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<book id="s390drivers">
 <bookinfo>
  <title>Writing s390 channel device drivers</title>

  <authorgroup>
   <author>
    <firstname>Cornelia</firstname>
    <surname>Huck</surname>
    <affiliation>
     <address>
       <email>cornelia.huck@de.ibm.com</email>
     </address>
    </affiliation>
   </author>
  </authorgroup>

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  <chapter id="intro">
   <title>Introduction</title>
  <para>
    This document describes the interfaces available for device drivers that
    drive s390 based channel attached I/O devices. This includes interfaces for
    interaction with the hardware and interfaces for interacting with the
    common driver core. Those interfaces are provided by the s390 common I/O
    layer.
  </para>
  <para>
    The document assumes a familarity with the technical terms associated
    with the s390 channel I/O architecture. For a description of this
    architecture, please refer to the "z/Architecture: Principles of
    Operation", IBM publication no. SA22-7832.
  </para>
  <para>
    While most I/O devices on a s390 system are typically driven through the
    channel I/O mechanism described here, there are various other methods
    (like the diag interface). These are out of the scope of this document.
  </para>
  <para>
    Some additional information can also be found in the kernel source
    under Documentation/s390/driver-model.txt.
  </para>
  </chapter>
  <chapter id="ccw">
   <title>The ccw bus</title>
  <para>
        The ccw bus typically contains the majority of devices available to
        a s390 system. Named after the channel command word (ccw), the basic
        command structure used to address its devices, the ccw bus contains
        so-called channel attached devices. They are addressed via I/O
        subchannels, visible on the css bus. A device driver for
        channel-attached devices, however, will never interact  with the
        subchannel directly, but only via the I/O device on the ccw bus,
        the ccw device.
  </para>
    <sect1 id="channelIO">
     <title>I/O functions for channel-attached devices</title>
    <para>
      Some hardware structures have been translated into C structures for use
      by the common I/O layer and device drivers. For more information on
      the hardware structures represented here, please consult the Principles
      of Operation.
    </para>
!Iarch/s390/include/asm/cio.h
    </sect1>
    <sect1 id="ccwdev">
     <title>ccw devices</title>
    <para>
      Devices that want to initiate channel I/O need to attach to the ccw bus.
      Interaction with the driver core is done via the common I/O layer, which
      provides the abstractions of ccw devices and ccw device drivers.
    </para>
    <para>
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      The functions that initiate or terminate channel I/O all act upon a
      ccw device structure. Device drivers must not bypass those functions
      or strange side effects may happen.
    </para>
!Iarch/s390/include/asm/ccwdev.h
!Edrivers/s390/cio/device.c
!Edrivers/s390/cio/device_ops.c
    </sect1>
    <sect1 id="cmf">
     <title>The channel-measurement facility</title>
  <para>
        The channel-measurement facility provides a means to collect
        measurement data which is made available by the channel subsystem
        for each channel attached device.
  </para>
!Iarch/s390/include/asm/cmb.h
!Edrivers/s390/cio/cmf.c
    </sect1>
  </chapter>

  <chapter id="ccwgroup">
   <title>The ccwgroup bus</title>
  <para>
        The ccwgroup bus only contains artificial devices, created by the user.
        Many networking devices (e.g. qeth) are in fact composed of several
        ccw devices (like read, write and data channel for qeth). The
        ccwgroup bus provides a mechanism to create a meta-device which
        contains those ccw devices as slave devices and can be associated
        with the netdevice.
  </para>
   <sect1 id="ccwgroupdevices">
    <title>ccw group devices</title>
!Iarch/s390/include/asm/ccwgroup.h
!Edrivers/s390/cio/ccwgroup.c
   </sect1>
  </chapter>

  <chapter id="genericinterfaces">
   <title>Generic interfaces</title>
  <para>
        Some interfaces are available to other drivers that do not necessarily
        have anything to do with the busses described above, but still are
        indirectly using basic infrastructure in the common I/O layer.
        One example is the support for adapter interrupts.
  </para>
!Edrivers/s390/cio/airq.c
  </chapter>

</book>
```