

Linux: File Management for DevOps

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Linux: Processes & System Resource Management for DevOps

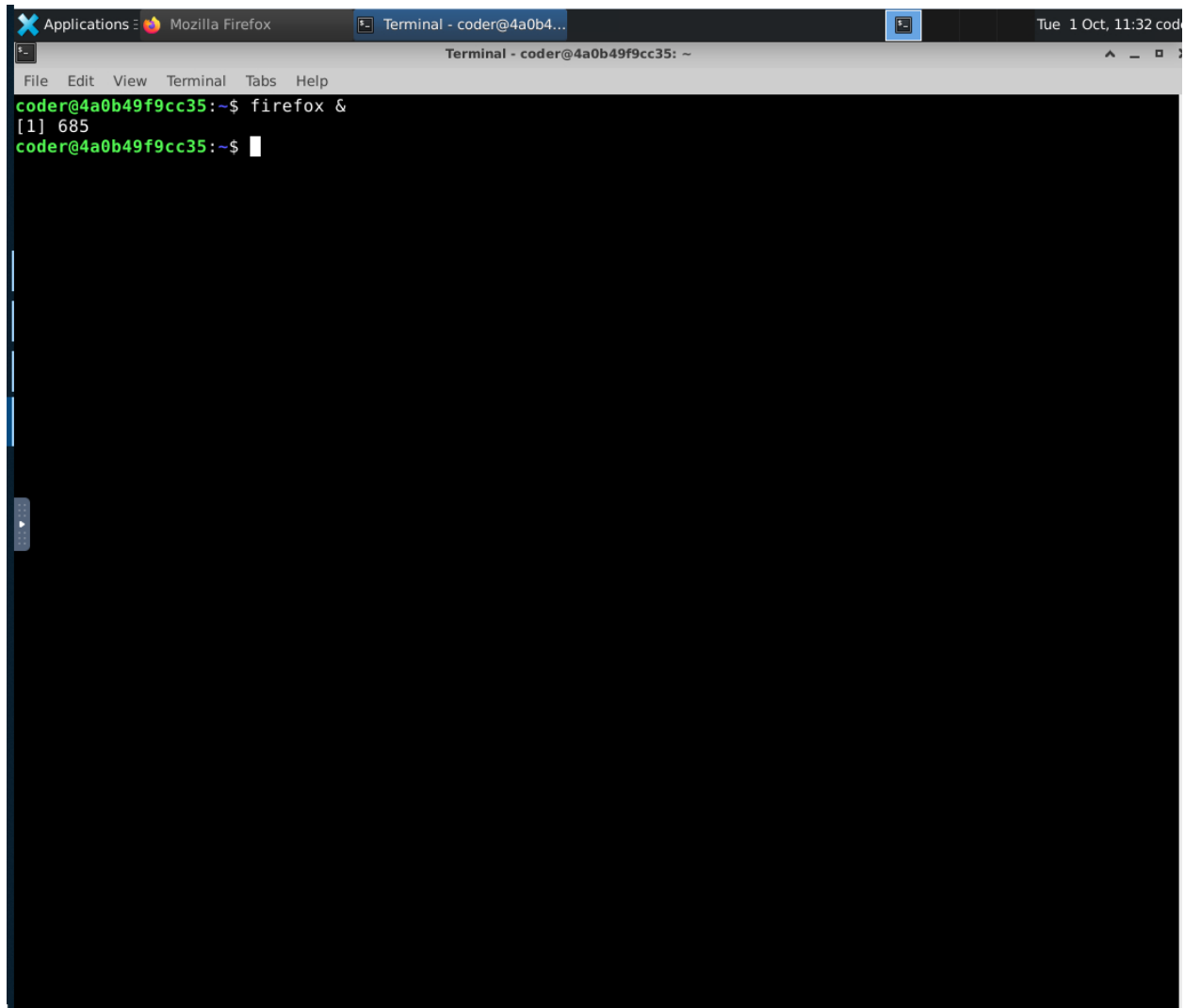
Instructor: Rudi Hinds

Due Date: 10/1/2024

Linux: File Management for DevOps

Step 1: Introduction to the course and What is a Process:

