

The s390 SCSI dump tool (zfcpdump)

System z machines (z900 or higher) provide hardware support for creating system dumps on SCSI disks. The dump process is initiated by booting a dump tool, which has to create a dump of the current (probably crashed) Linux image. In order to not overwrite memory of the crashed Linux with data of the dump tool, the hardware saves some memory plus the register sets of the boot CPU before the dump tool is loaded. There exists an SCLP hardware interface to obtain the saved memory afterwards. Currently 32 MB are saved.

This zfcpdump implementation consists of a Linux dump kernel together with a user space dump tool, which are loaded together into the saved memory region below 32 MB. zfcpdump is installed on a SCSI disk using zipl (as contained in the s390-tools package) to make the device bootable. The operator of a Linux system can then trigger a SCSI dump by booting the SCSI disk, where zfcpdump resides on.

The user space dump tool accesses the memory of the crashed system by means of the /proc/vmcore interface. This interface exports the crashed system's memory and registers in ELF core dump format. To access the memory which has been saved by the hardware SCLP requests will be created at the time the data is needed by /proc/vmcore. The tail part of the crashed systems memory which has not been stashed by hardware can just be copied from real memory.

To build a dump enabled kernel the kernel config option CONFIG_CRASH_DUMP has to be set.

To get a valid zfcpdump kernel configuration use "make zfcpdump_defconfig".

The s390 zipl tool looks for the zfcpdump kernel and optional initrd/initramfs under the following locations:

- kernel: <zfcpxdump directory>/zfcpdump.image
- ramdisk: <zfcpxdump directory>/zfcpdump.rd

The zfcpdump directory is defined in the s390-tools package.

The user space application of zfcpdump can reside in an initramfs or an initrd. It can also be included in a built-in kernel initramfs. The application reads from /proc/vmcore or zcore/mem and writes the system dump to a SCSI disk.

The s390-tools package version 1.24.0 and above builds an external zfcpdump initramfs with a user space application that writes the dump to a SCSI partition.

For more information on how to use zfcpdump refer to the s390 'Using the Dump Tools' book, which is available from IBM Knowledge Center: https://www.ibm.com/support/knowledgecenter/linuxonibm/iaaf/lrz_r_dt.html