FQA 3 – Hardware

3.1 – Selecting Hardware

Selecting appropriate hardware to run your 9front system on is important, as it can mean the difference between success and failure of a project. Fortunately, most common PC hardware is at least minimally functional in Plan 9 (excluding certain exotic audio, VGA, and WiFi devices). Nowadays, thanks to 9boot(8), realemu(8), and the VESA driver, it is at least very likely that your PC will boot. In addition, most popular virtualization platforms are reasonably well supported.

Check FQA 3.2 – Known Working Hardware as well as the various supported hardware pages on the Bell Labs Plan 9 wiki to help determine if your hardware or VM is supported.

3.2 – Known Working Hardware

This list adds to the various supported hardware pages on the Plan 9 from Bell Labs wiki. Note: NONE of these lists are all-inclusive. Some drivers listed on the Bell Labs wiki have not been tested by 9front developers. The following list consists of hardware, 1.) that we have actually used, or 2.) about which we have received reliable reports from users.

Some drivers and their options are also documented in plan9.ini(8).

Read: FQA 1.3.1.2 – New Hardware Support for information about hardware drivers that are new in 9front.
3.2.0 – Input Devices

3.2.0.1 – Mice

Almost any PS/2 or USB mouse is going to work. The following are preferred for use with Plan 9.

3.2.0.1.1 – IBM/Lenovo

**N700 Wireless/Bluetooth, 3 button Mouse and Laser Pointer**

- Part Number: 888015450
- DPI: 1200
- "Just works" with USB receiver. No additional driver required.
ScrollPoint Optical Mouse, 3 button, USB/PS2

Part Number: 31P7405
DPI: 800

3.2.0.2 – Keyboards

Almost any AT, PS/2, or USB keyboard is going to work. The following are preferred for use with Plan 9.
3.2.0.2.1 – IBM/Lenovo

**IBM Model M 1391401**
Part Number: 1391401

**IBM UltraNav SK−8835**
Part Number: SK−8835
3.2.1 – **Audio** Audio support is much improved in 9front, with added support for AC97, Intel HDA, and (hal) Soundblaster 16.

![Sound Blaster](image_url)

**AMD FCH Azalia Controller**
vid/did: 1022/780d

**Intel 888 Microsoft UAA bus for HD audio**
vid/did: 8086/284b

**Intel 82801CA/CAM AC97**
vid/did: 8086/2485

**Intel 82801 DB DBM/DA AC 97**
vid/did: 8086/24c5

**Intel 486486 82801IB/IR/IH HD Audio**
vid/did: 8086/293e

**Intel Gemeni Lake**
vid/did 8086/3198
Intel HD NM10/ICH7
vid/did: 8086/27d8

Intel HD 6 Series/C200 Series
vid/did: 8086/1c20

Intel HD 7 Series/C210 Series
vid/did: 8086/1e20

3.2.2 – Graphics Many video cards for which there exists no native VGA driver can be made to work with the generic VESA driver. Examples are provided below.

3.2.2.1 – AGP

NVidia GeForce FX 5200 128MB VGA output
vid/did: 10de/0322
monitor=vesa vgasize=1600x1200x32
monitor=dellst2210 vgasize=1920x1080x32

NVidia GeForce FX 5700
vid/did: 10de/0341
monitor=vesa vgasize=1600x1200x32
monitor=dellst2210 vgasize=1920x1080x32
3.2.2.2 – Integrated

**ATI Mobility Radeon 7500 128MB DVI/VGA output**
  vid/did: 1002/4c57
  monitor=vesa vgasize=1024x768x32

**ATI Mobility Radeon FireGL V3200/X600**
  vid/did: 1002/3154
  monitor=vesa vgasize=1600x1200x32

**ATI RS880**
  monitor=vesa vgasize=1280x1024x32

**ATI X1300**

**Intel Mobile 945GM/GMS/GME, 943/940GML Express**
  vid/did: 8086/27a6
  monitor=vesa vgasize=1400x1050x32
  monitor=x60t vgasize=1400x1050x32

**Intel X3100/GM965/PM965/GL960**
  vid/did: 8086/2a03
  monitor=vesa vgasize=1680x1050x32

**Intel Mobile Intel 4 Series 4500MHD**
  vid/did: 8086/2a42, 8086/2a43
  monitor=vesa vgasize=1440x900x32
  monitor=x301 vgasize=1440x900x32

**Intel HD 3rd Gen Core processor Graphics Controller**
  vid/did: 8086/0166
  monitor=vesa vgasize=1366x768x32
  monitor=x230 vgasize=1366x768x32

**NVIDIA GeForce FX Go5200 64M**
  vid/did: 10de/0324
  monitor=cinema vgasize=1152x768x32
S3 SuperSavage IX/C 16MB
vid/did: 5333/8c2e
monitor=t23 vgasize=1024x768x32
monitor=vesa vgasize=1024x768x32

3.2.2.3 – PCI Express

NVidia GeForce 6200 AGB
vid/did: 10de/0220

NVidia GeForce 6200 LE
vid/did: 10de/0163
monitor=e228wfp vgasize=1680x1050x32

NVidia GeForce 8400 GS
vid/did: 10de/0422
monitor=vesa vgasize=1680x1050x32

NVidia GeForce 8600 GT
vid/did: 10de/0402
monitor=vesa vgasize=1600x1200x32

NVidia GeForce GTX 550
vid/did: 10de/0bee
monitor=vesa vgasize=1600x1200x32

3.2.3 – Networking

3.2.3.1 – Ethernet

Ethernet is well supported across many vendors and chipsets. 9front introduces a "medium-to-low quality" driver for Broadcom BCM57xx cards, previously unsupported by Plan 9.