Used the terminal to open up firefox by typing in the `$ firefox &` command



The screenshot shows a Linux terminal window with a dark background. The terminal title bar reads "Terminal - coder@4a0b49f9cc35: ~". The prompt is "coder@4a0b49f9cc35:~\$". The command "firefox &" has been entered and executed. The output shows "[1] 685" on the next line, indicating the process ID of the background process. The prompt "coder@4a0b49f9cc35:~\$" is shown again on the following line. The terminal window is part of a desktop environment with other applications visible in the top bar, including "Applications", "Mozilla Firefox", and "Terminal - coder@4a0b49f9cc35: ~". The system clock in the top right corner shows "Tue 1 Oct, 11:32 cod".

```
coder@4a0b49f9cc35:~$ firefox &
[1] 685
coder@4a0b49f9cc35:~$
```

Step 2: Working with Processes (kill, pidof, sigterm, sigkill)

Learn how to search for a process by name and how to kill a process if we need to.

```

coder@4a0b49f9cc35:~$ firefox &
[1] 685
coder@4a0b49f9cc35:~$ pidof firefox
685
coder@4a0b49f9cc35:~$ ps -p 685
  PID TTY          TIME CMD
 685 pts/0    00:00:12 firefox-bin
coder@4a0b49f9cc35:~$ pidof light-locker
coder@4a0b49f9cc35:~$ pidof bash
394 16 1
coder@4a0b49f9cc35:~$

```

```

coder@4a0b49f9cc35:~$ ps -ef | grep firefox
coder      685      394  2 11:27 pts/0    00:00:12 firefox
coder      812      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -parentBuildID 20240509170740 -prefsLen 29811 -prefMapSize 241885 -appDir /opt/firefox/browser {c40c2c01-6407-4337-8894-08071013e7fa} 685 true socket
coder      864      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -childID 1 -isForBrowser -prefsLen 29952 -prefMapSize 241885 -jsInitLen 231800 -parentBuildID 20240509170740 -greomni /opt/firefox/omni.ja -appomni /opt/firefox/browser/omni.ja -appDir /opt/firefox/browser {4ce4a8bf-363a-4502-91f7-2dcf1185008c} 685 true tab
coder      917      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -childID 2 -isForBrowser -prefsLen 35537 -prefMapSize 241885 -jsInitLen 231800 -parentBuildID 20240509170740 -greomni /opt/firefox/omni.ja -appomni /opt/firefox/browser/omni.ja -appDir /opt/firefox/browser {9b239435-857d-428e-aed6-d32983326144} 685 true tab
coder      961      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -parentBuildID 20240509170740 -prefsLen 33943 -prefMapSize 241885 -appDir /opt/firefox/browser {32874156-c99c-43ae-af2f-9a1981c3958b} 685 true utility
coder      964      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -childID 3 -isForBrowser -prefsLen 30749 -prefMapSize 241885 -jsInitLen 231800 -parentBuildID 20240509170740 -greomni /opt/firefox/omni.ja -appomni /opt/firefox/browser/omni.ja -appDir /opt/firefox/browser {4006de03-642e-4699-9e00-d9582b62005f} 685 true tab
coder      966      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -childID 4 -isForBrowser -prefsLen 30749 -prefMapSize 241885 -jsInitLen 231800 -parentBuildID 20240509170740 -greomni /opt/firefox/omni.ja -appomni /opt/firefox/browser/omni.ja -appDir /opt/firefox/browser {948be308-5eb6-473b-944d-c4f8565c03e6} 685 true tab
coder      997      685  0 11:27 pts/0    00:00:00 /opt/firefox/firefox-bin -contentproc -childID 5 -isForBrowser -prefsLen 30806 -prefMapSize 241885 -jsInitLen 231800 -parentBuildID 20240509170740 -greomni /opt/firefox/omni.ja -appomni /opt/firefox/browser/omni.ja -appDir /opt/firefox/browser {d1394d45-c834-4bf5-bcbe-15b3664cec78} 685 true tab
coder      1145     394  0 11:37 pts/0    00:00:00 grep --color=auto firefox
coder@4a0b49f9cc35:~$

