledtrig-transient		Transient LED trigger

md Drivers in UEK R5 (x86_64)

Driver	Version	Description
dm-bio-prison		device-mapper bio prison
dm-bufio		device-mapper buffered I/O library
dm-cache-smq		smq cache policy
dm-cache		device-mapper cache target
dm-crypt		device-mapper target for transparent encryption / decryption
dm-delay		device-mapper delay target
dm-era		device-mapper era target
dm-flakey		device-mapper flakey target

Driver	Version	Description
dm-integrity		device-mapper target for integrity tags extension
dm-log-userspace		device-mapper userspace dirty log link
dm-log-writes		device-mapper log writes target
dm-log		device-mapper dirty region log
dm-mirror		device-mapper mirror target
dm-mod		device-mapper driver
dm-multipath		device-mapper multipath target
dm-queue-length		(C) Copyright IBM Corp. 2004,2005 All Rights Reserved. device-mapper path selector to balance the number of in-flight I/Os
dm-raid		device-mapper raid0/1/10/4/5/6 target
dm-region-hash		device-mapper region hash
dm-round-robin		device-mapper round-robin multipath path selector
dm-service-time		device-mapper throughput oriented path selector
dm-snapshot		device-mapper snapshot target
dm-switch		device-mapper dynamic path switching target
dm-thin-pool		device-mapper thin provisioning target
dm-verity		device-mapper target for transparent disk integrity checking
dm-zero		device-mapper dummy target returning zeros
dm-zoned		device-mapper target for zoned block devices
faulty		Fault injection personality for MD
linear		Linear device concatenation personality for MD
md-cluster		Clustering support for MD
dm-persistent-data		Immutable metadata library for dm
raid0		RAID0 (striping) personality for MD
raid1		RAID1 (mirroring) personality for MD
raid10		RAID10 (striped mirror) personality for MD

Driver	Version	Description
raid456		RAID4/5/6 (striping with parity) personality for MD

media Drivers in UEK R5 (x86_64)

Driver	Version	Description
b2c2-flexcop		B2C2 FlexcopII/II(b)/III digital TV receiver chip
cx2341x		cx23415/6/8 driver
cypress_firmware		Cypress firmware download
saa7146		driver for generic saa7146-based hardware
saa7146_vv		video4linux driver for saa7146-based hardware
smsdvb		SMS DVB subsystem adaptation module
smsmdtv		Siano MDTV Core module
tveeprom		i2c Hauppauge eeprom decoder driver
dvb-core		DVB Core Driver
a8293		Allegro A8293 SEC driver
af9013		Afatech AF9013 DVB-T demodulator driver
af9033		Afatech AF9033 DVB-T demodulator driver
atbm8830		AltoBeam ATBM8830/8831 GB20600 demodulator driver
au8522_common		Auvitek AU8522 QAM-B/ATSC Demodulator driver
au8522_decoder		
au8522_dig		Auvitek AU8522 QAM-B/ATSC Demodulator driver
bcm3510		Broadcom BCM3510 ATSC (8VSB/16VSB & ITU J83 AnnexB FEC QAM64/256) demodulator driver
cx22700		Conexant CX22700 DVB-T Demodulator driver
cx22702		Conexant CX22702 DVB-T Demodulator driver
cx24110		Conexant CX24110 DVB-S Demodulator driver
cx24113		DVB Frontend module for Conexant CX24113/CX24128hardware

Driver	Version	Description
isl6421		Driver for lnb supply and control ic isl6421
isl6423		ISL6423 SEC
itd1000		Integrant ITD1000 driver
ix2505v		DVB IX2505V tuner driver
l64781		LSI L64781 DVB-T Demodulator driver
lg2160	0.3	LG Electronics LG216x ATSC/MH Demodulator Driver
lgdt3305	0.2	LG Electronics LGDT3304/5 ATSC/QAM-B Demodulator Driver
lgdt3306a	0.2	LG Electronics LGDT3306A ATSC/QAM-B Demodulator Driver
lgdt330x		LGDT330X (ATSC 8VSB & ITU-T J.83 AnnexB 64/256 QAM) Demodulator Driver
lgs8gxx		Legend Silicon LGS8913/LGS8GXX DMB-TH demodulator driver
lnbh25		ST LNBH25 driver
lnbp21		Driver for lnb supply and control ic lnbp21, lnbh24
lnbp22		Driver for lnb supply and control ic lnbp22
m88ds3103		Montage Technology M88DS3103 DVB-S/S2 demodulator driver
m88rs2000	1.13	M88RS2000 DVB-S Demodulator driver
mb86a16		
mb86a20s		DVB Frontend module for Fujitsu mb86A20s hardware
mn88472		Panasonic MN88472 DVB-T/T2/C demodulator driver
mn88473		Panasonic MN88473 DVB-T/T2/C demodulator driver
mt312		Zarlink VP310/MT312/ZL10313 DVB-S Demodulator driver
mt352		Zarlink MT352 DVB-T Demodulator driver
mxl5xx		MaxLinear MxL5xx DVB-S/S2 tuner-demodulator driver
nxt200x		NXT200X (ATSC 8VSB & ITU-T J.83 AnnexB 64/256 QAM) Demodulator Driver
nxt6000		NxtWave NXT6000 DVB-T demodulator driver

Driver	Version	Description
or51132		OR51132 ATSC [pcHDTV HD-3000] (8VSB & ITU J83 AnnexB FEC QAM64/256) Demodulator Driver
or51211		Oren OR51211 VSB [pcHDTV HD-2000] Demodulator Driver
rtl2830		Realtek RTL2830 DVB-T demodulator driver
rtl2832		Realtek RTL2832 DVB-T demodulator driver
s5h1409		Samsung S5H1409 QAM-B/ATSC Demodulator driver
s5h1411		Samsung S5H1411 QAM-B/ATSC Demodulator driver
s5h1420		Samsung S5H1420/PnpNetwork PN1010 DVB-S Demodulator driver
s921		DVB Frontend module for Sharp S921 hardware
si2165		Silicon Labs Si2165 DVB-C/-T Demodulator driver
si2168		Silicon Labs Si2168 DVB-T/T2/C demodulator driver
si21xx		SL SI21XX DVB Demodulator driver
sp2		CIMaX SP2/HF CI driver
sp8870		Spase SP8870 DVB-T Demodulator driver
sp887x		Spase sp887x DVB-T demodulator driver
stb0899		STB0899 Multi-Std frontend
stb6000		DVB STB6000 driver
stb6100		STB6100 Silicon tuner
stv0288		ST STV0288 DVB Demodulator driver
stv0297		ST STV0297 DVB-C Demodulator driver
stv0299		ST STV0299 DVB Demodulator driver
stv0367		ST STV0367 DVB-C/T demodulator driver
stv0900		ST STV0900 frontend
stv090x		STV090x Multi-Std Broadcast frontend
stv0910		ST STV0910 multistandard frontend driver

Driver	Version	Description
stv6110		ST STV6110 driver
stv6110x		STV6110x Silicon tuner
stv6111		ST STV6111 satellite tuner driver
tc90522		Toshiba TC90522 frontend
tda10021		Philips TDA10021 DVB-C demodulator driver
tda10023		Philips TDA10023 DVB-C demodulator driver
tda10048		NXP TDA10048HN DVB-T Demodulator driver
tda1004x		Philips TDA10045H & TDA10046H DVB-T Demodulator
tda10071		NXP TDA10071 DVB-S/S2 demodulator driver
tda10086		Philips TDA10086 DVB-S Demodulator
tda18271c2dd		TDA18271C2 driver
tda665x		TDA665x driver
tda8083		Philips TDA8083 DVB-S Demodulator
tda8261		TDA8261 8PSK/QPSK Tuner
tda826x		DVB TDA826x driver
ts2020		Montage Technology TS2020 - Silicon tuner driver module
tua6100		DVB tua6100 driver
ves1820		VLSI VES1820 DVB-C Demodulator driver
ves1x93		VLSI VES1x93 DVB-S Demodulator driver
z110036		DVB ZL10036 driver
z110039		Zarlink ZL10039 DVB-S tuner driver
z110353		Zarlink ZL10353 DVB-T demodulator driver
firedtv		FireDTV DVB Driver
cs3308		i2c device driver for cs3308 8-channel volume control
cs5345		i2c device driver for cs5345 Audio ADC
cs53132a		i2c device driver for cs53132a Audio ADC
cx25840		Conexant CX25840 audio/video decoder driver

Driver	Version	Description
ir-kbd-i2c		input driver for i2c IR remote controls
m52790		i2c device driver for m52790 A/V switch
msp3400		device driver for msp34xx TV sound processor
mt9m111		Micron/Aptina MT9M111/MT9M112/MT9M131 Camera driver
saa6588		v4l2 driver module for SAA6588 RDS decoder
saa6752hs		device driver for saa6752hs MPEG2 encoder
saa7115		Philips SAA7111/SAA7113/SAA7114/SAA7115/SAA7118 video decoder driver
saa7127		Philips SAA7127/9 video encoder driver
saa717x		Philips SAA717x audio/video decoder driver
imx074		Sony IMX074 Camera driver
mt9m001		Micron MT9M001 Camera driver
mt9t031		Micron MT9T031 Camera driver
mt9t112		SoC Camera driver for mt9t112
mt9v022		Micron MT9V022 Camera driver
ov772x		SoC Camera driver for ov772x
ov9640		SoC Camera driver for OmniVision OV96xx
ov9740		SoC Camera driver for OmniVision OV9740
rj54n1cb0c		Sharp RJ54N1CB0C Camera driver
tw9910		SoC Camera driver for tw9910
tda7432		bttv driver for the tda7432 audio processor chip
tvaudio		device driver for various i2c TV sound decoder / audiomux chips
upd64031a		uPD64031A driver
upd64083		uPD64083 driver
vp27smpx		vp27smpx driver
wm8739		wm8739 driver
wm8775		wm8775 driver
smssdio		Siano SMS1xxx SDIO driver

Driver	Version	Description
b2c2-flexcop-pci		flexcop-pci
bt878		
bttv	0.9.19	bttv - v4l/v4l2 driver module for bt848/878 based cards
dst		DST DVB-S/T/C/ATSC Combo Frontend driver
dst_ca		DST DVB-S/T/C Combo CA driver
dvb-bt8xx		Bt8xx based DVB adapter driver
cx18-alsa	1.5.1	CX23418 ALSA Interface
cx18	1.5.1	CX23418 driver
altera-ci		altera FPGA CI module
cx23885	0.0.4	v4l2 driver module for cx23885 based TV cards Driver for cx23885 based TV cards
cx88-alsa	1.0.0	ALSA driver module for cx2388x based TV cards
cx88-blackbird	1.0.0	driver for cx2388x/cx23416 based mpeg encoder cards
cx88-dvb	1.0.0	driver for cx2388x based DVB cards
cx88-vp3054-i2c		driver for cx2388x VP3054 design
cx8800	1.0.0	v4l2 driver module for cx2388x based TV cards
cx8802	1.0.0	mpeg driver for cx2388x based TV cards
cx88xx		v4l2 driver module for cx2388x based TV cards input driver for cx88 GPIO-based IR remote controls
ddbbridge	0.9.31	intermediate-integrated Digital Devices PCIe Bridge
dm1105		SDMC DM1105 DVB driver
ivtv	1.4.3	CX23415/CX23416 driver
ivtvfb		
hopper		HOPPER driver
mantis		MANTIS driver
mantis_core		Mantis PCI DTV bridge driver
ngene		nGene
pluto2		Pluto2 driver
earth-pt1		Earthsoft PT1/PT2 Driver
saa7134-alsa		
saa7134-dvb		