3.2.3.1.1 – Integrated

Broadcom BCM5751M NetXtreme Gigabit
vid/did: 14e4/167d
tested 100/1000 mbps
Broadcom BCM5755/5780 NetXtreme Gigabit
   vid/did: 14e4/167b
   tested 100/1000 mbps

Broadcom BCM5782 NetXtreme Gigabit
   vid/did: 14e4/1696

Intel X553/X550−AT 10GBASE−T
   vid/did: 8086/15c8

Intel 82540EP Gigabit
   vid/did: 8086/101e
   tested 100/1000 mbps

Intel 82562ET
   tested 10/100 mbps

Intel 82566MM Gigabit
   vid/did: 8086/1049
   tested 100/1000 mbps

Intel 82567LM 82567LM−2 Gigabit
   vid/did: 8086/10f5
   tested 100/1000 mbps

Intel 82573L Gigabit
   vid/did: 8086/109a
   tested: 100/1000 mbps

Intel 82579LM Gigabit
   vid/did: 8086/1502
   tested: 100/1000 mbps

Intel 82801CAM PRO/100 VE
   vid/did: 8086/1031
   tested 10/100 mbps
Realtek RTL8139
vid/did: 10ec/8139
tested 10/100/1000 mbps

Realtek RTL8169/RTL8101E/RTL8102E
vid/did: 10ec/8136
tested 10/100/1000 mbps

3.2.3.1.2 – USB

Beceem Communications CLEAR Stick
vid/did 198f:8160
This is a WiMAX device that appears as a USB CDC Ethernet device
Works with nusb/ether

RNDIS
Android phones should work
Works with nusb/ether

3.2.3.1.3 – PCMCIA

3Com 3c589c
Set the following in plan9.ini: irq=3 port=0x300

3.2.3.2 – WiFi

9front adds support for several WiFi adapters from Ralink and Intel, as well as support for WPA and WPA2.
Read: wpa(8), and plan9.ini(8)

3.2.3.2.1 – Bridge (external)

Iogear GWU627
802.11n
connect ethernet port to GWU627
HTTP management interface requires Javascript. Managed to program it using Inferno's charon browser, which supports ecmaScript 1.0.
Vonets VAP11G
  802.11g
  connect ethernet port to VAP11G
  Requires a proprietary Windows program (ships with the device) to program its settings before using it for the first time.

3.2.3.2.2 – Mini–PCI

Actiontec 800MIP
  802.11b
  often branded Lucent WaveLAN
  ether0=type=wavelanpci ssid=MESH station=T42 irq=11

Ralink RT2860 802.11b

3.2.3.2.3 – Mini–PCI Express

Intel Centrino Advanced–N 6205 Taylor Peak (iwl–6005)
  vid/did: 8086/0085
  802.11g
  ether0=type=iwl essid=MESH

Intel Centrino Ultimate–N (iwl–6000)
  802.11g
  ether0=type=iwl essid=MESH

Intel Centrino Wireless–N 100
  802.11g
  ether0=type=iwl essid=MESH

Intel Centrino Wireless–N 2230
  802.11g
  ether0=type=iwl essid=MESH

Intel PRO Wireless 3945ABG (wpi–3945abg)
  802.11g
  ether0=type=wpi essid=MESH
Intel WiFi Link 1000/4965/5100/5300/5350 AGN
  802.11g
  ether0=type=iwl  essid=MESH

Ralink RT3090
  802.11g

3.2.3.2.4 – PCI

Ralink RT3090
  802.11b

3.2.3.2.5 – PCMCIA

Linksys WPC11
  802.11b
  Prism 2.5
  ISL37300P
  RevA

Lucent WaveLAN PC24E–H–FC
  802.11b
  ether0=type=wavelan  essid=MESH  crypt=off  station=x61  irq=11

3.2.4 – Tablet Digitizers

Support for Wacom serial tablets was added in 2012. The touchscreen digitizers in some Lenovo ThinkPads (notably, the X230) also seem to function without need of any drivers (presumably, controlled by the BIOS).

3.2.4.1 – Serial

3.2.4.1.1 – Integrated

Wacom WACF004
  ThinkPad X4* series tablets

  To enable the tablet’s serial port in plan9.ini:
  uart2=type=isa  port=0x200  irq=5

To turn on the tablet:
aux/wacom; aux/tablet &

Wacom WACF008
ThinkPad X6+ series tablets

To enable the tablet’s serial port in plan9.ini:
uart2=type=isa port=0x200 irq=5

To turn on the tablet:
aux/wacom; aux/tablet &

3.2.5 – Laptops

3.2.5.1 – Acer

Aspire 5100 (donated by some poor kid)
cpu: 1795MHz AuthenticAMD AMD–K8, works
ethernet: rtl8139 100Mbps, works
keyboard and touchpad, works
graphics: RS482M ATI RADEON Xpress Series,
monitor=vesa vgasize=1024x768x32 (native resolution not in VESA BIOS); radeon driver untested
wifi: Atheros AR5005G, does not work
audio: SB450 High Definition Audio Controller
3.2.5.2 – IBM/Lenovo

3.2.5.2.1 – ThinkPad ThinkPads are the best supported laptops in 9front because ThinkPads are what the developers use.