```

```

Applications: Mozilla Firefox Terminal - coder@4a0b4... Tue 1 Oct, 11:57 coder
Terminal - coder@4a0b49f9cc35: ~
File Edit View Terminal Tabs Help
coder@4a0b49f9cc35:~$ kill -l
1) SIGHUP      2) SIGINT      3) SIGQUIT     4) SIGILL      5) SIGTRAP
6) SIGABRT     7) SIGBUS     8) SIGFPE      9) SIGKILL     10) SIGUSR1
11) SIGSEGV    12) SIGUSR2    13) SIGPIPE     14) SIGALRM     15) SIGTERM
16) SIGSTKFLT  17) SIGCHLD   18) SIGCONT     19) SIGSTOP     20) SIGTSTP
21) SIGTTIN    22) SIGTTOU   23) SIGURG      24) SIGXCPU     25) SIGXFSZ
26) SIGVTALRM  27) SIGPROF   28) SIGWINCH    29) SIGIO       30) SIGPWR
31) SIGSYS     34) SIGRTMIN   35) SIGRTMIN+1  36) SIGRTMIN+2  37) SIGRTMIN+3
38) SIGRTMIN+4 39) SIGRTMIN+5 40) SIGRTMIN+6 41) SIGRTMIN+7 42) SIGRTMIN+8
43) SIGRTMIN+9 44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9 56) SIGRTMAX-8 57) SIGRTMAX-7
58) SIGRTMAX-6 59) SIGRTMAX-5 60) SIGRTMAX-4 61) SIGRTMAX-3 62) SIGRTMAX-2
63) SIGRTMAX-1 64) SIGRTMAX
coder@4a0b49f9cc35:~$

```

```

Applications: Mozilla Firefox Terminal - coder@4a0b4... Tue 1 Oct, 11:58 coder
Terminal - coder@4a0b49f9cc35: ~
File Edit View Terminal Tabs Help
coder@4a0b49f9cc35:~$ kill -l
1) SIGHUP      2) SIGINT      3) SIGQUIT     4) SIGILL      5) SIGTRAP
6) SIGABRT     7) SIGBUS     8) SIGFPE      9) SIGKILL     10) SIGUSR1
11) SIGSEGV    12) SIGUSR2    13) SIGPIPE     14) SIGALRM     15) SIGTERM
16) SIGSTKFLT  17) SIGCHLD   18) SIGCONT     19) SIGSTOP     20) SIGTSTP
21) SIGTTIN    22) SIGTTOU   23) SIGURG      24) SIGXCPU     25) SIGXFSZ
26) SIGVTALRM  27) SIGPROF   28) SIGWINCH    29) SIGIO       30) SIGPWR
31) SIGSYS     34) SIGRTMIN   35) SIGRTMIN+1  36) SIGRTMIN+2  37) SIGRTMIN+3
38) SIGRTMIN+4 39) SIGRTMIN+5 40) SIGRTMIN+6 41) SIGRTMIN+7 42) SIGRTMIN+8
43) SIGRTMIN+9 44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9 56) SIGRTMAX-8 57) SIGRTMAX-7
58) SIGRTMAX-6 59) SIGRTMAX-5 60) SIGRTMAX-4 61) SIGRTMAX-3 62) SIGRTMAX-2
63) SIGRTMAX-1 64) SIGRTMAX
coder@4a0b49f9cc35:~$ pidof firefox
685
coder@4a0b49f9cc35:~$ kill -9 685

