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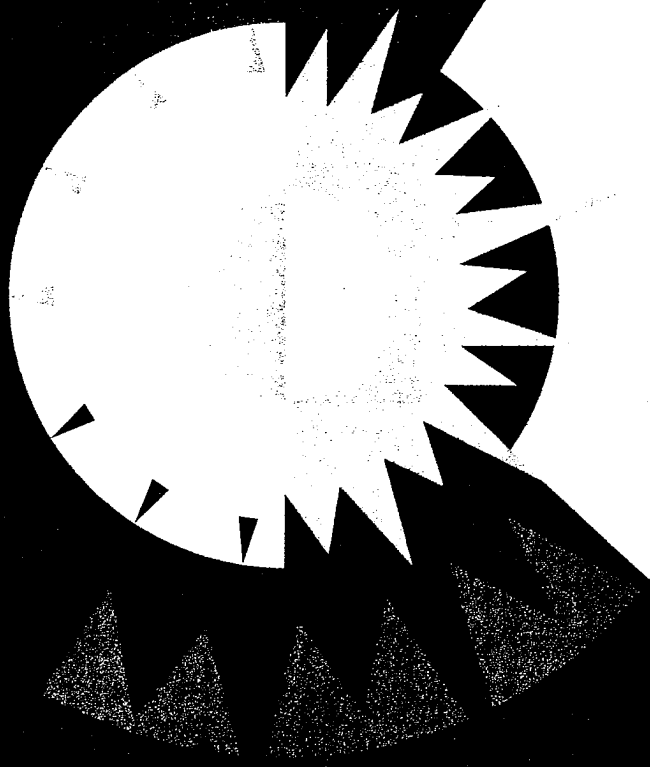

SunSoft Developer Engineering

SunSoft

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0 9 8 7 6 5 4 3 2 1

ISBN 0-13-443672-5

SunSoft Press
A Prentice Hall Title

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Preface. .

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Table 15-4 lists the valid values for *cmd*, their meanings and the type of *arg*:

Table 15-4 Valid priocntl.h cmd Values

cmd	***arg* Type**	**Function**
PC_GETCID	pcinfo_t	get class ID and attributes
PC_GETCLINFO	pcinfo_t	get class name and attributes
PC_SETPARMS	pcparms_t	set class and scheduling parameters
PC_GETPARMS	pcparms_t	get class and scheduling parameters

On success, `priocntl(2)` returns the following values:

- `PC_GETCID` returns the number of configured classes.
- `PC_GETCLINFO` returns the number of configured classes.
- `PC_SETPARMS` returns `0`.
- `PC_GETPARMS` returns the PID of the process whose scheduler properties it is returning.

On failure, `priocntl(2)` returns `-1` and sets `errno` to indicate the reason for the failure. See the man page for `priocntl(2)` for the complete list of error conditions.

The PC_GETCID and PC_GETCLINFO Commands

The `PC_GETCID` and `PC_GETCLINFO` commands retrieve scheduler parameters for a particular class based on the class ID or class name. Both commands use the following `pcinfo` structure to send arguments and receive return values:

```
typedef struct pcinfo {
    id_t pc_cid;              /* class id */
    char pc_clname[PC_CLNMSZ];    /* class name */
    long pc_clinfo[PC_CLINFOSZ]; /* class information */
} pcinfo_t;
```

The `PC_GETCID` command, given the class name, retrieves scheduler class ID and associated parameters. Some of the other `priocntl(2)` commands use the class ID to specify a scheduler class. The valid class names are `TS` for time-sharing and `RT` for realtime.