380D

2635–3AU

cpu: cpu0: 152MHz GenuineIntel P55C MMX (AX 00000543 CX 00000000 DX 008001BF)

graphics: Neomagic MagicGraph 128ZV

monitor=vga vgasize=800x600x16
ethernet: 3Com 3C589 PCMCIA, works

G50

nnnn–nnn
  cpu: 2394MHz GenuineIntel P6, cpuid: AX 00040651 CX 77DAFBFF DX BFEFBFF
  graphics: Intel Corporation Haswell–ULT Integrated Graphics Controller,
  realemu(8) monitor=vesa vgasize=1366x768x32
  ethernet: Realtek Semiconductor Co., Ltd. RTL8111/8168/8411 PCI Express Gigabit Ethernet Controller, works
  audio: Intel Corporation Haswell–ULT HD Audio Controller, works
  usb: Intel Corporation 8 Series USB EHCl #1, works

R400

7439–1DG
  cpu: 2527MHz GenuineIntel Core 2/Xeon, cpuid: AX 0x10676 CX 0x8E3FD DX 0xBFEFBFF
  graphics: Mobile Intel GM45 Express/4500MHD,
  realemu(8) monitor=vesa vgasize=1440x900x32
  ethernet: Intel 82567LM 82567LM–2 Gigabit (10/100/1000), works
  wifi: Intel Wifi Link 5100 AGN  Mini–PCI Express, works
  disk controller: Intel ICH9M/ME ICH9M/ME AHCI, works
  dvd: MATSHITADVD–RAM UJ870A SB04 HE34 068E34 068597, works
  audio: Intel 486486 82801IB/IR/IH HD Audio, works
  usb: works
  mp: mp + sata, ethernet works with *acpi=1
T23

2647–HSU

cpu: Intel Mobile Pentium III–M 866 MHz, 1.2 GHz
graphics: S3 SuperSavage IX/C 16MB, VGA 1024x768x32,
realemu(8) monitor=vesa vgasize=1024x768x32
ethernet: Intel 82801CAM PRO/100 VE or Intel 82562ET (10/100), works
wifi: Actiontec 800MIP (branded Lucent WaveLAN) Mini–PCI, works
audio: AC97, works

T42

2373–BK4

cpu: Intel Pentium M (Dothan) 1.7 GHz
graphics: ATI Mobility Radeon 7500 32MB,
realemu(8) monitor=vesa vgasize=1024x768x32
ethernet: Intel Gigabit Ethernet (10/100/1000), works
wifi: IBM 11a/b/g Mini–PCI, does not work; replaced with Actiontec 800MIP
(branded Lucent WaveLAN) Mini–PCI, works
disk controller: 82801DBM (ICH4–M), IDE DMA works
audio: AC97, works

T43p

2669–A92

cpu: Intel Pentium M (Dothan) 2.0 GHz (cpuid: AX 0x06D8 CX 0x0180 DX 0xAFE9FBFF)
graphics: ATI Mobility Radeon FireGL V3200/X600,
realemu(8) monitor=vesa vgasize=1600x1000x32 with internal LCD
ethernet: Broadcom BCM5751M (10/100/1000), works
wifi: replaced with Vonets VAP11G, works
disk controller: Intel 82801FBM SATA AHCI (ICH6–M): untested
usb: works
scram works with *acpi=1
mouse button 2 works with trackpad disabled in BIOS

T60p

2007–94U

cpu: Intel Core Duo (Yonah) 2.16GHz (cpuid: AX 0x06E8 CX 0xC1A9 DX 0xBFE9FBFF)
graphics: ATI MOBILITY FireGL V5200
realemu(8) monitor=vesa vgasize=1600x1200x32 with internal LCD
audio: Intel BA101897 IDT High Definition, untested
ethernet: Intel 82573L Intel PRO/1000 PL (10/100/1000), works
wifi: Intel PRO Wireless 3945ABG (wpi–3945abg), may work now with wpi driver
disk controller: Intel 82801GB/GBM PATA100, 82801GB/GHM AHCI, works
usb: works
mp: mp + sata, ethernet, usb works with *acpi=
mouse button 2 works with trackpad disabled in BIOS

T61

7659–CTO

cpu: Intel Core 2 Duo (Merom) 2.0 GHz FSB, 2–4MB L2 Cache CPU  
graphics: Intel GMA X3100,  
realemu(8) monitor=vesa vgasize=1280x800x32 with internal LCD; monitor=vesa vgasize=1680x1050x32 with VGA or Mini Doc DVI output and external monitor  
ethernet: Intel 82566MM (10/100/1000), works  
wifi: Intel Wireless WiFi Link 4965 AGN Mini–PCI Express, should work with iwL driver  
disk controller: Intel 82801HBM/HEM PATA, Intel 82801HBM SATA AHCI (ICH8–M): IDE DMA works, SATA works  
usb: works  
mp: mp + sata, ethernet, usb works with *acpi=  
mouse button 2 works with trackpad disabled in BIOS