```

```

Applications: Terminal - coder@4a0b4... Tue 1 Oct, 11:59 coder
Terminal - coder@4a0b49f9cc35: ~
File Edit View Terminal Tabs Help
coder@4a0b49f9cc35:~$ kill -l
1) SIGHUP      2) SIGINT      3) SIGQUIT     4) SIGILL      5) SIGTRAP
6) SIGABRT     7) SIGBUS     8) SIGFPE      9) SIGKILL     10) SIGUSR1
11) SIGSEGV    12) SIGUSR2    13) SIGPIPE     14) SIGALRM     15) SIGTERM
16) SIGSTKFLT  17) SIGCHLD   18) SIGCONT     19) SIGSTOP     20) SIGTSTP
21) SIGTTIN    22) SIGTTOU   23) SIGURG      24) SIGXCPU     25) SIGXFSZ
26) SIGVTALRM  27) SIGPROF   28) SIGWINCH    29) SIGIO       30) SIGPWR
31) SIGSYS     34) SIGRTMIN   35) SIGRTMIN+1  36) SIGRTMIN+2  37) SIGRTMIN+3
38) SIGRTMIN+4 39) SIGRTMIN+5 40) SIGRTMIN+6 41) SIGRTMIN+7 42) SIGRTMIN+8
43) SIGRTMIN+9 44) SIGRTMIN+10 45) SIGRTMIN+11 46) SIGRTMIN+12 47) SIGRTMIN+13
48) SIGRTMIN+14 49) SIGRTMIN+15 50) SIGRTMAX-14 51) SIGRTMAX-13 52) SIGRTMAX-12
53) SIGRTMAX-11 54) SIGRTMAX-10 55) SIGRTMAX-9 56) SIGRTMAX-8 57) SIGRTMAX-7
58) SIGRTMAX-6 59) SIGRTMAX-5 60) SIGRTMAX-4 61) SIGRTMAX-3 62) SIGRTMAX-2
63) SIGRTMAX-1 64) SIGRTMAX
coder@4a0b49f9cc35:~$ pidof firefox
685
coder@4a0b49f9cc35:~$ kill -9 685
coder@4a0b49f9cc35:~$ Exiting due to channel error.
Exiting due to channel error.
Exiting due to channel error.
Exiting due to channel error.

[1]+  Killed                  firefox
coder@4a0b49f9cc35:~$

```

Step 3: Working with the Process Hierarchy

```

coder@4a0b49f9cc35:~$ ls -l /sbin/init
lrwxrwxrwx 1 root root 20 Nov 21 2023 /sbin/init -> /lib/systemd/systemd
coder@4a0b49f9cc35:~$ ps -ef | grep init
coder      354      1  0 11:25 ?        00:00:00 /bin/sh /initscripts-ro/run-as-coder.sh
coder     1297    394  0 12:31 pts/0    00:00:00 grep --color=auto init
coder@4a0b49f9cc35:~$

```

Step 4: Managing Process Resource Consumption:

Using the top command

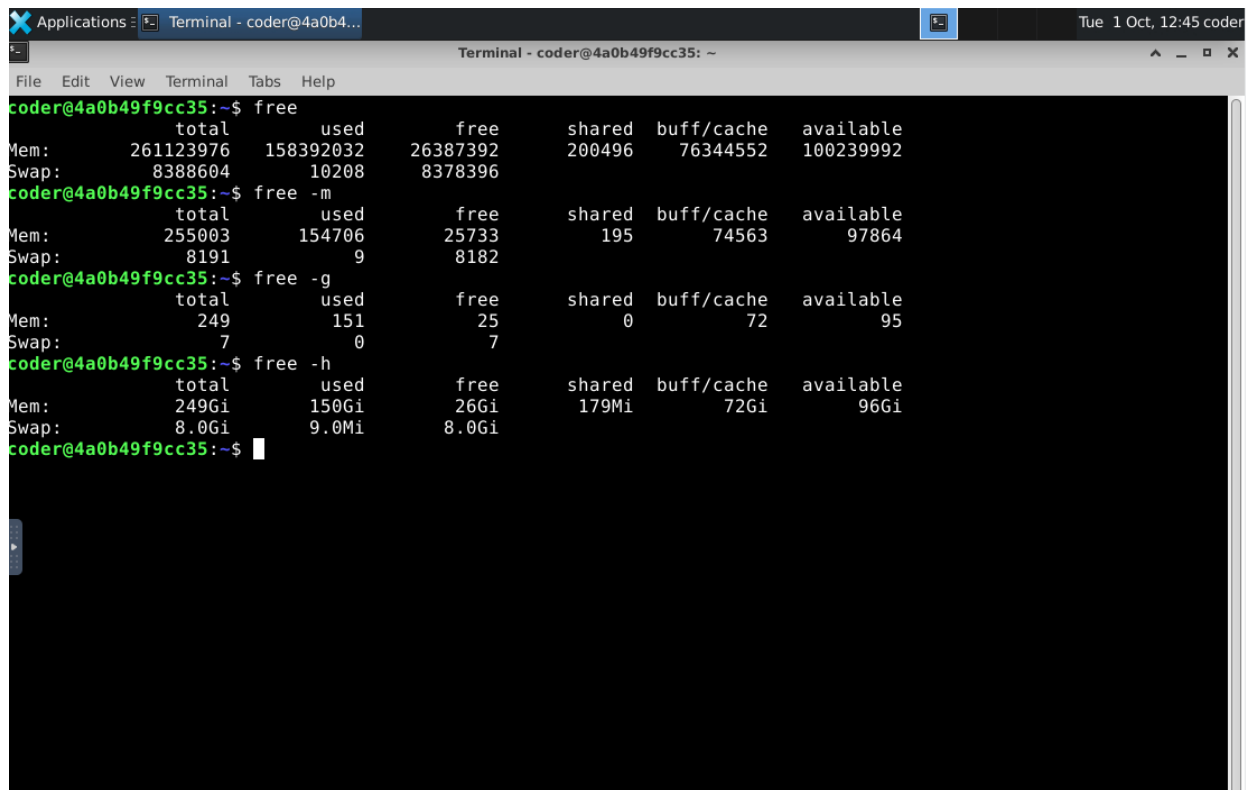
```

top - 12:40:10 up 60 days, 20:37, 0 users, load average: 2.68, 3.81, 3.84
Tasks: 62 total, 1 running, 61 sleeping, 0 stopped, 0 zombie
%Cpu(s): 4.1 us, 3.9 sy, 0.0 ni, 92.0 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 255003.9 total, 27175.1 free, 153797.9 used, 74030.8 buff/cache
MiB Swap: 8192.0 total, 8182.0 free, 10.0 used, 98761.2 avail Mem

  PID USER      PR  NI   VIRT    RES    SHR  S  %CPU  %MEM    TIME+  COMMAND
 1319 coder     20   0 3005268 298092 112384 S   4.3   0.1   0:18.97 firefox-bin
    39 coder     20   0 168436   88896 24156 S   3.7   0.0   0:08.70 Xvnc
 1500 coder     20   0 2447584 88896 67976 S   1.3   0.0   0:02.12 Isolated Web Co
   477 coder     20   0 5336404 61064 40192 S   0.7   0.0   0:01.08 xfwm4
 1316 coder     20   0 1138772 24164 4608 S   0.7   0.0   0:00.24 python3
 1698 coder     20   0 10324    2560 2048 R   0.3   0.0   0:00.01 top
    1 root       20   0 7372     2048 1792 S   0.0   0.0   0:00.08 vnc_startup.sh
   16 coder     20   0 7504     2048 1792 S   0.0   0.0   0:00.00 bash
   25 coder     20   0 1136352 28416 9472 S   0.0   0.0   0:00.99 python3
   80 coder     20   0 453052 46768 29952 S   0.0   0.0   0:00.27 xfce4-session
   89 coder     20   0 453036 47424 30208 S   0.0   0.0   0:00.32 xfce4-session
  108 coder     20   0 8172     1544 1280 S   0.0   0.0   0:00.00 dbus-launch
  109 coder     20   0 8428     2048 1792 S   0.0   0.0   0:00.00 dbus-daemon
  138 coder     20   0 8172     1800 1536 S   0.0   0.0   0:00.00 dbus-launch
  139 coder     20   0 8548     2048 1792 S   0.0   0.0   0:00.02 dbus-daemon
  151 coder     20   0 7980     1532 512 S   0.0   0.0   0:00.00 ssh-agent
  162 coder     20   0 8172     1544 1280 S   0.0   0.0   0:00.00 dbus-launch
  163 coder     20   0 8572     2048 1792 S   0.0   0.0   0:00.06 dbus-daemon
  167 coder     20   0 309476 4864 4352 S   0.0   0.0   0:00.00 at-spi-bus-laun
  177 coder     20   0 8300     2560 2304 S   0.0   0.0   0:00.00 dbus-daemon
  184 coder     20   0 231008 3840 3328 S   0.0   0.0   0:00.12 xfconfd
  185 coder     20   0 231004 3840 3328 S   0.0   0.0   0:00.03 xfconfd
  195 coder     20   0 162796 5376 4608 S   0.0   0.0   0:00.02 at-spi2-registr
  197 coder     20   0 226124 18432 11264 S   0.0   0.0   0:00.14 xfce4-screensav
