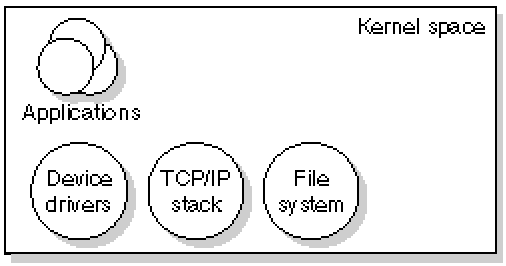
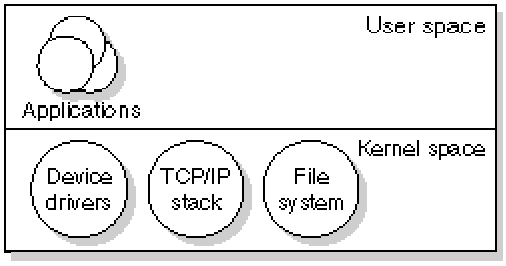
The Operating System

"QNX Neutrino is a microkernel operating system that makes fault-resilient, field-upgradable systems much easier to design and implement. QNX Neutrino also offers unprecedented scalability: Developers can build their applications once, then distribute them on a single processor, across a massive cluster of processors, or on an SMP system - all without special coding. QNX Neutrino represents the latest generation of QNX OS technology, and is the product of more than 20 years' experience in the embedded market."

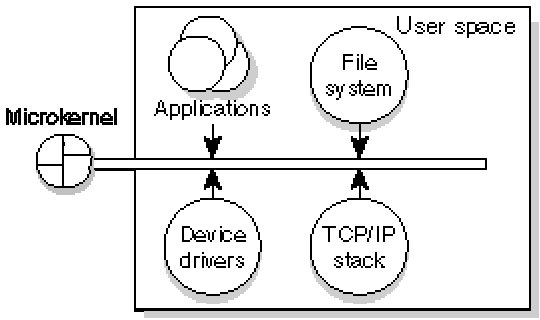
A conventional executive



A monolithic OS



A microkernel



QNX Software System Corporation. *QNX Neutrino Realtime Operating System*. System Architecture. 2002.

QNX Software System Corporation. *QNX Neutrino Realtime Operating System*. Programmer's Guide. 2002.

QNX Software System Corporation. *QNX Neutrino Realtime Operating System*. Building Embedded Systems. 2002.

Making an Image

A minimum buildfile.

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] .script = {
    display_msg "Hello"
}
```

Simple case in which one or more programs need to be used.

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] .script = {
    devc-tcon &
    reopen /dev/con1
    [+session] esh
}
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
libc.so
[data=copy]
devc-tcon
esh
ls
cat
sin
pidin
```

Instead of devc-tcon, devc-con can be used. This full console driver offers several consoles.

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] startup-script = {
      devc-con -n9 &
      reopen /dev/con1
      [+session] sh &
      reopen /dev/con2
      [+session] sh &
      reopen /dev/con3
      [+session] sh &
      reopen /dev/con4
      [+session] sh &
      reopen /dev/con5
      [+session] sh &
      reopen /dev/con6
      [+session] sh &
      reopen /dev/con7
      [+session] sh &
      reopen /dev/con8
      [+session] sh &
      reopen /dev/con9
      [+session] sh &
}
[type=link] /tmp=/dev/shmem
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
libc.so
[data=c]
devc-con
sh
ls
cat
pidin
shutdown
```

The next step can be introducing the network

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] startup-script = {
    devc-tcon &
    seedres
    pci-bios &
    waitfor /dev/pci
    io-net -d el900 -p ttcpip if=en0:150.0.1.44:255.255.255.0
        default=150.0.1.3
    reopen /dev/con1
    [+session] sh &
}
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
devn-el900.so
libc.so
libsocket.so
npm-ttcpip.so
[data=copy]
devc-con
io-net
pci-bios
seedres
sh
cat
ls
ftp
ping
telnet
```

A buildfile for accessing the floppy disk

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] startup-script = {
    seedres
    pci-bios &
    waitfor /dev/pci
    devb-fdc cam quite disk name=fd blk
        automount=fd0:/:qnx4,cache=64k
    devc-tcon &
    reopen /dev/con1
    [+session] sh
}
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
cam-disk.so
fs-qnx4.so
io-blk.so
libc.so
libcam.so
[data=copy]
devb-fdc
devc-tcon
pci-bios
seedres
sh
...
```

A buildfile for accessing the hard disk

```
[virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] startup-script = {
    seedres
    pci-bios &
    waitfor /dev/pci
    devb-eide cam quite blk automount=hd0t77:/:qnx4
    devc-tcon &
    reopen /dev/con1
    [+session] sh
}
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
cam-disk.so
fs-qnx4.so
io-blk.so
libc.so
libcam.so
[data=copy]
devb-eide
devc-tcon
pci-bios
seedres
sh
...
```

Using Forth as a working environment

```
 [virtual=x86,bios +compress] .bootstrap = {
    startup-bios -s 64k
    PATH=/proc/boot procnto
}
[+script] .script = {
    devc-tcon &
    waitfor /dev/con1
    forth
}
[type=link] /usr/lib/ldqnx.so.2=/proc/boot/libc.so
libc.so
devc-tcon
forth
```

```
Offset     Size  Name
     0      400  *.boot
   400      100  Startup-header flags1=0xd flags2=0 paddr_bias=0
   500     a008  startup.*
  a508       5c  Image-header mountpoint=/
  a564      198  Image-directory
  ----     ----  Root-dirent
  ----       12  usr/lib/ldqnx.so.2 -> /proc/boot/libc.so
  a6fc       44  proc/boot/.script
  b000    36368  proc/boot/procnto
 42000    4d000  proc/boot/libc.so.2
  ----        9  proc/boot/libc.so -> libc.so.2
 8f000     9000  proc/boot/devc-tcon
 98000     6000  proc/boot/forth
Checksums: image=0x2ed0254f startup=0xa104f52d
```