7661–12U

cpu: Intel Core 2 Duo (Merom) 2.0 GHz FSB, 2–4MB L2 Cache CPU  
graphics: Intel GMA X3100,  
realemu(8) monitor=vesa vgasize=1280x800x32 with internal LCD; monitor=vesa vgasize=1680x1050x32 with VGA or Mini Doc DVI output and external monitor  
ethernet: Intel 82566MM (10/100/1000), works  
wifi: Intel PRO Wireless 3945ABG (wpi–3945abg), may now work with wpi driver; replaced with Wavelan PC24E–H–FC PCMCIA, works  
disk controller: Intel 82801HBM/HEM PATA, Intel 82801HBM SATA AHCI (ICH8–M): IDE DMA works, SATA works  
usb: works  
mp: mp + sata, ethernet, usb works with *acpi=  
mouse button 2 works with trackpad disabled in BIOS

T400

6475–EC7

cpu: 2261MHz GenuinelIntel Core 2/Xeon (cpuid: AX 0x10676 CX 0x8E3FD DX 0x8FEBFBFF)  
graphics: Intel Corporation Mobile 4 Series,  
realemu(8) monitor=vesa vgasize=1440x900x32 with internal LCD  
ethernet: i82567: 1000Mbps, works  
wifi: Intel WiFi Link 5100 AGN Mini–PCI Express, works  
disk controller: Intel ICH9M/ME AHCI, works  
audio: Intel HDA, should work
T410i

2518–4QG
  cpu: Intel(R) Core(TM) i5 CPU M 430 @ 2.27GHz
  graphics: Intel Graphics Media Accelerator HD,
  realemu(8) monitor=vesa vgasize=1280x800x32 with internal LCD
  ethernet: Intel 82577LM Gigabit, works
  wifi: unknown, reportedly works
  audio: unknown, reportedly works

T420s

4171–53U
  cpu: Intel® Core™ i5–2540M (2.6GHz, 3MB L3, 1333MHz FSB) (cpuid: AX 000206A7
  CX 17BAE3FF DX BFEBF0FF)
  graphics: Intel HD Graphics 3000 (integrated Sandy Bridge GPU),
  realemu(8) monitor=vesa vgasize=1600x900x32
  ethernet: Intel 82579LM Gigabit, works
  audio: Intel HD 6 Series/C200 Series, works
  wifi: Intel Centrino Advanced-N 6205 Taylor Peak, etheriwl (firmware: iwn–6005),
  works
T430s

2353–ABU

T431s

20AA–000BUS

cpu: 1796MHz GenuineIntel P6 (cpuid: AX 000306A9 CX 77BAE3BF DX BFEBFBFF)
graphics: Intel 3rd Gen Core processor Graphics Controller, realemu(8) monitor=vesa vgasize=1920x1080x32 with third party Samsung internal LCD
audio: 7 Series/C210 Series HDA Controller, works
ethernet: Intel 82579LM (10/100/1000), works
wifi: Intel Centrino Advanced-N 6235, works
disk controller: Intel 7 Series Chipset Family 6–port SATA Controller [AHCI mode], works
usb: works
scram works with *acpi=
mouse button 2 works with trackpad disabled in BIOS

X41 tablet

cpu: Intel Pentium M (Dothan) 1.6GHz LV (778) L2 2 MB cache
graphics: Intel GMA900, realemu(8) monitor=vesa vgasize=1024x768x32
tablet: WACF004, works
ethernet: BCM5751M (10/100/1000), works
wifi: Intel PRO/Wireless 2915ABG Mini–PCI, does not work
X60s

1704–GL5

  coreboot
cpu cpu0: 1663MHz GenuineIntel P6 (cpuid: AX 0x06E8 CX 0xC1A9 DX 0xBFE9FBFF)
graphics: Intel 945GM,
realemu(8) monitor=vesa vgasize=1024x768x16
ethernet: Intel 82573L Intel PRO/1000 PL, works
audio: Intel HDA, untested
wifi: Ralink RT3090, works

X60 Tablet

6363–CTO

cpu: Intel Core Duo (Yonah) L2400 LV 1.66 GHz (2MB Cache) cpu0: 1663MHz GenuineIntel P6 (AX 000006EC CX 000C1A9 DX BFE9FBFF)
lcd: replaced with HV121P01–100 (1400x1050)
graphics: Intel Graphics Media Accelerator 950,
realemu(8) monitor=x60t vgasize=1400x1050x32;
monitor=vesa vgasize=1280x1024x32 (native 1400x1050 resolution not in VESA BIOS)
tablet: WACF008, works
ethernet: Intel 82573L (10/100/1000), works
audio: Intel HD Audio with AD1981HD codec, speaker and green lineout work with echo pin 5,3 >/dev/audioctl
wifi: Intel WiFi Link 5100 AGN, works — flashed with custom BIOS to remove WiFi card whitelist
disk controller: Intel 82801GBM/GHM (ICH7–M Family) SATA Controller [AHCI mode], untested
mp: mp + sata, ethernet works with *acpi
X61s

cpu: Intel Core 2 Duo
graphics: Intel GM965/GL960,
realemu(8) monitor=vesa vgasize=1024x768x32
ethernet: Intel 82566MM (10/100/1000), works
wifi: Intel PRO/Wireless 4965 AG or AGN ‘[Kedron]’ Mini-PCI Express, untested, should work with iwl driver
disk controller: Intel 82801HBM SATA (ICH8-M): IDE DMA works, SATA works
mp: mp + sata, ethernet works with *acpi=