Driver	Version	Description
saa7134-empress		
saa7134	0, 2, 17	v4l2 driver module for saa7130/34 based TV cards
saa7164		Driver for NXP SAA7164 based TV cards
budget-av		driver for the SAA7146 based so-called budget PCI DVB w/ analog input and CI-module (e.g. the KNC cards)
budget-ci		driver for the SAA7146 based so-called budget PCI DVB cards w/ CI-module produced by Siemens, Technotrend, Hauppauge
budget-core		
budget-patch		Driver for full TS modified DVB-S SAA7146+AV7110 based so-called Budget Patch cards
budget		driver for the SAA7146 based so-called budget PCI DVB cards by Siemens, Technotrend, Hauppauge
dvb-ttpci		driver for the SAA7146 based AV110 PCI DVB cards by Siemens, Technotrend, Hauppauge
ttpci-EEPROM		Decode dvb_net MAC address from EEPROM of PCI DVB cards made by Siemens, Technotrend, Hauppauge
soc_camera		Image capture bus driver
soc_camera_platform		SoC Camera Platform driver
soc_mediabus		soc-camera media bus interface
tea575x		Routines for control of TEA5757/5759 Philips AM/FM radio tuner chips
ati_remote		ATI/X10 RF USB Remote Control
ene_ir		Infrared input driver for KB3926B/C/D/E/F (aka ENE0100/ENE0200/ENE0201/ENE0202) CIR port
fintek-cir		Fintek LPC SuperIO Consumer IR Transceiver driver
gpio-ir-recv		GPIO IR Receiver driver
iguanair		IguanaWorks USB IR Transceiver
imon	0.9.4	Driver for SoundGraph iMON MultiMedia IR/Display
ir-jvc-decoder		JVC IR protocol decoder

Driver	Version	Description
ir-lirc-codec		LIRC IR handler bridge
ir-mce_kbd-decoder		MCE Keyboard/mouse IR protocol decoder
ir-nec-decoder		NEC IR protocol decoder
ir-rc5-decoder		RC5(x/sz) IR protocol decoder
ir-rc6-decoder		RC6 IR protocol decoder
ir-sanyo-decoder		SANYO IR protocol decoder
ir-sharp-decoder		Sharp IR protocol decoder
ir-sony-decoder		Sony IR protocol decoder
ir-xmp-decoder		XMP IR protocol decoder
ite-cir		ITE Tech Inc. IT8712F/ITE8512F CIR driver
rc-adstech-dvb-t-pci		
rc-alink-dtu-m		
rc-anysee		
rc-apac-viewcomp		
rc-asus-pc39		
rc-asus-ps3-100		
rc-ati-tv-wonder-hd-600		
rc-ati-x10		
rc-avermedia-a16d		
rc-avermedia-cardbus		
rc-avermedia-dvbt		
rc-avermedia-m135a		
rc-avermedia-m733a-rm-k6		
rc-avermedia-rm-ks		
rc-avermedia		
rc-avertv-303		
rc-azurewave-ad-tu700		
rc-behold-columbus		
rc-behold		
rc-budget-ci-old		
rc-cec		
rc-cinergy-1400		
rc-cinergy		
rc-d680-dmb		

Driver	Version	Description
rc-delock-61959		Delock 61959 remote keytable
rc-dib0700-nec		
rc-dib0700-rc5		
rc-digitalnow-tinytwin		
rc-digittrade		
rc-dm1105-nec		
rc-dntv-live-dvb-t		
rc-dntv-live-dvbt-pro		
rc-dtt200u		
rc-dvbsky		
rc-dvico-mce		
rc-dvico-portable		
rc-em-terratec		
rc-encore-enltv-fm53		
rc-encore-enltv		
rc-encore-enltv2		
rc-evga-indtube		
rc-eztv		
rc-flydvb		
rc-flyvideo		
rc-fusionhdtv-mce		
rc-gadmei-rm008z		
rc-geekbox		
rc-genius-tvgo-allmce		
rc-gotview7135		
rc-hauppauge		
rc-imon-mce		
rc-imon-pad		
rc-iodata-bctv7e		
rc-it913x-v1		
rc-it913x-v2		
rc-kaiomy		
rc-kworld-315u		
rc-kworld-pc150u		
rc-kworld-plus-tv-analog		

Driver	Version	Description
rc-leadtek-y04g0051		
rc-lme2510		
rc-manli		
rc-medion-x10-digitainer		Medion X10 RF remote keytable (Digitainer variant)
rc-medion-x10-or2x		Medion X10 OR22/OR24 RF remote keytable
rc-medion-x10		
rc-msi-digivox-ii		
rc-msi-digivox-iii		
rc-msi-tvanywhere-plus		
rc-msi-tvanywhere		
rc-nebula		
rc-nec-terratec-cinergy-xs		
rc-norwood		
rc-npgtech		
rc-pctv-sedna		
rc-pinnacle-color		
rc-pinnacle-grey		
rc-pinnacle-pctv-hd		
rc-pixelview-002t		
rc-pixelview-mk12		
rc-pixelview-new		
rc-pixelview		
rc-powercolor-real-angel		
rc-proteus-2309		
rc-purpletv		
rc-pv951		
rc-rc6-mce		
rc-real-audio-220-32-keys		
rc-reddo		
rc-snapstream-firefly		
rc-streamzap		
rc-su3000		
rc-tbs-nec		
rc-technisat-ts35		

Driver	Version	Description
rc-technisat-usb2		
rc-terratec-cinergy-c-pci		
rc-terratec-cinergy-s2-hd		
rc-terratec-cinergy-xs		
rc-terratec-slim-2		
rc-terratec-slim		
rc-tevii-nec		
rc-tivo		
rc-total-media-in-hand-02		
rc-total-media-in-hand		
rc-trekstor		
rc-tt-1500		
rc-twinhan-dtv-cab-ci		
rc-twinhan1027		
rc-videomate-mlf		
rc-videomate-s350		
rc-videomate-tv-pvr		
rc-winfast-usbii-deluxe		
rc-winfast		
rc-zx-irdec		
lirc_dev		LIRC base driver module
mceusb		Windows Media Center Ed. eHome Infrared Transceiver device driver
nuvoton-cir		Nuvoton W83667HG-A & W83677HG-I CIR driver
rc-core		
rc-loopback		Loopback device for rc-core debugging
redrat3		RedRat3 USB IR Transceiver Driver
streamzap		Streamzap Remote Control driver
ttusbir		TechnoTrend USB IR Receiver
winbond-cir		Winbond SuperI/O Consumer IR Driver
e4000		Elonics E4000 silicon tuner driver
fc0011		Fitipower FC0011 silicon tuner driver
fc0012	0.6	Fitipower FC0012 silicon tuner driver

Driver	Version	Description
fc0013	0.2	Fitipower FC0013 silicon tuner driver
fc2580		FCI FC2580 silicon tuner driver
it913x		ITE IT913X silicon tuner driver
m88rs6000t		Montage M88RS6000 internal tuner driver
max2165		Maxim MAX2165 silicon tuner driver
mc44s803		Freescale MC44S803 silicon tuner driver
mt2060		Microtune MT2060 silicon tuner driver
mt2063		MT2063 Silicon tuner
mt20xx		Microtune tuner driver
mt2131		Microtune MT2131 silicon tuner driver
mt2266		Microtune MT2266 silicon tuner driver
mxl5005s		MaxLinear MXL5005S silicon tuner driver
mxl5007t	0.2	MaxLinear MxL5007T Silicon IC tuner driver
qm1d1c0042		Sharp QM1D1C0042 tuner
qt1010	0.1	Quantek QT1010 silicon tuner driver
r820t		Rafael Micro r820t silicon tuner driver
si2157		Silicon Labs Si2141/ Si2146/2147/2148/2157/2158 silicon tuner driver
tda18212		NXP TDA18212HN silicon tuner driver
tda18218		NXP TDA18218HN silicon tuner driver
tda18271	0.4	NXP TDA18271HD analog / digital tuner driver
tda827x		DVB TDA827x driver
tda8290		Philips/NXP TDA8290/TDA8295 analog IF demodulator driver
tda9887		
tea5761		Philips TEA5761 FM tuner driver
tea5767		Philips TEA5767 FM tuner driver
tua9001		Infineon TUA9001 silicon tuner driver

Driver	Version	Description
tuner-simple		Simple 4-control-bytes style tuner driver
tuner-types		Simple tuner device type database
tuner-xc2028		Xceive xc2028/xc3028 tuner driver
xc4000		Xceive xc4000 silicon tuner driver
xc5000		Xceive xc5000 silicon tuner driver
au0828	0.0.3	Driver for Auvitek AU0828 based products
b2c2-flexcop-usb		Technisat/B2C2 FlexCop II/Ib/III Digital TV USB Driver
cx231xx-alsa		Cx231xx Audio driver
cx231xx-dvb		driver for cx231xx based DVB cards
cx231xx	0.0.3	Conexant cx231xx based USB video device driver
dvb-usb-a800	1.0	AVerMedia AverTV DVB-T USB 2.0 (A800)
dvb-usb-af9005-remote	1.0	Standard remote control decoder for Afatech 9005 DVB-T USB1.1 stick
dvb-usb-af9005	1.0	Driver for Afatech 9005 DVB-T USB1.1 stick
dvb-usb-az6027	1.0	Driver for AZUREWAVE DVB-S/S2 USB2.0 (AZ6027)
dvb-usb-cinergyT2		Terratec Cinergy T2 DVB-T driver
dvb-usb-cxusb	1.0-alpha	Driver for Conexant USB2.0 hybrid reference design
dvb-usb-dib0700	1.0	Driver for devices based on DiBcom DiB0700 - USB bridge
dvb-usb-dibusb-common		
dvb-usb-dibusb-mb	1.0	Driver for DiBcom USB DVB-T devices (DiB3000M-B based)
dvb-usb-dibusb-mc-common		
dvb-usb-dibusb-mc	1.0	Driver for DiBcom USB2.0 DVB-T (DiB3000M-C/P based) devices
dvb-usb-digitv	1.0-alpha	Driver for Nebula Electronics uDigiTV DVB-T USB2.0
dvb-usb-dtt200u	1.0	Driver for the WideView/Yakumo/Hama/Typhoon/Club3D/Miglia DVB-T USB2.0 devices
dvb-usb-dtv5100		AME DTV-5100 USB2.0 DVB-T