For the `RT` class, `pc_clinfo` contains an `rtinfo` structure which holds `rt_maxpri`, the maximum valid realtime priority; this value is configurable. In the default configuration, this is the highest priority any process can have. The minimum valid realtime priority is zero.

```
typedef struct rtinfo {
    short rt_maxpri;       /* maximum realtime priority */
} rtinfo_t;
```


For the TS class
maximum time
sharing end-use

```
typedef stru
    short ts
} tsinfo_t;
```

The following p
RT scheduler cl

Code Example 15-1

```
/*
 * Get sched
 */

#include <sy
#include <sy
#include <sy
#include <sy
#include <st
#include <st
#include <st
#include <er

main ()
{
    pcinfo_t
    tsinfo_t
    rtinfo_t
    short

    /* times
        (voi
        if (p
            p
            e
        }
        tsin
        maxt
        (voi
            p

    /* realt
        (voi
```

For the TS class, pc_clinfo contains a tsinfo structure which holds ts_maxupri, the maximum time-sharing end-user priority; this value is also configurable. The minimum time-sharing end-user priority is negative ts_maxupri.

```
typedef struct tsinfo {
    short ts_maxupri;  /* limits of user priority range */
} tsinfo_t;
```

The following program, getcid.c, gets and prints the range of valid priorities for the TS and RT scheduler classes.

Code Example 15-1 getcid.c Program

```
/*
 * Get scheduler class IDs and priority ranges.
 */

#include <sys/types.h>
#include <sys/priocntl.h>
#include <sys/rtpriocntl.h>
#include <sys/tspriocntl.h>
#include <stdio.h>
#include <string.h>
#include <stdlib.h>
#include <errno.h>

main ()
{
    pcinfo_t   pcinfo;
    tsinfo_t   *tsinfop;
    rtinfo_t*  rtinfop;
    short      maxtsupri, maxrtpri;

    /* timesharing */
        (void) strcpy (pcinfo.pc_clname, "TS");
        if (priocntl (0L, 0L, PC_GETCID, &pcinfo) == -1L) {
            perror ("PC_GETCID failed for timesharing class");
            exit (1);
        }
        tsinfop = (struct tsinfo *) pcinfo.pc_clinfo;
        maxtsupri = tsinfop->ts_maxupri;
        (void) printf("Timesharing: ID %ld, priority range -%d through %d\n",
            pcinfo.pc_cid, maxtsupri, maxtsupri);

    /* realtime */
        (void) strcpy(pcinfo.pc_clname, "RT");
```

Code Example 15-3 Program to Get Class Name Given Process ID (Continued)

```
            exit (3);
    }
    (void) printf("process ID %d, class %s\n", pid,
     pcinfo.pc_clname);
}
```

The PC_GETPARMS and PC_SETPARMS Commands

The PC_GETPARMS command retrieves and the PC_SETPARMS command sets scheduler parameters for processes. Both commands use the following pcparms structure to send arguments or receive return values:

```
typedef struct pcparms {
    id_t     pc_cid;                    /* process class */
    long    pc_clparms[PC_CLPARMSZ];  /* class-specific */
} pcparms_t;
```

The following function, used in an earlier program example, uses PC_GETPARMS to obtain the scheduler class ID of a process:

```
/*
 * Return scheduler class ID of process with ID pid.
 */

getclassID (pid)
    id_t        pid;
{
    pcparms_t   pcparms;

    pcparms.pc_cid = PC_CLNULL;
    if (priocntl(P_PID, pid, PC_GETPARMS, &pcparms) == -1){
        return (-1);
    }
    return (pcparms.pc_cid);
}
```

For the RT class, pc_clparms contains an rtparms structure. The rtparms structure holds scheduler parameters specific to the RT class.

```
typedef struct rtparms {
    short       rt_pri;         /* realtime priority */
    ulong   rt_tqsecs;      /* seconds in time quantum */
    long    rt_tqnsecs;     /* additional nsecs in quantum */
} rtparms_t;
```


In this structur
rt_tqnsecs i
multiple of the
nanoseconds is
gives another

For the TS clas
parameter spe

```
typedef str
    short
    short
} tsparms_t
```

In this structur
priority, and t
set for itself wi

The PC_GETPA
The return val
returned in the
arguments to
PC_CLNULL or

Table 15-5 Retur

Number Processes Se by idtype
1
More than 1

If idtype and
process, prioc
than one proce
specific criteria

- idtype anc
- idtype anc
- idtype anc

In this structure, `rt_pri` is the realtime priority, `rt_tqsecs` is the number of seconds, and `rt_tqnsecs` is the number of additional nanoseconds in a time slice rounded up to the next multiple of the system clock's resolution. The sum of `rt_tqsecs` seconds and `rt_tqnsecs` nanoseconds is the interval a process can use the CPU without sleeping before the scheduler gives another process a chance at the CPU.