X61 Tablet

7767-01U

cpu: Intel Core 2 Duo CPU L7700 (1.80 GHz)
lcd: replaced with HV121P01-100 (1400x1050)
graphics: Intel GMA X3100,
realemu(8) monitor=x60t vgasize=1400x1050x32;
monitor=vesa vgasize=1280x1024x32 (native 1400x1050 resolution not in VESA BIOS)
tablet: WACF008, works
ethernet: Intel 82566MM (10/100/1000), works
audio: Intel HDA, works
wifi: Intel Centrino Advanced-N 6205 Taylor Peak (iwl-6005), works — flashed with custom BIOS to remove WiFi card whitelist
disk controller: Intel 82801HBM SATA (ICH8-M): IDE DMA works, SATA works mp: mp + sata, ethernet works with *acpi=
X131e

3368–2FU

cpu: 1397MHz GenuineIntel P6 (cpuid: AX 0x206A7 CX 0x15BAE3BF DX 0xBFEBF-BFF)
graphics: Intel HD Graphics 3000,
realemu(8) monitor=vesa vgasize=1366x768x32
ethernet: Realtek RTL8167 PCIe Gigabit Ethernet: works
audio: Intel HDA, works

6283–22U

cpu: 1397MHz GenuineIntel P6 (cpuid: AX 0x206A7 CX 0x15BAE3BF DX 0xBFEBF-BFF)
graphics: Intel HD Graphics 3000,
realemu(8) monitor=vesa vgasize=1366x768x32
ethernet: Realtek RTL8167 PCIe Gigabit Ethernet: works
wifi: Intel Centrino Advanced-N 6205: works
audio: Intel HDA, works
X200

7455–A54

cpu: Intel Core 2 Duo
graphics: Mobile Intel GMA 4500MHD,
realemu(8) monitor=vesa vgasize=1280x800x32
ethernet: Intel 82567LF Gigabit (10/100/1000), works
wifi: Intel WiFi Link 5150, works
disk controller: Intel ICH9M/ME ICH9M/ME AHCI, works
audio: Intel 486486 82801IB/IR/IH HD Audio, works
usb: works

X200s

7466–3SG

cpu: 1862MHz Genuine Intel Core 2/Xeon (cpuid: AX 0x10676 CX 0x8E3FD DX 0xBFEFBFF)
graphics: Mobile Intel GM45 Express/4500,
realemu(8) monitor=vesa vgasize=1280x800x32
ethernet: Intel 82567LM 82567LM–2 Gigabit (10/100/1000), works
wifi: Intel WiFi Link 5300 AGN Mini–PCI Express, works
disk controller: Intel ICH9M/ME ICH9M/ME AHCI, works
audio: Intel 486486 82801IB/IR/IH HD Audio, works
usb: works
mp: mp + sata, ethernet works with *acpi=1
X201

**3323–DBG**

cpu: 2661MHz GenuineIntel P6
graphics: Mobile Intel GMA 5700MHD,
realemu(8) monitor=vesa vgasize=1280x800x32
ethernet: Intel Corporation 82577LM Intel 82577LM Gigabit, works
wifi: Intel Centrino Ultimate-N 6300 AGN, works
disk controller: Intel Corporation PCH (Ibex Peak) SATA AHCI, works
audio: Intel HDA, works
ssd: INTEL SSDSC2BW180A3L, works
usb: works

X220

**4291–4CG**

cpu: 2791MHz GenuineIntel P6 (cpuid: AX 0x206A7 CX 0x17BAE3FF DX 0xBFEBFBFF)
graphics: Intel HD 3000,
realemu(8) monitor=vesa vgasize=1366x768x32
ethernet: Intel 82579 (10/100/1000), works
audio: Intel HDA, works
wifi: Intel Centrino Advanced-N 6205, works
disk controller: works
ssd: INTEL SSDSA2BW160G3, works
usb: works
X230

2306–CTO

cpu: Intel Core i5–3320M (2.60 GHz, 3MB L3, 1600MHz FSB), cpuid: AX 0x306A9
  CX 0x77BAE3FF DX 0x8FEBFBFF
graphics: Intel HD 3rd Gen Core processor Graphics Controller,
  realemu(8) monitor=x230 vgasize=1366x768x32;
  monitor=vesa vgasize=1366x768x32
ethernet: Intel 82579LM Gigabit (10/100/1000), works
wifi: Intel Centrino Advanced-N 6205 Taylor Peak, etheriwl (firmware: iwn–6005), works
disk controller: Intel 7 Series Chipset Family 6–port SATA Controller AHCI mode,
ahci, works
usb: Intel 7 Series/C210 Series Chipset Family USB Enhanced Host Controller #1,
ehci, works
audio: Intel 7 Series/C210 Series Chipset Family High Definition Audio Controller,
  works
efi: works

X230 Tablet

3434–CTO

cpu: Intel Core i5–3320M (Ivy Bridge), 2.6 GHz, 3 MB Shared L3 Cache, 2C/4T, 35
  W TDP, 22 nm (cpuid: AX 0x306A9 CX 0x77BAE3FF DX 0x8FEBFBFF)
graphics: Intel HD 4000,
  realemu(8) monitor=vesa vgasize=1366x768x32
  tablet: USB, untested
ethernet: Intel 82579 (10/100/1000), works
audio: Intel HDA, works
wifi: Intel 802.11b/g/n, might work
disk controller: works
ssd: SAMSUNG SSD 830 Series CXM03B1Q S0XYNEAC774074 128GB, works
usb: disable USB3 in BIOS, works
X230 Tablet