Driver	Version	Description
dvb-usb-dw2102	0.1	Driver for DVBWorld DVB-S 2101, 2102, DVB-S2 2104, DVB-C 3101 USB2.0, TeVii S421, S480, S482, S600, S630, S632, S650, TeVii S660, S662, Prof 1100, 7500 USB2.0, Geniatech SU3000, T220, TechnoTrend S2-4600, Terratec Cinergy S2 devices
dvb-usb-friio	0.2	Driver for Friio ISDB-T USB2.0 Receiver
dvb-usb-gp8psk	1.1	Driver for Genpix DVB-S
dvb-usb-m920x	0.1	DVB Driver for ULI M920x
dvb-usb-nova-t-usb2	1.0	Hauppauge WinTV-NOVA-T usb2
dvb-usb-opera	0.1	Driver for Opera1 DVB-S device
dvb-usb-pctv452e		Pinnacle PCTV HDTV USB DVB / TT connect S2-3600 Driver
dvb-usb-technisat-usb2	1.0	Driver for Technisat DVB-S/S2 USB 2.0 device
dvb-usb-ttusb2	1.0	Driver for Pinnacle PCTV 400e DVB-S USB2.0
dvb-usb-umt-010	1.0	Driver for HanfTek UMT 010 USB2.0 DVB-T device
dvb-usb-vp702x	1.0	Driver for Twinhan StarBox DVB-S USB2.0 and clones
dvb-usb-vp7045	1.0	Driver for Twinhan MagicBox/ Alpha and DNTV tinyUSB2 DVB-T USB2.0
dvb-usb	1.0	A library module containing commonly used USB and DVB function USB DVB devices
dvb-usb-af9015		Afatech AF9015 driver
dvb-usb-af9035		Afatech AF9035 driver
dvb-usb-anysee		Driver Anysee E30 DVB-C & DVB-T USB2.0
dvb-usb-au6610	0.1	Driver for Alcor Micro AU6610 DVB-T USB2.0
dvb-usb-az6007	2.0	Driver for AzureWave 6007 DVB-C/T USB2.0 and clones
dvb-usb-ce6230		Intel CE6230 driver
dvb-usb-dvbsky		Driver for DVBSky USB
dvb-usb-ec168		E3C EC168 driver
dvb-usb-gl861	0.1	Driver MSI Mega Sky 580 DVB-T USB2.0 / GL861
dvb-usb-lmedm04	2.07	LME2510(C) DVB-S USB2.0
dvb-usb-mxl1111sf	1.0	Driver for MaxLinear MxL1111SF

Driver	Version	Description
dvb-usb-rtl28xxu		Realtek RTL28xxU DVB USB driver
dvb_usb_v2	2.0	DVB USB common
mxl111sf-demod	0.1	MaxLinear MxL111SF DVB-T demodulator driver
mxl111sf-tuner	0.1	MaxLinear MxL111SF CMOS tuner driver
em28xx-alsa	0.2.2	Empia em28xx device driver - audio interface
em28xx-dvb	0.2.2	Empia em28xx device driver - digital TV interface
em28xx-rc	0.2.2	Empia em28xx device driver - input interface
em28xx	0.2.2	Empia em28xx device driver
gspca_gl860		Genesys Logic USB PC Camera Driver
gspca_benq		Benq DC E300 USB Camera Driver
gspca_conex		GSPCA USB Conexant Camera Driver
gspca_cpia1		Vision CPiA
gspca_dtcs033		Scopium DTCS033 astro-cam USB Camera Driver
gspca_etoms		Etoms USB Camera Driver
gspca_finepix		Fujifilm FinePix USB V4L2 driver
gspca_jeilinj		GSPCA/JEILINJ USB Camera Driver
gspca_jl2005bcd		JL2005B/C/D USB Camera Driver
gspca_kinect		GSPCA/Kinect Sensor Device USB Camera Driver
gspca_konica		Konica chipset USB Camera Driver
gspca_main	2.14.0	GSPCA USB Camera Driver
gspca_mars		GSPCA/Mars USB Camera Driver
gspca_mr97310a		GSPCA/Mars-Semi MR97310A USB Camera Driver
gspca_nw80x		NW80x USB Camera Driver
gspca_ov519		OV519 USB Camera Driver
gspca_ov534		GSPCA/OV534 USB Camera Driver
gspca_ov534_9		GSPCA/OV534_9 USB Camera Driver
gspca_pac207		Pixart PAC207
gspca_pac7302		Pixart PAC7302
gspca_pac7311		Pixart PAC7311
gspca_se401		Endpoints se401

Driver	Version	Description
gspca_sn9c2028		Sonix SN9C2028 USB Camera Driver
gspca_sn9c20x		GSPCA/SN9C20X USB Camera Driver
gspca_sonixb		GSPCA/SN9C102 USB Camera Driver
gspca_sonixj		GSPCA/SONIX JPEG USB Camera Driver
gspca_spca1528		SPCA1528 USB Camera Driver
gspca_spca500		GSPCA/SPCA500 USB Camera Driver
gspca_spca501		GSPCA/SPCA501 USB Camera Driver
gspca_spca505		GSPCA/SPCA505 USB Camera Driver
gspca_spca506		GSPCA/SPCA506 USB Camera Driver
gspca_spca508		GSPCA/SPCA508 USB Camera Driver
gspca_spca561		GSPCA/SPCA561 USB Camera Driver
gspca_sq905		GSPCA/SQ905 USB Camera Driver
gspca_sq905c		GSPCA/SQ905C USB Camera Driver
gspca_sq930x		GSPCA/SQ930x USB Camera Driver
gspca_stk014		Syntek DV4000 (STK014) USB Camera Driver
gspca_stk1135		Syntek STK1135 USB Camera Driver
gspca_stv0680		STV0680 USB Camera Driver
gspca_sunplus		GSPCA/SPCA5xx USB Camera Driver
gspca_t613		GSPCA/T613 (JPEG Compliance) USB Camera Driver
gspca_topro		Topro TP6800/6810 gspca webcam driver
gspca_tv8532		TV8532 USB Camera Driver
gspca_vc032x		GSPCA/VC032X USB Camera Driver
gspca_vicam		GSPCA ViCam USB Camera Driver
gspca_xirlink_cit		Xirlink C-IT
gspca_zc3xx		GSPCA ZC03xx/VC3xx USB Camera Driver
gspca_m5602		ALi m5602 webcam driver
gspca_stv06xx		STV06XX USB Camera Driver

Driver	Version	Description
hdpvr	0.2.1	Hauppauge HD PVR driver
pvrusb2	0.9.1	Hauppauge WinTV-PVR-USB2 MPEG2 Encoder/Tuner
pwc	10.0.15	Philips & OEM USB webcam driver
s2255drv	1.25.1	Sensoray 2255 Video for Linux driver
smsusb		Driver for the Siano SMS1xxx USB dongle
stk1160		STK1160 driver
stkwebcam		Syntek DC1125 webcam driver
tm6000-alsa		ALSA driver module for tm5600/tm6000/tm6010 based TV cards
tm6000-dvb		DVB driver extension module for tm5600/6000/6010 based TV cards
tm6000		Trident TVMaster TM5600/TM6000/TM6010 USB2 adapter
dvb-ttusb-budget		TTUSB DVB Driver
ttusb_dec		TechnoTrend/Hauppauge DEC USB
ttusbdecfe		TTUSB DEC DVB-T/S Demodulator driver
usbvision	0.9.11	USBVision USB Video Device Driver for Linux
uvcvideo	1.1.1	USB Video Class driver
zr364xx	0.7.4	Zoran 364xx
tuner		device driver for various TV and TV+FM radio tuners
v4l2-common		misc helper functions for v4l2 device drivers
v4l2-dv-timings		V4L2 DV Timings Helper Functions
videobuf-core		helper module to manage video4linux buffers
videobuf-dma-sg		helper module to manage video4linux dma sg buffers
videobuf-dvb		
videobuf-vmalloc		helper module to manage video4linux vmalloc buffers
videobuf2-core		Media buffer core framework
videobuf2-dma-sg		dma scatter/gather memory handling routines for videobuf2
videobuf2-dvb		
videobuf2-memops		common memory handling routines for videobuf2

Driver	Version	Description
videobuf2-v412		Driver helper framework for Video for Linux 2
videobuf2-vmalloc		vmalloc memory handling routines for videobuf2
videodev		Device registrar for Video4Linux drivers v2

memstick Drivers in UEK R5 (x86_64)

Driver	Version	Description
memstick		Sony MemoryStick core driver
mspro_block		Sony MemoryStickPro block device driver
jmb38x_ms		JMicron jmb38x MemoryStick driver
r592		Ricoh R5C592 Memstick/Memstick PRO card reader driver
rtsx_pci_ms		Realtek PCI-E Memstick Card Host Driver
rtsx_usb_ms		Realtek USB Memstick Card Host Driver
tifm_ms		TI FlashMedia MemoryStick driver

message Drivers in UEK R5 (x86_64)

Driver	Version	Description
mptbase	3.04.20	Fusion MPT base driver
mptctl	3.04.20	Fusion MPT misc device (ioctl) driver
mptfc	3.04.20	Fusion MPT FC Host driver
mptlan	3.04.20	Fusion MPT LAN driver
mptsas	3.04.20	Fusion MPT SAS Host driver
mptscsih	3.04.20	Fusion MPT SCSI Host driver
mptspi	3.04.20	Fusion MPT SPI Host driver

mfd Drivers in UEK R5 (x86_64)

Driver	Version	Description
lpc_ich		LPC interface for Intel ICH

Driver	Version	Description
lpc_sch		LPC interface for Intel Poulsbo SCH
pcf50633-adc		PCF50633 adc driver
pcf50633-gpio		
pcf50633		I2C chip driver for NXP PCF50633 PMU
rdc321x-southbridge		RDC R-321x MFD southbridge driver
retu-mfd		Retu MFD driver
rtsx_pci		Realtek PCI-E Card Reader Driver
rtsx_usb		Realtek USB Card Reader Driver
si476x-core		API for command exchange for si476x Si4761/64/68 AM/FM MFD core device driver
sm501		SM501 Core Driver
ucb1400_core		Philips UCB1400 driver
viperboard		Nano River Technologies viperboard mfd core driver
vx855		Driver for the VIA VX855 chipset

misc Drivers in UEK R5 (x86_64)

Driver	Version	Description
ad525x_dpot-i2c		digital potentiometer I2C bus driver
ad525x_dpot		Digital potentiometer driver
altera-stapl		altera FPGA kernel module
apds9802als		Avago apds9802als ALS Driver
apds990x		APDS990X combined ALS and proximity sensor
bh1770g1c		BH1770GLC / SFH7770 combined ALS and proximity sensor
cb710		ENE CB710 memory card reader driver
at24		Driver for most I2C EEPROMs
eprom		I2C EEPROM driver
eprom_93cx6	1.0	EEPROM 93cx6 chip driver
max6875		MAX6875 driver
enclosure		Enclosure Services
hmc6352		hmc6352 Compass Driver

