

# Block layer support for Persistent Reservations

The Linux kernel supports a user space interface for simplified Persistent Reservations which map to block devices that support these (like SCSI). Persistent Reservations allow restricting access to block devices to specific initiators in a shared storage setup.

This document gives a general overview of the support ioctl commands. For a more detailed reference please refer to the SCSI Primary Commands standard, specifically the section on Reservations and the "PERSISTENT RESERVE IN" and "PERSISTENT RESERVE OUT" commands.

All implementations are expected to ensure the reservations survive a power loss and cover all connections in a multi path environment. These behaviors are optional in SPC but will be automatically applied by Linux.

## The following types of reservations are supported:

- **PR\_WRITE\_EXCLUSIVE**  
Only the initiator that owns the reservation can write to the device. Any initiator can read from the device.
- **PR\_EXCLUSIVE\_ACCESS**  
Only the initiator that owns the reservation can access the device.
- **PR\_WRITE\_EXCLUSIVE\_REG\_ONLY**  
Only initiators with a registered key can write to the device, Any initiator can read from the device.
- **PR\_EXCLUSIVE\_ACCESS\_REG\_ONLY**  
Only initiators with a registered key can access the device.
- **PR\_WRITE\_EXCLUSIVE\_ALL\_REGS**  
Only initiators with a registered key can write to the device, Any initiator can read from the device. All initiators with a registered key are considered reservation holders. Please reference the SPC spec on the meaning of a reservation holder if you want to use this type.
- **PR\_EXCLUSIVE\_ACCESS\_ALL\_REGS**  
Only initiators with a registered key can access the device. All initiators with a registered key are considered reservation holders. Please reference the SPC spec on the meaning of a reservation holder if you want to use this type.

## The following ioctl are supported:

### 1. IOC\_PR\_REGISTER

This ioctl command registers a new reservation if the `new_key` argument is non-null. If no existing reservation exists `old_key` must be zero, if an existing reservation should be replaced `old_key` must contain the old reservation key.

If the `new_key` argument is 0 it unregisters the existing reservation passed in `old_key`.

### 2. IOC\_PR\_RESERVE

This ioctl command reserves the device and thus restricts access for other devices based on the `type` argument. The `key` argument must be the existing reservation key for the device as acquired by the `IOC_PR_REGISTER`, `IOC_PR_REGISTER_IGNORE`, `IOC_PR_PREEMPT` or `IOC_PR_PREEMPT_ABORT` commands.

### 3. IOC\_PR\_RELEASE

This ioctl command releases the reservation specified by `key` and `flags` and thus removes any access restriction implied by it.

### 4. IOC\_PR\_PREEMPT

This ioctl command releases the existing reservation referred to by `old_key` and replaces it with a new reservation of `type` for the reservation key `new_key`.

### 5. IOC\_PR\_PREEMPT\_ABORT

This ioctl command works like `IOC_PR_PREEMPT` except that it also aborts any outstanding command sent over a connection identified by `old_key`.

### 6. IOC\_PR\_CLEAR

This ioctl command unregisters both `key` and any other reservation key registered with the device and drops any existing reservation.

## Flags

All the ioctls have a flag field. Currently only one flag is supported:

- `PR_FL_IGNORE_KEY`  
Ignore the existing reservation key. This is commonly supported for `IOC_PR_REGISTER`, and some implementation may support the flag for `IOC_PR_RESERVE`.

For all unknown flags the kernel will return `-EOPNOTSUPP`.