3434–DB7

cpu: Intel(R) Core(TM) i7–3520M CPU @ 2.90GHz (cpuid: AX 000306A9 CX 77BAE3FF DX BFEFBFF)
graphics: Intel HD 4000,
realmu(8) monitor=vesa vgasize=1366x768x32
tablet: USB, untested
ethernet: Intel 82579 (10/100/1000), works
audio: Intel HDA, works
wifi: Intel Centrino Advanced–N 6205, works
disk controller: works
ssd: LITEONIT LCS–128M6S DC72205 S0C41178Z1ZSVB159894 128GB, works
usb: disable USB3 in BIOS, works

X240

20AL–CTO

wifi: Intel Wireless–N 7260, does not work, but may not be hard to add to existing etheriw1 driver
X250

20CM–CTO

cpu: Intel(R) Core(TM) i5–5200U CPU @ 2.20GHz, cpuid: AX 000306D4 CX 77FAF-BBF DX BFEBFBFF
graphics: Intel Corporation Broadwell–U Integrated Graphics,
realemu(8) monitor=vesa vgasize=1920x1080x32
ethernet: Intel Corporation Ethernet Connection (3) I218–LM (10/100/1000), works
wifi: Intel Wireless–N 7265, does not work, but may not be hard to add to existing etheriwl driver
disk controller: Intel Corporation Wildcat Point–LP SATA Controller [AHCI Mode], works
usb: Intel Corporation Wildcat Point–LP USB EHCI Controller, works
audio: Intel Corporation Broadwell–U Audio Controller, works

20CM–CTO1WW

cpu: Intel(R) Core(TM) i5–5200U CPU @ 2.20GHz, cpuid: AX 000306D4 CX 77FAF-BBF DX BFEBFBFF
graphics: Intel Corporation Broadwell–U Integrated Graphics,
realemu(8) monitor=vesa vgasize=1920x1080x32
ethernet: Intel Corporation Ethernet Connection (3) I218–LM (10/100/1000), works
wifi: Intel Wireless–N 7265, does not work, but may not be hard to add to existing etheriwl driver
disk controller: Intel Corporation Wildcat Point–LP SATA Controller [AHCI Mode], works
usb: Intel Corporation Wildcat Point–LP USB EHCI Controller, works
audio: Intel Corporation Broadwell–U Audio Controller, works
X260

nnnn–nnn

  cpu: 2496MHz GenuineIntel P6, cpuid: AX 000406E3 CX 77FAFBFF DX BFEBFBFF
graphics: Intel Corporation HD Graphics 520,
realemu(8) monitor=vesa vgasize=1920x1080x32
ethernet: Intel Corporation Ethernet Connection I219–LM (10/100/1000), works
wifi: Intel Corporation Centrino Advanced-N 6235, works with etheriwl driver
disk controller: Intel Corporation Sunrise Point–LP SATA Controller [AHCI mode], works
usb: Intel Corporation Sunrise Point–LP USB 3.0 xHCI Controller, works
audio: Intel Corporation Sunrise Point–LP HD Audio, works

X301

2776–P4U

  cpu: Intel Core 2 Duo SU9400 1.4GHz 3MB cache, cpuid: AX 0x1067A CX
0x408E3FD DX 0xBFEBFBFF
graphics: Mobile Intel GM45 Express/4500MHD,
realemu(8) monitor=x301 vgasize=1440x900x32;
monitor=vesa vgasize=1440x900x32
ethernet: Intel 82567LM 82567LM–2 Gigabit (10/100/1000), works
wifi: Intel WiFi Link 5100 AGN Mini–PCI Express, works
disk controller: Intel ICH9M/ME ICH9M/ME AHCI, works
ssd: Samsung MMCRE64G8MPP–0VA 64GB, works
dvd: Matsushita DVD–RAM UJ–844, works
audio: Intel HD 486486 828011B/IR/IH, works
usb: works
mp: mp + sata, ethernet works with *acpi=1
2776−P6U

cpu: Intel Core 2 Duo SU9400 1.4GHz 3MB cache, cpuid: AX 00010676 CX 0008E3FD DX BFEBFBFF

1) graphics: Mobile Intel GM45 Express/4500MHD, realemu(8) monitor=x301 vgsize=1440x900x32;

2) ethernet: Intel 82567LM Gigabit (10/100/1000), works

3) wifi: Intel WiFi Link 5100 AGN Mini−PCI Express, works

4) disk controller: 82801BM/EM (ICH9M/ICH9M−E) 4 port SATA Controller AHCI mode, works

5) audio: Intel HD 828011 (ICH9 Family), works

6) usb: works

7) mp: mp + sata, ethernet works with *acpi=1

---

Yoga 370

20JH−002AUS

cpu: 2712MHz GenuineIntel P6, cpuid: AX 000806E9 CX 77FAFBFF DX BFEBFBFF

1) graphics: Intel Corporation Skylake Gaussian Mixture Model, realemu(8) monitor=vesa vgsize=1920x1080x32