Driver	Version	Description
hpilo	1.5.0	hpilo
ics932s401		ICS932S401 driver
ioc4		PCI driver master module for SGI IOC4 Base-IO Card
isl29003	1.0	ISL29003 ambient light sensor driver
isl29020		Intersil isl29020 ALS Driver
lis3lv02d		ST LIS3LV02Dx three-axis digital accelerometer driver
lis3lv02d_i2c		lis3lv02d I2C interface
mei-me		Intel(R) Management Engine Interface
mei		Intel(R) Management Engine Interface
gru	0.85	SGI GRU Device Driver0.85
xp		Cross Partition (XP) base
xpc		Cross Partition Communication (XPC) support
xpnet		Cross Partition Network adapter (XPNET)
tifm_7xx1	0.8	TI FlashMedia host driver
tifm_core	0.8	TI FlashMedia core driver
tsl2550	1.2	TSL2550 ambient light sensor driver
vmw_balloon	1.5.0.0-k	VMware Memory Control (Balloon) Driver
vmw_vmci	1.1.5.0-k	VMware Virtual Machine Communication Interface.

mmc Drivers in UEK R5 (x86_64)

Driver	Version	Description
mmc_block		Multimedia Card (MMC) block device driver
mmc_core		
sdio_uart		
cb710-mmc		ENE CB710 memory card reader driver - MMC/SD part
rtsx_pci_sdmmc		Realtek PCI-E SD/MMC Card Host Driver
rtsx_usb_sdmmc		Realtek USB SD/MMC Card Host Driver

Driver	Version	Description
sdhci-acpi		Secure Digital Host Controller Interface ACPI driver
sdhci-pci		Secure Digital Host Controller Interface PCI driver
sdhci-pltfm		SDHCI platform and OF driver helper
sdhci		Secure Digital Host Controller Interface core driver
sdrichoh_cs		Ricoh PCMCIA Secure Digital Interface driver
tifm_sd	0.8	TI FlashMedia SD driver
usdhi6rol0		Renesas usdhi6rol0 SD/SDIO host driver
ushc		USB SD Host Controller driver
via-sdmmc		VIA SD/MMC Card Interface driver
vub300		VUB300 USB to SD/MMC/SDIO adapter driver
wbsd		Winbond W83L51xD SD/MMC card interface driver

mtd Drivers in UEK R5 (x86_64)

Driver	Version	Description
ar7part		MTD partitioning for TI AR7
cfi_cmdset_0001		MTD chip driver for Intel/Sharp flash chips
cfi_cmdset_0002		MTD chip driver for AMD/Fujitsu flash chips
cfi_cmdset_0020		
cfi_probe		Probe code for CFI-compliant flash chips
cfi_util		
chipreg		Core routines for registering and invoking MTD chip drivers
gen_probe		Helper routines for flash chip probe code
jedec_probe		Probe code for JEDEC-compliant flash chips
map_absent		Placeholder MTD chip driver for 'absent' chips
map_ram		MTD chip driver for RAM chips
map_rom		MTD chip driver for ROM chips

Driver	Version	Description
cmdlinepart		Command line configuration of MTD partitions
block2mtd		Emulate an MTD using a block device
mtddram		Simulated MTD driver for testing
pmc551		Ramix PMC551 PCI Mezzanine Ram Driver. (C) 1999,2000 Nortel Networks.
ftl		Support code for Flash Translation Layer, used on PCMCIA devices
inftl		Support code for Inverse Flash Translation Layer, used on M-Systems DiskOnChip 2000, Millennium and Millennium Plus
lpddr_cmds		MTD driver for LPDDR flash chips
qinfo_probe		Driver to probe qinfo flash chips
ck804xrom		MTD map driver for BIOS chips on the Nvidia ck804 southbridge
esb2rom		MTD map driver for BIOS chips on the ESB2 southbridge
latch-addr-flash		MTD map driver for flashes addressed physically with upper address lines being set board specifically
map_funcs		
pci		Generic PCI map driver
scb2_flash		MTD map driver for Intel SCB2 BIOS Flash
mtd		Core MTD registration and access routines Generic support for concatenating of MTD devices
mtd_blkdevs		Common interface to block layer for MTD 'translation layers'
mtdblock		Caching read/erase/writeback block device emulation access to MTD devices
mtdblock_ro		Simple read-only block device emulation access to MTD devices
mtdoops		MTD Oops/Panic console logger/driver
mtdswap		Block device access to an MTD suitable for using as swap space
diskonchip		M-Systems DiskOnChip 2000, Millennium and Millennium Plus device driver
nand		Generic NAND flash driver code

Driver	Version	Description
nand_bch		NAND software BCH ECC support
nand_ecc		Generic NAND ECC support
nandsim		The NAND flash simulator
nftl		Support code for NAND Flash Translation Layer, used on M-Systems DiskOnChip 2000 and Millennium
redboot		Parsing code for RedBoot Flash Image System (FIS) tables
rfd_ftl		Support code for RFD Flash Translation Layer, used by General Software's Embedded BIOS
sm_ftl		Smartmedia/xD mtd translation layer
ssfdc		Flash Translation Layer for read-only SSFDC SmartMedia card
ubi	1	UBI - Unsorted Block Images

net Drivers in UEK R5 (x86_64)

Driver	Version	Description
bonding	3.7.1	Ethernet Channel Bonding Driver, v3.7.1
c_can		CAN bus driver for Bosch C_CAN controller
c_can_pci		PCI CAN bus driver for Bosch C_CAN/D_CAN controller
c_can_platform		Platform CAN bus driver for Bosch C_CAN controller
can-dev		CAN device driver interface
cc770		cc770CAN netdevice driver
m_can		CAN bus driver for Bosch M_CAN controller
sja1000		sja1000CAN netdevice driver
slcan		serial line CAN interface
softing		Softing DPRAM CAN driver
softing_cs		softing CANcard driver, links PCMCIA card to softing driver
ems_usb		CAN driver for EMS Dr. Thomas Wuensche CAN/USB interfaces
esd_usb2		CAN driver for esd CAN-USB/2 and CAN-USB/Micro interfaces

Driver	Version	Description
gs_usb		Socket CAN device driver for Geschwister Schneider Technologie-, Entwicklungs- und Vertriebs UG. USB2.0 to CAN interfaces and bytewerk.org candleLight USB CAN interfaces.
kvaser_usb		CAN driver for Kvaser CAN/USB devices
peak_usb		CAN driver for PEAK-System USB adapters
usb_8dev		CAN driver for 8 devices USB2CAN interfaces
vcan		virtual CAN interface
dummy	1.0	
eql		
3c574_cs		3Com 3c574 series PCMCIA ethernet driver
3c589_cs		3Com 3c589 series PCMCIA ethernet driver
3c59x		3Com 3c59x/3c9xx ethernet driver
typhoon	1.0	3Com Typhoon Family (3C990, 3CR990, and variants)
starfire	2.1	Adaptec Starfire Ethernet driver
acenic		AceNIC/3C985/GA620 Gigabit Ethernet driver
ena	1.5.0K	Elastic Network Adapter (ENA)
amd8111e		AMD8111 based 10/100 Ethernet Controller. Driver Version 3.0.7
nmclan_cs		New Media PCMCIA ethernet driver
pcnet32		Driver for PCnet32 and PCnetPCI based ethercards
alx		Qualcomm Atheros(R) AR816x/AR817x PCI-E Ethernet Network Driver
at11c	1.0.1.1-NAPI	Qualcomm Atheros 100/100M Ethernet Network Driver
at11e	1.0.0.7-NAPI	Atheros 1000M Ethernet Network Driver
at11	2.1.3	Atheros L1 Gigabit Ethernet Driver
at12	2.2.3	Atheros Fast Ethernet Network Driver
b44	2.0	Broadcom 44xx/47xx 10/100 PCI ethernet driver

Driver	Version	Description
bnx2	2.2.6	QLogic BCM5706/5708/5709/5716 Driver
bnx2x	1.712.30-0	QLogic BCM57710/57711/57711E/57712/57712_MF/57800/57800_MF/57810/57810_MF/57840/57840_MF Driver
bnxt_en	1.9.0	Broadcom BCM573xx network driver
cnic	2.5.22	QLogic cnic Driver
tg3	3.137	Broadcom Tigon3 ethernet driver
bna	3.2.25.1	QLogic BR-series 10G PCIe Ethernet driver
liquidio_vf	1.6.1	Cavium LiquidIO Intelligent Server Adapter Virtual Function Driver
cxgb		Chelsio 10Gb Ethernet Driver
cxgb3	1.1.5-ko	Chelsio T3 Network Driver
cxgb4	2.0.0-ko	Chelsio T4/T5/T6 Network Driver
cxgb4vf	2.0.0-ko	Chelsio T4/T5/T6 Virtual Function (VF) Network Driver
libcxgb	1.0.0-ko	Chelsio common library
enic	2.3.0.42	Cisco VIC Ethernet NIC Driver
de2104x	0.7	Intel/Digital 21040/1 series PCI Ethernet driver
de4x5		
dmfe	1.36.4	Davicom DM910X fast ethernet driver
tulip	1.1.15	Digital 21*4* Tulip ethernet driver
uli526x		ULi M5261/M5263 fast ethernet driver
winbond-840	1.01-e	Winbond W89c840 Ethernet driver
xircom_cb		Xircom Cardbus ethernet driver
dl2k		D-Link DL2000-based Gigabit Ethernet Adapter
sundance		Sundance Alta Ethernet driver
dnet		Dave DNET Ethernet driver
be2net	11.4.0.0	Emulex OneConnect NIC Driver 11.4.0.0
ethoc		OpenCores Ethernet MAC driver
fmvj18x_cs		fmvj18x and compatible PCMCIA ethernet driver
e100	3.5.24-k2-NAPI	Intel(R) PRO/100 Network Driver