  199 coder     20   0 226124 17588 10752 S   0.0   0.0   0:00.14 xfce4-screensav
  205 coder     20   0 309476 4864 4352 S   0.0   0.0   0:00.00 at-spi-bus-laun
  210 coder     20   0 8432     2816 2560 S   0.0   0.0   0:00.01 dbus-daemon
  214 coder     20   0 237916 4608 4096 S   0.0   0.0   0:00.00 gvfsd
  217 coder     20   0 238020 4864 4352 S   0.0   0.0   0:00.00 gvfsd
  228 coder     20   0 162796 5120 4608 S   0.0   0.0   0:00.02 at-spi2-registr
  238 coder     20   0 7980     1532 512 S   0.0   0.0   0:00.00 ssh-agent
  247 coder     20   0 7664     1280 1024 S   0.0   0.0   0:00.00 gpg-agent
  263 coder     20   0 227104 19480 12288 S   0.0   0.0   0:00.18 xfsettingsd
  331 coder     20   0 220956 13568 11264 S   0.0   0.0   0:00.07 xfsettingsd
  338 coder     20   0 338900 17408 11008 S   0.0   0.0   0:00.08 Thunar
  344 coder     20   0 538344 51096 31520 S   0.0   0.0   0:00.93 xfdesktop
  354 coder     20   0 2892     1024 1024 S   0.0   0.0   0:00.00 sh
  358 coder     20   0 457844 25088 16896 S   0.0   0.0   0:01.04 xfce4-terminal

```

Step 5: Using the free command to understand available memory



The screenshot shows a terminal window with the following commands and their outputs:

```
coder@4a0b49f9cc35:~$ free
              total        used        free      shared  buff/cache   available
Mem:      261123976    158392032    26387392      200496     76344552    100239992
Swap:      8388604         10208     8378396

coder@4a0b49f9cc35:~$ free -m
              total        used        free      shared  buff/cache   available
Mem:         255003     154706     25733        195     74563      97864
Swap:         8191           9      8182

coder@4a0b49f9cc35:~$ free -g
              total        used        free      shared  buff/cache   available
Mem:           249         151          25           0           72           95
Swap:            7           0           7

coder@4a0b49f9cc35:~$ free -h
              total        used        free      shared  buff/cache   available
Mem:         249Gi       150Gi       26Gi       179Mi       72Gi       96Gi
Swap:         8.0Gi        9.0Mi       8.0Gi
```

Reference:

Coursera | Online Courses & Credentials From Top Educators. Join for Free | Coursera.
(2018). Coursera. <https://www.coursera.org/learn/linux-processes-and-system-resource-management-for-devops/home/info>