2) ethernet: Intel I219−LM Gigabit (10/100/1000), works with dongle

3) wifi: Intel 8265, does not work

4) audio: does not seem to work
3.2.5.3 – Toshiba

3.2.5.3.1 – Satellite

M30–S309

cpu: 1397MHz GenuineIntel P6 (AX 00000695 CX 00000180 DX A7E9F9BF)
graphics: NVidia GeForce FX Go5200 64M,
monitor=cinema vgasize=1152x768x32
ethernet: Intel 82801DB PRO/100 VE (MOB) (i82557), works
disk controller: Intel 82801DBM (ICH4–M) IDE Controller, works
audio: Intel 82801DB/DBL/DBM (ICH4/ICH4–L/ICH4–M) AC’97 Audio Controller, works
usb: Intel 82801DB/DBL/DBM (ICH4/ICH4–L/ICH4–M) USB UHCI Controller, untested

3.2.6 – Desktops

3.2.6.1 – eMachines

T3302 cpu: AMD Sempron 3300+ 2GHz
chipset: VIA K8M800
graphics: VIA S3 UniChrome, replaced with NVidia GeoForce FX 5700 128MB DVI output, 1920x1080x32
ethernet: 3Com 3C905–TX Fast Etherlink 10/100 PCI TX
audio:
usb: works
3.2.6.2 – Igel

4210 LX Winestra

3.2.6.3 – Soekris

net6501−70

cpu: Intel Atom E680 1.6Ghz, both pc and pc64 work
ethernet: 4x Intel 82574L Gigabit Ethernet, works
usb: works
serial console: works, use console=0 b19200 in plan9.ini. 9boot hangs
without a serial cable attached; disable uartputc as a workaround
this machine does not have ACPI

3.2.6.4 – IBM/Lenovo

3.2.6.4.1 – ThinkCentre

M55

8810−D3U

cpu: Intel Core 2 Duo
graphics: Intel GMA 3000 internal (untested), replaced with NVidia GeForce 8400GS
DVI output, realemu(8) monitor=vesa vgasize=1680x1050x32
etheren: Broadcom BCM5755 (10/100/1000), works
audio: Intel HDA, works
usb: works
mp: mp + sata, ethernet, usb works with *acpi=

3.3 – Virtual Machines

9front has been tested on several virtual machines. Details below.

Note: As a general rule it is a good idea to manually specify a unique MAC address for
each virtual machine instance running on the network, to avoid collisions.

3.3.1 – Qemu

The following generic setup is tested with qemu 1.5.0 and 2.0.50 running on Linux,
using FQA 3.3.3 – virtio for disk and network. This same generic setup should work for
most host operating systems.

3.3.1.1 – Installation

Create a sparse disk image:

    qemu−img create −f qcow2 9front.qcow2.img 30G
Boot the 9front.iso:

```bash
qemu-system-x86_64 -cpu host -enable-kvm -m 1024 \
-net nic,model=virtio,macaddr=52:54:00:00:EE:03 -net user \
-device virtio-scsi-pci,id=scsi \n-drive if=none,id=vd0,file=9front.qcow2.img \n-device scsi-hd,drive=vd0 \n-drive if=none,id=vd1,file=9front.iso \n-device scsi-cd,drive=vd1,bootindex=0
```

Finally, see: FQA 4.3 – *Performing a simple install*

### 3.3.1.2 – Post-Installation Booting

```bash
qemu-system-x86_64 -cpu host -enable-kvm -m 1024 \n-net nic,model=virtio,macaddr=52:54:00:00:EE:03 -net user \n-device virtio-scsi-pci,id=scsi \n-drive if=none,id=vd0,file=9front.qcow2.img \n-device scsi-hd,drive=vd0
```

### 3.3.1.2.1 – Multiboot

Multiboot can be used to start the 9front kernel directly, skipping the bootloader step:

```bash
qemu -kernel 9pc -initrd plan9.ini
```

### 3.3.1.4 – Networking

User networking is the default and works the same on every platform. More advanced options are particular to specific host operating systems; several are described below.

**Note:** On many operating systems ICMP is limited to the superuser. One consequence is that a VM running with guest networking cannot ping remote hosts.

#### 3.3.1.4.1 – Linux VDE

Install vde2.

Setup a tap interface:

```bash
sudo tunctl -u $USER -t tap0
```

Start a virtual switch connected to the tap interface:

```bash
vde_switch --tap tap0 --daemon
```

Connect the switch to the network of the host. Use DHCP:

```bash
slirpvde --dhcp --daemon
```

When booting 9front, add the following to the `qemu` command line arguments:
–net vde

3.3.1.4.2 – OpenBSD TAP

Tested: OpenBSD/amd64 6.0–STABLE, qemu–2.6.0

Note: Read over this first. Be careful not to clobber any system settings you may already have configured. If you don’t understand something, read the relevant man pages until you do. Feel free to substitute arbitrary network values below.
# as root
pkg_add bzip2 plan9port qemu ssvnc wget

sysctl net.inet.ip.forwarding=1

echo 'net.inet.ip.forwarding=1' >> /etc/sysctl.conf

echo inet 192.168.54.1 255.255.255.0 NONE > /etc/hostname.vether0

match out from $int_if:network to any nat-to ($ext_if:0)

from $int_if:network to any nat-to ($ext_if:0)

pfctl -f /etc/pf.conf

echo link0 up >/etc/hostname.tap0

echo add vether0 add tap0 up >/etc/hostname.bridge0

sh /etc/netstart

subnet 192.168.54.0 netmask 255.255.255.0 {
  option routers 192.168.54.1;
  range 192.168.54.100 192.168.54.199;
}

rcctl enable dhcpd

rcctl start dhcpd

rcctl enable unbound

echo 'permit setenv { -ENV PS1=$DOAS_PS1 SSH_AUTH_SOCK } :wheel'