Driver	Version	Description
e1000	7.3.21-k8-NAPI	Intel(R) PRO/1000 Network Driver
e1000e	3.2.6-k	Intel(R) PRO/1000 Network Driver
fm10k	0.21.7-k	Intel(R) Ethernet Switch Host Interface Driver
i40e	2.1.14-k	Intel(R) Ethernet Connection XL710 Network Driver
i40evf	3.0.0-k	Intel(R) XL710 X710 Virtual Function Network Driver
igb	5.4.0-k	Intel(R) Gigabit Ethernet Network Driver
igbvf	2.4.0-k	Intel(R) Gigabit Virtual Function Network Driver
ixgb	1.0.135-k2-NAPI	Intel(R) PRO/10GbE Network Driver
ixgbe	5.1.0-k	Intel(R) 10 Gigabit PCI Express Network Driver
ixgbev	4.1.0-k	Intel(R) 10 Gigabit Virtual Function Network Driver
jme	1.0.8	JMicron JMC2x0 PCI Express Ethernet driver
mvmdio		Marvell MDIO interface driver
skge	1.14	SysKonnect Gigabit Ethernet driver
sky2	1.30	Marvell Yukon 2 Gigabit Ethernet driver
mlx4_core	4.0-0	Mellanox ConnectX HCA low-level driver
mlx4_en	4.0-0	Mellanox ConnectX HCA Ethernet driver
mlx5_core	5.0-0	Mellanox Connect-IB, ConnectX-4 core driver
mlxfw		Mellanox firmware flash lib
myri10ge	1.5.3-1.534	Myricom 10G driver (10GbE)
s2io	2.0.26.28	
vxge		Neterion's X3100 Series 10GbE PCIe I/O Virtualized Server Adapter
forcedeth		Reverse Engineered nForce ethernet driver
netxen_nic	4.0.82	QLogic/NetXen (1/10) GbE Intelligent Ethernet Driver
qed	8.10.11.21	QLogic FastLinQ 4xxxx Core Module
qede	8.10.10.21	QLogic FastLinQ 4xxxx Ethernet Driver

Driver	Version	Description
qla3xxx	v2.03.00-k5	QLogic ISP3XXX Network Driver v2.03.00-k5
qlcnic	5.3.66	QLogic 1/10 GbE Converged/ Intelligent Ethernet Driver
qlge	1.00.00.35	QLogic 10 Gigabit PCI-E Ethernet Driver
r6040	0.29 04Jul2016	RDC R6040 NAPI PCI FastEthernet driver
8139cp	1.3	RealTek RTL-8139C+ series 10/100 PCI Ethernet driver
8139too	0.9.28	RealTek RTL-8139 Fast Ethernet driver
r8169	2.3LK-NAPI	RealTek RTL-8169 Gigabit Ethernet driver
sfc	4.1	Solarflare network driver
sc92031		Silan SC92031 PCI Fast Ethernet Adapter driver
sis190	1.4	SiS sis190/191 Gigabit Ethernet driver
sis900		SiS 900 PCI Fast Ethernet driver
epic100		SMC 83c170 EPIC series Ethernet driver
smc91c92_cs		SMC 91c92 series PCMCIA ethernet driver
smc9420	1.01	
dwmac-generic		Generic dwmac driver
stmmac-platform		STMMAC 10/100/1000 Ethernet platform support
stmmac		STMMAC 10/100/1000 Ethernet device driver
cassini		Sun Cassini(+) ethernet driver
niu	1.1	NIU ethernet driver
sungem		Sun GEM Gbit ethernet driver
sunhme	3.10	Sun HappyMealEthernet(HME) 10/100baseT ethernet driver
tehuti		Tehuti Networks(R) Network Driver
tlan		Driver for TI ThunderLAN based ethernet PCI adapters
xirc2ps_cs		Xircom PCMCIA ethernet driver
geneve	0.6	Interface driver for GENEVE encapsulated traffic
hv_netvsc		Microsoft Hyper-V network driver
fakelb		

Driver	Version	Description
ifb		
ipvlan		Driver for L3 (IPv6/IPv4) based VLANs
ipvtap		
macsec		MACsec IEEE 802.1AE
macvlan		Driver for MAC address based VLANs
macvtap		
mdio		Generic support for MDIO-compatible transceivers
mii		MII hardware support library
netconsole		Console driver for network interfaces
nlmon		Netlink monitoring device
ntb_netdev	0.7	ntb_netdev
amd		AMD PHY driver
at803x		Atheros 803x PHY driver
bcm-phy-lib		Broadcom PHY Library
bcm7xxx		Broadcom BCM7xxx internal PHY driver
bcm87xx		
broadcom		Broadcom PHY driver
cicada		Cicadia PHY driver
davicom		Davicom PHY driver
dp83640		National Semiconductor DP83640 PHY driver
et1011c		LSI ET1011C PHY driver
icplus		ICPlus IP175C/IP101A/IP101G/IC1001 PHY drivers
lxt		Intel LXT PHY driver
marvell		Marvell PHY driver
mdio-bitbang		
micrel		Micrel PHY driver
national		NatSemi PHY driver
qsemi		Quality Semiconductor PHY driver
realtek		Realtek PHY driver
smc		SMSC PHY driver
stel10Xp		STMicroelectronics STe10Xp PHY driver

Driver	Version	Description
vitesse		Vitesse PHY driver
bsd_comp		
ppp_async		
ppp_deflate		
ppp_generic		
ppp_mppe	1.0.2	Point-to-Point Protocol Microsoft Point-to-Point Encryption support
ppp_synctty		
pppoe		PPP over Ethernet driver
pppox		PPP over Ethernet driver (generic socket layer)
pptp		Point-to-Point Tunneling Protocol
rionet		Ethernet over RapidIO
slhc		
slip		
sungem_phy		
tap		
team		Ethernet team device driver
team_mode_activebackup		Active-backup mode for team
team_mode_broadcast		Broadcast mode for team
team_mode_loadbalance		Load-balancing mode for team
team_mode_random		Random mode for team
team_mode_roundrobin		Round-robin mode for team
tun		Universal TUN/TAP device driver
asix	22-Dec-2011	ASIX AX8817X based USB 2.0 Ethernet Devices
ax88179_178a		ASIX AX88179/178A based USB 3.0/2.0 Gigabit Ethernet Devices
catc		CATC EL1210A NetMate USB Ethernet driver
cdc-phonet		USB CDC Phonet host interface
cdc_eem		USB CDC EEM
cdc_ether		USB CDC Ethernet devices
cdc_mbim		USB CDC MBIM host driver
cdc_ncm		USB CDC NCM host driver
cdc_subset		Simple 'CDC Subset' USB networking links
cx82310_eth		Conexant CX82310-based ADSL router USB ethernet driver

Driver	Version	Description
dm9601		Davicom DM96xx USB 10/100 ethernet devices
gl620a		GL620-USB-A Host-to-Host Link cables
hso		USB High Speed Option driver
huawei_cdc_ncm		USB CDC NCM host driver with encapsulated protocol support
int51x1		Intellon usb powerline adapter
ipheth		Apple iPhone USB Ethernet driver
kalmia		Samsung Kalmia USB network driver
kaweth		KL5USB101 USB Ethernet driver
lg-vl600		LG-VL600 modem's ethernet link
mcs7830		USB to network adapter MCS7830)
net1080		NetChip 1080 based USB Host-to-Host Links
pegasus		Pegasus/Pegasus II USB Ethernet driver
plusb		Prolific PL-2301/2302/25A1/27A1 USB Host to Host Link Driver
qmi_wwan		Qualcomm MSM Interface (QMI) WWAN driver
r8152	v1.09.9	Realtek RTL8152/RTL8153 Based USB Ethernet Adapters
rndis_host		USB Host side RNDIS driver
rtl8150		rtl8150 based usb-ethernet driver
sierra_net	v.2.0	USB-to-WWAN Driver for Sierra Wireless modems
sm5c75xx		SM5C75XX USB 2.0 Gigabit Ethernet Devices
sm5c95xx		SM5C95XX USB 2.0 Ethernet Devices
sr9700		SR9700 one chip USB 1.1 USB to Ethernet device from http://www.corechip-sz.com/
sr9800	11-Nov-2013	SR9800 USB 2.0 USB2NET Dev : http://www.corechip-sz.com
usbnet		USB network driver framework
zaurus		Sharp Zaurus PDA, and compatible products
veth		Virtual Ethernet Tunnel
virtio_net		Virtio network driver
vmxnet3	1.4.a.0-k	VMware vmxnet3 virtual NIC driver

Driver	Version	Description
vxlan	0.1	Driver for VXLAN encapsulated traffic
dlci		Frame Relay DLCI layer
hdlc		HDLC support module
hdlc_cisco		Cisco HDLC protocol support for generic HDLC
hdlc_fr		Frame-Relay protocol support for generic HDLC
hdlc_ppp		PPP protocol support for generic HDLC
hdlc_raw		Raw HDLC protocol support for generic HDLC
i2400m-usb		Driver for USB based Intel Wireless WiMAX Connection 2400M (5x50 & 6050)
i2400m		Intel 2400M WiMAX networking bus-generic driver
adm8211		Driver for IEEE 802.11b wireless cards based on ADMtek ADM8211
ath		Shared library for Atheros wireless LAN cards.
ath9k		Support for Atheros 802.11n wireless LAN cards.
ath9k_common		Shared library for Atheros wireless 802.11n LAN cards.
ath9k_htc		Atheros driver 802.11n HTC based wireless devices
ath9k_hw		Support for Atheros 802.11n wireless LAN cards.
carl9170		Atheros AR9170 802.11n USB wireless
wil6210		Driver for 60g WiFi WIL6210 card
at76c50x-usb		Atmel at76x USB Wireless LAN Driver
atmel		Support for Atmel at76c50x 802.11 wireless ethernet cards.
atmel_cs		Support for Atmel at76c50x 802.11 wireless ethernet cards.
atmel_pci		Support for Atmel at76c50x 802.11 wireless ethernet cards.
b43		Broadcom B43 wireless driver
b43legacy		Broadcom B43legacy wireless driver
brcmfmac		Broadcom 802.11 wireless LAN fullmac driver.

Driver	Version	Description
brcmsmac		Broadcom 802.11n wireless LAN driver.
brcmutil		Broadcom 802.11n wireless LAN driver utilities.
airo		Support for Cisco/Aironet 802.11 wireless ethernet cards. Direct support for ISA/PCI/MPI cards and support for PCMCIA when used with airo_cs.
airo_cs		Support for Cisco/Aironet 802.11 wireless ethernet cards. This is the module that links the PCMCIA card with the airo module.
ipw2100	git-1.2.2	Intel(R) PRO/Wireless 2100 Network Driver
ipw2200	1.2.2kdmprq	Intel(R) PRO/Wireless 2200/2915 Network Driver
libipw	git-1.1.13	802.11 data/management/control stack
iwl3945	in-tree:ds	Intel(R) PRO/Wireless 3945ABG/BG Network Connection driver for Linux
iwl4965	in-tree:d	Intel(R) Wireless WiFi 4965 driver for Linux
iwlegacy	in-tree:	iwl-legacy: common functions for 3945 and 4965
iwldvm		Intel(R) Wireless WiFi Link AGN driver for Linux
iwlwifi		Intel(R) Wireless WiFi driver for Linux
iwlmvm		The new Intel(R) wireless AGN driver for Linux
hostap		Host AP common routines
hostap_cs		Support for Intersil Prism2-based 802.11 wireless LAN cards (PC Card).
hostap_pci		Support for Intersil Prism2.5-based 802.11 wireless LAN PCI cards.
hostap_plx		Support for Intersil Prism2-based 802.11 wireless LAN cards (PLX).
orinoco		Driver for Lucent Orinoco, Prism II based and similar wireless cards
orinoco_cs		Driver for PCMCIA Lucent Orinoco, Prism II based and similar wireless cards
orinoco_nortel		Driver for wireless LAN cards using the Nortel PCI bridge