For the `TS` class, `pc_clparms` contains a `tsparms` structure which holds the scheduler parameter specific to the timesharing class.

```
typedef struct tsparms {
    short   ts_uprilim;         /* user priority limit */
    short   ts_upri;            /* user priority */
} tsparms_t;
```

In this structure, `ts_upri` is the user priority, the user-controlled component of a time-sharing priority, and `ts_uprilim` is the user priority limit, the maximum user priority a process can set for itself without being super-user.

The `PC_GETPARMS` command retrieves the scheduler class and parameters of a single process. The return value of `priocntl(2)` is the process ID of the process whose parameters are returned in the `pcparms` structure. The process chosen depends on the `idtype` and `id` arguments to `priocntl(2)` and on the value of `pcparms.pc_cid`, which contains `PC_CLNULL` or a class ID returned by `PC_GETCID`.

Table 15-5 Return Values for PC_GETPARMS

Number of Processes Selected by `idtype` and `id`	`pc_cid`		
	RT class ID	**TS class ID**	**PC_CLNULL**
1	RT parameters of process selected	TS parameters of process selected	class and parameters of process selected
More than 1	RT parameters of highest priority RT process	TS parameters of process with highest user priority	(error)

If `idtype` and `id` select a single process and `pc_cid` does not conflict with the class of that process, `priocntl(2)` returns the scheduler parameters of the process. If they select more than one process in a single scheduler class, `priocntl(2)` returns parameters using class-specific criteria as shown inTable 15-5. `priocntl(2)` returns an error in the following cases:

- `idtype` and `id` select one or more processes and none is in the class specified by `pc_cid`.
- `idtype` and `id` select more than one process and `pc_cid` is `PC_CLNULL`.
- `idtype` and `id` select no processes.

RT_TQINF specifies an infinite time slice. RT_TQDEF specifies the default time slice configured for the realtime priority being set with the PC_SETPARMS call. RT_NOCHANGE specifies no change from the current time slice; this value is useful, for example, when you change process priority but do not want to change the time slice. You can also use RT_NOCHANGE in the rt_pri field to change a time slice without changing the priority.

The priocntlset(2) Function

The priocntlset(2) function changes scheduler parameters of a set of processes, just like priocntl(2). The priocntlset(2) function also has the same command set as priocntl(2); the cmd and arg input arguments are the same. But, while priocntl(2) applies to a set of processes specified by a single idtype/id pair, priocntlset(2) applies to a set of processes that results from a logical combination of two idtype/id pairs. The following is the format of the procntlset(2) function:

```
#include <sys/types.h>
#include <sys/procset.h>
#include <sys/priocntl.h>
#include <sys/rtpriocntl.h>
#include <sys/tspriocntl.h>

long priocntlset(procset_t *psp, int cmd, /* arg */);
```

The input argument psp points to a procset structure that specifies the two idtype/id pairs and the logical operation to perform. This structure is defined in procset.h.

```
typedef struct procset {
        idop_t  p_op;       /* operator connecting */
                            /* left and right sets */

        /* left set: */
        idtype_t    p_lidtype;      /* left ID type */
        id_t        p_lid;          /* left ID */

        /* right set: */
        idtype_t    p_ridtype;      /* right ID type */
        id_t        p_rid;          /* right ID */
} procset_t;
```

The p_lidtype and p_lid parameters specify the ID type and ID of one ("left") set of processes; p_ridtype and p_rid specify the ID type and ID of a second ("right") set of processes. p_op specifies the operation to perform on the two sets of processes to get the set of processes priocntlset(2) will act upon.