Current layout

Class devices all over
Current SCSI sysfs representation

struct device represents SCSI objects
  • host / target / lun
  • No transport specific objects

Upper layer drivers are scsi bus drivers
  • sd / sr / st / ses
  • Not sg as it has to attach to all devices

Everything else is stored as class devices
  • Transport classes
sysfs object lifetime

SCSI host
- Created by the driver
- Lifetime managed by the underlying (PCI) device
- No problems there

SCSI target
- Total number controller by HBA
- Lifetime bound to the underlying devices

SCSI devices
- Lifetime controlled by underlying transport or userland
- Intermediate devices during scanning
Uevents during scanning

uevent path '/class/scsi_host/host2' action 'add'
uevent path '/class/spi_host/host2' action 'add'
uevent path '/bus/pci/drivers/mptspi' action 'add'
uevent path '/class/spi_transport/target2:0:0' action 'add'
uevent path '/class/spi_transport/target2:0:1' action 'add'
uevent path '/class/spi_transport/target2:0:1' action 'remove'
uevent path '/class/spi_transport/target2:0:2' action 'add'
uevent path '/class/spi_transport/target2:0:2' action 'remove'
uevent path '/class/spi_transport/target2:0:13' action 'remove'
uevent path '/class/spi_transport/target2:0:14' action 'add'
uevent path '/class/spi_transport/target2:0:14' action 'remove'
uevent path '/class/spi_transport/target2:0:15' action 'add'
uevent path '/class/spi_transport/target2:0:15' action 'remove'
uevent path '/devices/pci0000:00/0000:00:10.0/host2/target2:0:0/2:0:0:0' action 'add'
uevent path '/class/scsi_device/2:0:0:0' action 'add'
SCSI device attributes

No default attributes for target and device
  • Attributes are created after objects are visible in sysfs
  • Userland programs have to wait for them
  • Racy

Convert to use default attributes
scanning lifetime rules

Scanning process

- Create object for each possible target
- Create scsi_device for LUN 0
- Delete if no response
- Get number of existing luns by Inquiry or from the HBA
- Create scsi_device for each found LUN
- Delete if no response
- Delete target if no LUNs connected
Problems during scanning

No uevents for targets

• targets have no bus, hence no uevents are generated
• No fancy udev matching rules possible
• Add scsi_target to the scsi bus will solve that

But:

• Intermediate targets may be created during scanning
• Targets are created and registered with sysfs, even for intermediate targets
• False positives for uevents

Rework to not register intermediate targets
Problems during scanning

Delayed SCSI device removal

- Removal of SCSI devices has to be delayed until I/O is finished
- SCSI device has to be kept active during that time
- Scanning process might hit upon a device scheduled for removal
- Removal is not reversible, so scanning process might return a (then invalid) device

Rework to make removal reversible
Fixed event ordering

uevent '/devices/pci0000:00/0000:00:10.0/host2' action 'add'
uevent '/devices/.../host2/scsi_host/host2' action 'add'
uevent '/devices/.../host2/spi_host/host2' action 'add'
uevent '/bus/pci/drivers/mptspi' action 'add'
uevent '/devices/.../host2/target2:0:0' action 'add'
uevent '/devices/.../host2/target2:0:0/spi_transport/target2:0:0' action 'add'
uevent '/devices/.../host2/target2:0:0/2:0:0:0' action 'add'
uevent '/devices/.../host2/target2:0:0/2:0:0:0/scsi_device/2:0:0:0' action 'add'
uevent '/devices/.../host2/target2:0:0/2:0:0:0/bsg/2:0:0:0' action 'add'
Further directions
scci_target

scci_target keeps own reference counter
  • With rework reap_ref is in sync with kobj counter
  • Removal desirable

integrate device_handler framework
  • Convert device_handler to bus driver
  • Match on targets only
scsi_device

Get rid of scsi_device class
  • No information whatsoever
  • All related information can be access via scsi bus

Convert 'sg' to a proper bus driver
  • Requires multiple binding
Transport classes

Convert transport classes to buses?

• Either single bus 'transport' or per transport
• Matching provided by sysfs core
• Most of the attribute_container functionality already provided
• Might require multiple binding eventually
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