Driver	Version	Description
orinoco_plx		Driver for wireless LAN cards using the PLX9052 PCI bridge
orinoco_tmd		Driver for wireless LAN cards using the TMD7160 PCI bridge
spectrum_cs		Driver for Symbol Spectrum24 Trilogy cards with firmware downloader
p54common		Softmac Prism54 common code
p54pci		Prism54 PCI wireless driver
p54usb		Prism54 USB wireless driver
mac80211_hwsim		Software simulator of 802.11 radio(s) for mac80211
libertas		Libertas WLAN Driver Library
libertas_cs		Driver for Marvell 83xx compact flash WLAN cards
libertas_sdio		Libertas SDIO WLAN Driver
usb8xxx		8388 USB WLAN Driver
libertas_tf		Libertas WLAN Thinfirm Driver Library
libertas_tf_usb		8388 USB WLAN Thinfirm Driver
mwifiex	1.0	Marvell WiFi-Ex Driver version 1.0
mwifiex_pcie	1.0	Marvell WiFi-Ex PCI-Express Driver version 1.0
mwifiex_sdio	1.0	Marvell WiFi-Ex SDIO Driver version 1.0
mwifiex_usb	1.0	Marvell WiFi-Ex USB Driver version1.0
mwl8k	0.13	Marvell TOPDOG(R) 802.11 Wireless Network Driver
rt2400pci	2.3.0	Ralink RT2400 PCI & PCMCIA Wireless LAN driver.
rt2500pci	2.3.0	Ralink RT2500 PCI & PCMCIA Wireless LAN driver.
rt2500usb	2.3.0	Ralink RT2500 USB Wireless LAN driver.
rt2800lib	2.3.0	Ralink RT2800 library
rt2800mmio	2.3.0	rt2800 MMIO library
rt2800pci	2.3.0	Ralink RT2800 PCI & PCMCIA Wireless LAN driver.
rt2800usb	2.3.0	Ralink RT2800 USB Wireless LAN driver.
rt2x00lib	2.3.0	rt2x00 library
rt2x00mmio	2.3.0	rt2x00 mmio library

Driver	Version	Description
rt2x00pci	2.3.0	rt2x00 pci library
rt2x00usb	2.3.0	rt2x00 usb library
rt61pci	2.3.0	Ralink RT61 PCI & PCMCIA Wireless LAN driver.
rt73usb	2.3.0	Ralink RT73 USB Wireless LAN driver.
rtl818x_pci		RTL8180 / RTL8185 / RTL8187SE PCI wireless driver
rtl8187		RTL8187/RTL8187B USB wireless driver
btcoexist		Realtek 802.11n PCI wireless core
rtl8188ee		Realtek 8188E 802.11n PCI wireless
rtl8192c-common		Realtek 8192C/8188C 802.11n PCI wireless
rtl8192ce		Realtek 8192C/8188C 802.11n PCI wireless
rtl8192cu		Realtek 8192C/8188C 802.11n USB wireless
rtl8192de		Realtek 8192DE 802.11n Dual Mac PCI wireless
rtl8192ee		Realtek 8192EE 802.11n PCI wireless
rtl8192se		Realtek 8192S/8191S 802.11n PCI wireless
rtl8723ae		Realtek 8723E 802.11n PCI wireless
rtl8723be		Realtek 8723BE 802.11n PCI wireless
rtl8723-common		Realtek RTL8723AE/RTL8723BE 802.11n PCI wireless common routines
rtl8821ae		Realtek 8821ae 802.11ac PCI wireless
rtl_pci		PCI basic driver for rtlwifi
rtl_usb		USB basic driver for rtlwifi
rtlwifi		Realtek 802.11n PCI wireless core
rndis_wlan		Driver for RNDIS based USB Wireless adapters
wl1251		TI wl1251 Wireless LAN Driver Core
wl1251_sdio		
wl3501_cs		Planet wl3501 wireless driver
zd1201	0.15	Driver for ZyDAS ZD1201 based USB Wireless adapters

Driver	Version	Description
zd1211rw	1.0	USB driver for devices with the ZD1211 chip.
xen-netback		
xen-netfront		Xen virtual network device frontend

ntb Drivers in UEK R5 (x86_64)

Driver	Version	Description
ntb	1.0	PCIe NTB Driver Framework
ntb_transport	4	Software Queue-Pair Transport over NTB

nvdimmm Drivers in UEK R5 (x86_64)

Driver	Version	Description
libnvdimm		
nd_blk		
nd_btt		
nd_e820		
nd_pmem		

nvme Drivers in UEK R5 (x86_64)

Driver	Version	Description
nvme-core	1.0	
nvme-fabrics		
nvme-fc		
nvme-rdma		
nvme	1.0	
nvme-fcloop		
nvme-loop		
nvmet-fc		
nvmet-rdma		
nvmet		

parport Drivers in UEK R5 (x86_64)

Driver	Version	Description
parport		
parport_cs		PCMCIA parallel port card driver
parport_pc		PC-style parallel port driver
parport_serial		Driver for common parallel+serial multi-I/O PCI cards

pci Drivers in UEK R5 (x86_64)

Driver	Version	Description
pci-hyperv		Hyper-V PCI
acpiphp_ibm	1.0.1	ACPI Hot Plug PCI Controller Driver IBM extension
shpchp		Standard Hot Plug PCI Controller Driver
aer_inject		PCIe AER software error injector

pcmcia Drivers in UEK R5 (x86_64)

Driver	Version	Description
pd6729		Driver for the Cirrus PD6729 PCI-PCMCIA bridge
yenta_socket		

pinctrl Drivers in UEK R5 (x86_64)

Driver	Version	Description
pinctrl-cannonlake		Intel Cannon Lake PCH pinctrl/GPIO driver
pinctrl-denverton		Intel Denverton SoC pinctrl/GPIO driver
pinctrl-geminilake		Intel Gemini Lake SoC pinctrl/GPIO driver
pinctrl-intel		Intel pinctrl/GPIO core driver
pinctrl-lewisburg		Intel Lewisburg pinctrl/GPIO driver

platform Drivers in UEK R5 (x86_64)

Driver	Version	Description
chromeos_laptop		Chrome OS Laptop driver
chromeos_pstore		Chrome OS pstore module
acer-wmi		Acer Laptop WMI Extras Driver
acerhdf		Aspire One temperature and fan driver
amilo-rfkill		
apple-gmux		Apple Gmux Driver
asus-laptop		Asus Laptop Support
asus-nb-wmi		Asus Notebooks WMI Hotkey Driver
asus-wmi		Asus Generic WMI Driver
classmate-laptop		
compal-laptop	0.2.7	Compal Laptop Support
dell-laptop		Dell laptop driver
dell-smbios		Common functions for kernel modules using Dell SMBIOS
dell-wmi-aio		WMI hotkeys driver for Dell All-In-One series
dell-wmi		Dell laptop WMI hotkeys driver
eeepc-laptop		Eee PC Hotkey Driver
eeepc-wmi		Eee PC WMI Hotkey Driver
fujitsu-laptop	0.6.0	Fujitsu laptop extras support
fujitsu-tablet	2.5	Fujitsu tablet pc extras driver
hdaps		IBM Hard Drive Active Protection System (HDAPS) driver
hp-wmi		HP laptop WMI hotkeys driver
hp_accel		Glue between LIS3LV02Dx and HP ACPI BIOS and support for disk protection LED.
ibm_rtl		
ideapad-laptop		IdeaPad ACPI Extras
intel-rst		
intel-smartconnect		
intel-vbbtn		
intel_ips		Intelligent Power Sharing Driver
intel_oaktrail	0.4ac1	Intel Oaktrail Platform ACPI Extras

Driver	Version	Description
msi-laptop	0.5	MSI Laptop Support
msi-wmi		MSI laptop WMI hotkeys driver
mxm-wmi		MXM WMI Driver
panasonic-laptop		ACPI HotKey driver for Panasonic Let's Note laptops
samsung-laptop		Samsung Backlight driver
samsung-q10		Samsung Q10 Driver
sony-laptop		Sony laptop extras driver (SPIC and SNC ACPI device)
thinkpad_acpi	0.25	ThinkPad ACPI Extras
topstar-laptop		Topstar Laptop ACPI Extras driver
toshiba_acpi		Toshiba Laptop ACPI Extras Driver
toshiba_bluetooth		Toshiba Laptop ACPI Bluetooth Enable Driver
wmi-bmof		WMI embedded Binary MOF driver
wmi		ACPI-WMI Mapping Driver

power Drivers in UEK R5 (x86_64)

Driver	Version	Description
bq2415x_charger		bq2415x charger driver
bq24190_charger		TI BQ24190 Charger Driver
bq24735-charger		bq24735 battery charging driver
ds2780_battery		Maxim/Dallas DS2780 Stand-Alone Fuel Gauge IC driver
ds2781_battery		Maxim/Dallas DS2781 Stand-Alone Fuel Gauge IC driver
ds2782_battery		Maxim/Dallas DS2782 Stand-Alone Fuel Gauge IC driver
gpio-charger		Driver for chargers which report their online status through a GPIO
isp1704_charger		ISP170x USB Charger driver
lp8727_charger		TI/National Semiconductor LP8727 charger driver
max17040_battery		MAX17040 Fuel Gauge
max17042_battery		MAX17042 Fuel Gauge
max8903_charger		MAX8903 Charger Driver
sbs-battery		SBS battery monitor driver
smb347-charger		SMB347 battery charger driver

pps Drivers in UEK R5 (x86_64)

Driver	Version	Description
pps-gpio	1.0.0	Use GPIO pin as PPS source
pps-ldisc		PPS TTY device driver
pps_parport		parallel port PPS client
pps_core		LinuxPPS support (RFC 2783) - ver. 5.3.6

ptp Drivers in UEK R5 (x86_64)

Driver	Version	Description
ptp		PTP clocks support
ptp_kvm		PTP clock using KVMCLOCK

regulator Drivers in UEK R5 (x86_64)

Driver	Version	Description
fixed		Fixed voltage regulator
lp3971		LP3971 PMIC driver
max1586		MAXIM 1586 voltage regulator driver
tps65023-regulator		TPS65023 voltage regulator driver
tps6507x-regulator		TPS6507x voltage regulator driver
userspace-consumer		Userspace consumer for voltage and current regulators

rtc Drivers in UEK R5 (x86_64)

Driver	Version	Description
rtc-bq32k		TI BQ32000 I2C RTC driver
rtc-bq4802		TI BQ4802 RTC driver
rtc-ds1286		DS1286 RTC driver
rtc-ds1307		RTC driver for DS1307 and similar chips
rtc-ds1374		Maxim/Dallas DS1374 RTC Driver
rtc-ds1511		Dallas DS1511 RTC driver
rtc-ds1553		Dallas DS1553 RTC driver

Driver	Version	Description
rtc-ds1672		Dallas/Maxim DS1672 timekeeper driver
rtc-ds1742		Dallas DS1742 RTC driver
rtc-ds2404		DS2404 RTC
rtc-ds3232		Maxim/Dallas DS3232/DS3234 RTC Driver
rtc-em3027		EM Microelectronic EM3027 RTC driver
rtc-fm3130		RTC driver for FM3130
rtc-isl12022		ISL 12022 RTC driver
rtc-isl1208		Intersil ISL1208 RTC driver
rtc-m41t80		ST Microelectronics M41T80 series RTC I2C Client Driver
rtc-m48t35		M48T35 RTC driver
rtc-m48t59		M48T59/M48T02/M48T08 RTC driver
rtc-m48t86		M48T86 RTC driver
rtc-max6900		Maxim MAX6900 RTC driver
rtc-msm6242		Oki MSM6242 RTC driver
rtc-pcf2127		NXP PCF2127/29 RTC driver
rtc-pcf50633		PCF50633 RTC driver
rtc-pcf85063		PCF85063 RTC driver
rtc-pcf8523		NXP PCF8523 RTC driver
rtc-pcf8563		Philips PCF8563/Epson RTC8564 RTC driver
rtc-pcf8583		PCF8583 I2C RTC driver
rtc-rp5c01		Ricoh RP5C01 RTC driver
rtc-rs5c372		Ricoh RS5C372 RTC driver
rtc-rv3029c2		Micro Crystal RV3029/RV3049 RTC driver
rtc-rx8025		RX-8025 SA/NB RTC driver
rtc-rx8581		Epson RX-8581 RTC driver
rtc-s35390a		S35390A RTC driver
rtc-stk17ta8		Simtek STK17TA8 RTC driver
rtc-v3020		V3020 RTC
rtc-x1205		Xicor/Intersil X1205 RTC driver

scsi Drivers in UEK R5 (x86_64)

Driver	Version	Description
3w-9xxx	2.26.02.014	3ware 9000 Storage Controller Linux Driver
3w-sas	3.26.02.000	LSI 3ware SAS/SATA-RAID Linux Driver
aacraid	1.2.1[50834]-custom	Dell PERC2, 2/Si, 3/Si, 3/Di, Adaptec Advanced Raid Products, HP NetRAID-4M, IBM ServeRAID & ICP SCSI driver
aic79xx	3.0	Adaptec AIC790X U320 SCSI Host Bus Adapter driver
aic7xxx	7.0	Adaptec AIC77XX/78XX SCSI Host Bus Adapter driver
aic94xx	1.0.3	Adaptec aic94xx SAS/SATA driver
arcmsr	v1.30.00.22-20151126	Areca ARC11xx/12xx/16xx/18xx SAS/SATA RAID Controller Driver
be2iscsi	11.4.0.0	Emulex OneConnectOpen-iSCSI Driver version 11.4.0.0 Driver 11.4.0.0
bfa	3.2.25.1	QLogic BR-series Fibre Channel HBA Driver fcpim
bnx2fc	2.11.8	QLogic FCoE Driver
bnx2i	2.7.10.1	QLogic NetXtreme II BCM5706/5708/5709/57710/57711/57712/57800/57810/57840 iSCSI Driver
ch		device driver for scsi media changer devices
csiostor	1.0.0-ko	Chelsio FCoE driver
cxgb3i	2.0.1-ko	Chelsio T3 iSCSI Driver
cxgb4i	0.9.5-ko	Chelsio T4-T6 iSCSI Driver
libcxgbi	0.9.1-ko	Chelsio iSCSI driver library
fcoe		FCoE
libfcoe		FIP discovery protocol and FCoE transport for FCoE HBAs
fnic	1.6.0.34	Cisco FCoE HBA Driver
hpsa	3.4.20-0	Driver for HP Smart Array Controller version 3.4.20-0
hptiop		HighPoint RocketRAID 3xxx/4xxx Controller Driver
hv_storvsc		Microsoft Hyper-V virtual storage driver
imm		

Driver	Version	Description
initio		Initio INI-9X00U/UW SCSI device driver
ips	7.12.05	IBM ServeRAID Adapter Driver 7.12.05
iscsi	1.2.0	
iscsi_boot_sysfs		sysfs interface and helpers to export iSCSI boot information
iscsi_tcp		iSCSI/TCP data-path
libfc		libfc
libiscsi		iSCSI library functions
libiscsi_tcp		iSCSI/TCP data-path
libsas		SAS Transport Layer
lpfc	0:12.0.0.2	Emulex LightPulse Fibre Channel SCSI driver 12.0.0.2
megaraid_mbox	2.20.5.1	LSI Logic MegaRAID Mailbox Driver
megaraid_mm	2.20.2.7	LSI Logic Management Module
megaraid_sas	07.704.04.00-rc1	Avago MegaRAID SAS Driver
mpt3sas	17.100.00.00	LSI MPT Fusion SAS 3.0 Device Driver
mvsas	0.8.16	Marvell 88SE6440 SAS/SATA controller driver
mvumi		Marvell UMI Driver
libosd		open-osd initiator library libosd.ko
osd		open-osd Upper-Layer-Driver osd.ko
osst		OnStream {DI- FW- SC- USB}{30 50} Tape Driver
aha152x_cs		Adaptec 152x SCSI driver; \$Revision: 6467 \$
pm80xx	0.1.38	PMC-Sierra PM8001/8006/8081/8088/8089/8074 /8076/8077/8070/8072 SAS/SATA controller driver
pmcraid	1.0.3	PMC Sierra MaxRAID Controller Driver
ppa		
qedf	8.20.5.0	QLogic QEDF 25/40/50/100Gb FCoE Driver
qedi	8.10.4.0	QLogic FastLinQ 4xxxx iSCSI Module
qla2xxx	10.00.00.06-k1	QLogic Fibre Channel HBA Driver

Driver	Version	Description
qla4xxx	5.04.00-k6	QLogic iSCSI HBA Driver
raid_class		RAID device class
scsi_debug	1.86	SCSI debug adapter driver
scsi_transport_fc		FC Transport Attributes
scsi_transport_iscsi	2.0-870	iSCSI Transport Interface
scsi_transport_sas		SAS Transport Attributes
scsi_transport_spi		SPI Transport Attributes
scsi_transport_srp		SRP Transport Attributes
sd_mod		SCSI disk (sd) driver
ses		SCSI Enclosure Services (ses) driver
sg	3.5.36	SCSI generic (sg) driver
smartpqi	1.1.2-126	Driver for Microsemi Smart Family Controller version 1.1.2-126
snic	0.0.1.18	Cisco SCSI NIC Driver
sr_mod		SCSI cdrom (sr) driver
st		SCSI tape (st) driver
stex	6.02.0000.01	Promise Technology SuperTrak EX Controllers
sym53c8xx	2.2.3	NCR, Symbios and LSI 8xx and 1010 PCI SCSI adapters
ufshcd-pci	0.2	UFS host controller PCI glue driver
ufshcd	0.2	Generic UFS host controller driver Core
virtio_scsi		Virtio SCSI HBA driver
vmw_pvscsi	1.0.7.0-k	VMware PVSCSI driver
xen-scsifront		Xen SCSI frontend driver

ssb Drivers in UEK R5 (x86_64)

Driver	Version	Description
ssb		Sonics Silicon Backplane driver

staging Drivers in UEK R5 (x86_64)

Driver	Version	Description
firewire-serial		FireWire Serial TTY Driver

Driver	Version	Description
r8192e_pci	0014.0401.2010	Linux driver for Realtek RTL819x WiFi cards
rtllib		
rtllib_crypt_ccmp		
rtllib_crypt_tkip		
rtllib_crypt_wep		
r8712u		rtl871x wireless lan driver

target Drivers in UEK R5 (x86_64)

Driver	Version	Description
iscsi_target_mod	4.1.x	iSCSI-Target Driver for mainline target infrastructure
tcm_loop		TCM loopback virtual Linux/SCSI fabric module
target_core_file		TCM FILEIO subsystem plugin
target_core_iblock		TCM IBLOCK subsystem plugin
target_core_mod		Target_Core_Mod/ConfigFS
target_core_pscsi		TCM PSCSI subsystem plugin
target_core_user		TCM USER subsystem plugin
tcm_fc		FC TCM fabric driver 0.4

thermal Drivers in UEK R5 (x86_64)

Driver	Version	Description
intel_powerclamp		Package Level C-state Idle Injection for Intel CPUs

tty Drivers in UEK R5 (x86_64)

Driver	Version	Description
cyclades	2.6	
ipwireless		ipwireless 1.1
n_gsm		
n_hdlc		
nozomi		Nozomi driver
serial_cs		

Driver	Version	Description
altera_jtaguart		Altera JTAG UART driver
altera_uart		Altera UART driver
arc_uart		ARC(Synopsys) On-Chip(fpga) serial driver
jsm		Driver for the Digi International Neo and Classic PCI based product line
synclink		
synclink_gt		
synclinkmp		

uio Drivers in UEK R5 (x86_64)

Driver	Version	Description
uio		
uio_aec		
uio_cif		
uio_hv_generic	0.02.0	Generic UIO driver for VMBus devices
uio_pci_generic	0.01.0	Generic UIO driver for PCI 2.3 devices
uio_pdrv_genirq		Userspace I/O platform driver with generic IRQ handling
uio_sercos3		UIO driver for the Automata Sercos III PCI card

usb Drivers in UEK R5 (x86_64)

Driver	Version	Description
cxacru		Conexant AccessRunner ADSL USB modem driver
speedtch		Alcatel SpeedTouch USB driver
ueagle-atm		ADI 930/Eagle USB ADSL Modem driver
usbatm		Generic USB ATM/DSL I/O
xusbatm		Driver for USB ADSL modems initialized in userspace
cdc-acm		USB Abstract Control Model driver for USB modems and ISDN adapters

Driver	Version	Description
cdc-wdm		USB Abstract Control Model driver for USB WCM Device Management
usbblp		USB Printer Device Class driver
usbtmc		
hwa-hc		Host Wired Adapter USB Host Control Driver
isp1362-hcd		ISP1362 USB Host Controller Driver
sl811-hcd		SL811HS USB Host Controller Driver
u132-hcd		U132 USB Host Controller Driver
whci-hcd		WHCI Wireless USB host controller driver
mdc800		USB Driver for Mustek MDC800 Digital Camera
microtek		Microtek Scanmaker X6 USB scanner driver
adutux		adutux (see www.ontrak.net)
appledisplay		Apple Cinema Display driver
emi26		Emagic EMI 2 6 firmware loader.
emi62		Emagic EMI 6 2m firmware loader.
ezusb		
ftdi-elan		FTDI ELAN driver
idmouse		Siemens ID Mouse FingerTIP Sensor Driver
iowarrior		USB IO-Warrior driver
isight_firmware		
ldusb		LD USB Driver
legousbtower		LEGO USB Tower Driver
sisusbvga		sisusbvga - Driver for Net2280/SiS315-based USB2VGA dongles
usb3503		USB3503 USB HUB driver
usbLCD		USBLCD Driver Version 1.05
usbsevseg		USB 7 Segment Driver
uss720		USB Parport Cable driver for Cables using the Lucent Technologies USS720 Chip
phy-generic		NOP USB Transceiver driver
aircable		AIRcable USB Driver
ark3116		USB ARK3116 serial/IrDA driver

Driver	Version	Description
belkin_sa		USB Belkin Serial converter driver
ch341		
cp210x		Silicon Labs CP210x RS232 serial adaptor driver
cyberjack		REINER SCT cyberJack pinpad/e-com USB Chipcard Reader Driver
cypress_m8		Cypress USB to Serial Driver
digi_acceleport		Digi AccelePort USB-2/USB-4 Serial Converter driver
empeg		USB Empeg Mark I/II Driver
f81232		Fintek F81232 USB to serial adaptor driver
ftdi_sio		USB FTDI Serial Converters Driver
garmin_gps		garmin gps driver
io_edgeport		Edgeport USB Serial Driver
io_ti		Edgeport USB Serial Driver
ipaq		USB PocketPC PDA driver
ipw		IPWireless tty driver
ir-usb		USB IR Dongle driver
iuu_phoenix		Infinity USB Unlimited Phoenix driver
keyspan		Keyspan USB to Serial Converter Driver
keyspan_pda		USB Keyspan PDA Converter driver
kl5kusb105		KLSI KL5KUSB105 chipset USB->Serial Converter driver
kobil_sct		KOBIL USB Smart Card Terminal Driver (experimental)
mct_u232		Magic Control Technology USB-RS232 converter driver
metro-usb		Metrologic Instruments Inc. - USB-POS driver
mos7720		Moschip USB Serial Driver
mos7840		Moschip 7840/7820 USB Serial Driver
mxuport		
navman		
omninet		USB ZyXEL omni.net LCD PLUS Driver
opticon		Opticon USB barcode to serial driver (1D)

Driver	Version	Description
option		USB Driver for GSM modems
oti6858		Ours Technology Inc. OTi-6858 USB to serial adapter driver
pl2303		Prolific PL2303 USB to serial adaptor driver
qcaux		
qcserial		Qualcomm USB Serial driver
quatech2		Quatech 2nd gen USB to Serial Driver
safe_serial		USB Safe Encapsulated Serial
sierra		USB Driver for Sierra Wireless USB modems
spcp8x5		SPCP8x5 USB to serial adaptor driver
ssu100		Quatech SSU-100 USB to Serial Driver
symbolserial		
ti_usb_3410_5052		TI USB 3410/5052 Serial Driver
usb-serial-simple		
usb_debug		
usb_wwan		USB Driver for GSM modems
visor		USB HandSpring Visor / Palm OS driver
whiteheat		USB ConnectTech WhiteHEAT driver
wishbone-serial		USB Wishbone-Serial adapter
xsens_mt		USB-serial driver for Xsens motion trackers
uas		
ums-alauda		Driver for Alauda-based card readers
ums-cypress		SAT support for Cypress USB/ATA bridges with ATACB
ums-datafab		Driver for Datafab USB Compact Flash reader
ums-eneub6250		Driver for ENE UB6250 reader
ums-freecom		Driver for Freecom USB/IDE adaptor
ums-isd200		Driver for In-System Design, Inc. ISD200 ASIC
ums-jumpshot		Driver for Lexar "Jumpshot" Compact Flash reader
ums-karma		Driver for Rio Karma

Driver	Version	Description
ums-onetouch		Maxtor USB OneTouch hard drive button driver
ums-realtek		Driver for Realtek USB Card Reader
ums-sddr09		Driver for SanDisk SDDR-09 SmartMedia reader
ums-sddr55		Driver for SanDisk SDDR-55 SmartMedia reader
ums-usbata		Driver for SCM Microsystems (a.k.a. Shuttle) USB-ATAPI cable
usb-storage		USB Mass Storage driver for Linux
typec		USB Type-C Connector Class
typec_ucsi		USB Type-C Connector System Software Interface driver
usbip-core		USB/IP Core
wusb-cbaf		Wireless USB Cable Based Association
wusb-wa		Wireless USB Wire Adapter core
wusbcore		Wireless USB core

uwb Drivers in UEK R5 (x86_64)

Driver	Version	Description
hwa-rc		Host Wireless Adapter Radio Control Driver
i1480-dfu-usb		Intel Wireless UWB Link 1480 firmware uploader for USB
i1480-est		i1480's Vendor Specific Event Size Tables
umc		UWB Multi-interface Controller capability bus
uwb		Ultra Wide Band core
whc-rc		Wireless Host Controller Radio Control Driver
whci		WHCI UWB Multi-interface Controller enumerator

vfi Drivers in UEK R5 (x86_64)

Driver	Version	Description
mdev	0.1	Mediated device Core Driver

Driver	Version	Description
vfio_mdev	0.1	VFIO based driver for Mediated device
vfio-pci	0.2	VFIO PCI - User Level meta-driver
vfio	0.3	VFIO - User Level meta-driver
vfio_iommu_type1	0.2	Type1 IOMMU driver for VFIO
vfio_virqfd	0.1	IRQFD support for VFIO bus drivers

vhost Drivers in UEK R5 (x86_64)

Driver	Version	Description
vhost	0.0.1	Host kernel accelerator for virtio
vhost_net	0.0.1	Host kernel accelerator for virtio net
vhost_scsi		VHOST_SCSI series fabric driver
vhost_vsock		vhost transport for vsock

video Drivers in UEK R5 (x86_64)

Driver	Version	Description
apple_bl		Apple Backlight Driver
lcd		LCD Lowlevel Control Abstraction
platform_lcd		
aty128fb		FBDev driver for ATI Rage128 / Pro cards
atyfb		FBDev driver for ATI Mach64 cards
radeonfb		framebuffer driver for ATI Radeon chipset
cirrusfb		Accelerated FBDev driver for Cirrus Logic chips
fb_ddc		DDC/EDID reading support
fb_sys_fops		Generic file read (fb in system RAM)
syscopyarea		Generic copyarea (sys-to-sys)
sysfillrect		Generic fill rectangle (sys-to-sys)
sysimgblt		1-bit/8-bit to 1-32 bit color expansion (sys-to-sys)
hyperv_fb		Microsoft Hyper-V Synthetic Video Frame Buffer Driver

Driver	Version	Description
macmodes		
nvidiafb		Framebuffer driver for nVidia graphics chipset
rivafb		Framebuffer driver for nVidia Riva 128, TNT, TNT2, and the GeForce series
savagefb		FBDev driver for S3 Savage PCI/AGP Chips
sm501fb		SM501 Framebuffer driver
vfb		
vga16fb		Legacy VGA framebuffer device driver
viafb		
xen-fbfront		Xen virtual framebuffer device frontend
vgastate		VGA State Save/Restore

virtio Drivers in UEK R5 (x86_64)

Driver	Version	Description
virtio		
virtio_balloon		Virtio balloon driver
virtio_input		Virtio input device driver
virtio_pci	1	virtio-pci
virtio_ring		

w1 Drivers in UEK R5 (x86_64)

Driver	Version	Description
w1_ds2780		1-wire Driver for Maxim/Dallas DS2780 Stand-Alone Fuel Gauge IC
w1_ds2781		1-wire Driver for Maxim/Dallas DS2781 Stand-Alone Fuel Gauge IC
wire		Driver for 1-wire Dallas network protocol.

watchdog Drivers in UEK R5 (x86_64)

Driver	Version	Description
acquirewdt		Acquire Inc. Single Board Computer Watchdog Timer driver
advantechwdt		Advantech Single Board Computer WDT driver
alim1535_wdt		ALi M1535 PMU Watchdog Timer driver
alim7101_wdt		ALi M7101 PMU Computer Watchdog Timer driver
cpu5wdt		sma cpu5 watchdog driver
eurotechwdt		Driver for Eurotech CPU-1220/1410 on board watchdog
f71808e_wdt		F71808E Watchdog Driver
hpwdt	1.4.0	hp watchdog driver
i6300esb		Watchdog driver for Intel 6300ESB chipsets
iTCO_vendor_support	1.04	Intel TCO Vendor Specific WatchDog Timer Driver Support
iTCO_wdt	1.11	Intel TCO WatchDog Timer Driver
ib700wdt		IB700 SBC watchdog driver
ibmasr		IBM Automatic Server Restart driver
ie6xx_wdt		Intel Atom E6xx Watchdog Device Driver
it8712f_wdt		IT8712F Watchdog Driver
it87_wdt		Hardware Watchdog Device Driver for IT87xx EC-LPC I/O
machzwd		MachZ ZF-Logic Watchdog driver
mena21_wdt		MEN A21 Watchdog
nv_tco		TCO timer driver for NV chipsets
of_xilinx_wdt		Xilinx Watchdog driver
pc87413_wdt		PC87413 WDT driver
pcwd_pci		Berkshire PCI-PC Watchdog driver
pcwd_usb		Berkshire USB-PC Watchdog driver
sbc60xxwdt		60xx Single Board Computer Watchdog Timer driver

Driver	Version	Description
sbc_epx_c3		Hardware Watchdog Device for Winsystems EPX-C3 SBC. Note that there is no way to probe for this device -- so only use it if you are <i>*sure*</i> you are running on this specific SBC system from Winsystems! It writes to IO ports 0x1ee and 0x1ef!
sbc_fitpc2_wdt		SBC-FITPC2 Watchdog
sc1200wdt		Driver for National Semiconductor PC87307/PC97307 watchdog component
sch311x_wdt		SMSC SCH311x WatchDog Timer Driver
smc37b787_wdt		Driver for SMC 37B787 watchdog component (Version 1.1)
softdog		Software Watchdog Device Driver
sp5100_tco		TCO timer driver for SP5100/SB800 chipset
via_wdt		Driver for watchdog timer on VIA chipset
w83627hf_wdt		w83627hf/thf WDT driver
w83877f_wdt		Driver for watchdog timer in w83877f chip
w83977f_wdt		Driver for watchdog timer in W83977F I/O chip
wafer5823wdt		ICP Wafer 5823 Single Board Computer WDT driver
wdt_pci		Driver for the ICS PCI-WDT500/501 watchdog cards
xen_wdt		Xen WatchDog Timer Driver

xen Drivers in UEK R5 (x86_64)

Driver	Version	Description
ovmapi		
tmem		Shim to Xen transcendent memory
xen-acpi-processor		Xen ACPI Processor P-states (and Cx) driver which uploads PM data to Xen hypervisor
xen-evtchn		
xen-gntalloc		User-space grant reference allocator driver

Driver	Version	Description
xen-gntdev		User-space granted page access driver
xen-privcmd		
xen-scsiback		Xen SCSI backend driver
xenfs		Xen filesystem