# as user who is in wheel group
mkdir -p $HOME/9 $HOME/bin

qemu-img -f qcow2 9front.qcow2.img 30G

wget http://9front.org/iso/9front-5561.df1dc1ff2475.iso.bz2

bunzip2 9front-5561.df1dc1ff2475.iso.bz2

mv 9front-5561.df1dc1ff2475.iso 9front.iso

cd $HOME/bin
wget http://openbsd.stanleylieber.com/rc/q9
chmod 775 q9
cd
# boot from iso (install)
doas -u root q9 -i
# boot from qcow image (after completing the install)
doas -u root q9
# connect to qemu via vnc
qemu.exe −net nic −net tap,ifname="tap−qemu" ...

3.3.1.4.3 – Windows TAP

This is tested with the qemu for windows distribution. Download and run the installer from openvpn to install the windows TAP driver. Create a new TAP interface with the "Add a new TAP virtual ethernet adapter" from the openvpn start menu. Go to the network manager and rename that TAP interface to something more sane like: "qemu−tap". Configure ip addresses or bridge that interface with the network manager.

Now you should be able to run qemu on that interface:

qemu.exe −net nic −net tap,ifname="tap−qemu" ...

3.3.1.4.4 – Linux TAP

Contributed by joe9:

on the host:

sudo ip tuntap add dev tap0 mode tap user joe
sudo ip address add 10.0.0.1/24 dev tap0

start qemu using (do not need sudo for qemu):

SDL_VIDEO_X11_DGAMOUSE=0 qemu−system−x86_64 \  
−cpu host −enable−kvm −m 1024 \  
−netdev tap,ifname=eth,script=no,downscript=no \  
−device e1000,mac=52:54:00:00:00:EE:03 \  
−device virtio−scsi−pci,id=scsi −drive \  
if=none,id=vd0,file=9front.qcow2.img \  
−device scsi−hd,drive=vd0 \  
−usb −usbdevice tablet −sdl \  
−ctrl−grab

on 9front: add the below line to /lib/ndb/local

    sys=cirno ether=52540000ee03 ip=10.0.0.2 ipmask=255.255.255.0  
    ipgw=10.0.0.1  
    dns=10.0.0.1  
    dom=cirno.9front

run: ip/ipconfig -N

Now, "ping 10.0.0.2" from linux host and "ip/ping 10.0.0.1" from qemu 9front should work.

check the communication between the vm and the linux host using (on the linux host):
Contributed by hiro:

If you want to enable internet access enable NAT forwarding on the linux host (as root).

To do this, first globally enable forwarding:

```
    echo 1 > /proc/sys/net/ipv4/ip_forward
```

Enable Masquerading for everything comjing from the VM's tap device (eth0 being your host's way to the internet):

```
    iptables -t nat -A POSTROUTING -s 10.0.0.0/24 -o eth0 -j MASQUERADE
```

Block everything else from being forwarded:

```
    iptables -A FORWARD -m state --state RELATED,ESTABLISHED -j ACCEPT
    iptables -A FORWARD -s 10.0.0.0/24 -i tap0 -j ACCEPT
    iptables -P FORWARD DROP
```

---

3.3.1.5 – Audio

Run qemu with the flag `-soundhw sb16` and put the following line in plan9.ini:

```
    audio0=type=sb16 port=0x220 irq=5 dma=5
```

Note: `irq` and `dma` values may vary.

3.3.1.6 – Graphics

Use `monitor=vesa`

Note: Some versions of QEMU running on OSX have exhibited graphical glitches when using a 16-bit color mode (for example: 1024x768x16). Try a 32-bit mode instead (for example: 1024x768x32).
3.3.2 – Virtualbox

Don’t use Virtualbox. It tends to break between versions.


If you can’t be dissuaded, the following sections detail empirical observations re: Virtualbox.

3.3.2.1 – Ethernet The emulated "Intel PRO/1000 MT Server" ethernet controller is known to work.

3.3.2.2 – Audio

Put the following in plan9.ini:

    audio0?type=sb16

3.3.2.3 – Graphics Use monitor=vesa

3.3.2.4 – Known Working Versions

4.3.14 r95030 on Windows 7

4.3.16 on Mac OS X

4.3.18 r96516 on Linux x86_64 kernel 3.14.22

4.3.18 on Windows 7:
just tried with vbox 4.3.18 on windows7. 9front boots fine in BIOS mode, but the PCnet nic dosnt work. reason is that vbox plx pci irq routing is fucked so the ethernet doesn't get interrupts. if i boot with *nopcirouting=1, it works fine. theres a option to select the chipset so i tried ICH9 with IO-APIC enabled. normal mp mode fails because of broken mp tables, but works with *acpi=. also, it works with UEFI mode (which always uses ACPI). the usual intel mt server nic also works (thats what is usually recommended for working arround the broken ethernet).

pci routing issue has been fixed in latest kernel, should be available in iso release after 3960.

4.3.20 r96996 on Mac OS X 10.6.8/10.9 and Ubuntu 14.04/14.10:

General -> Basic
Type: Other
Version: Other/Uknown

System -> Motherboard
Chipset: PIIIX3
Pointing Device: PS/2 Mouse
Extended Features: [x] Enable I/O APIC

System -> Processor
Extended Features: [x] PAE/NX (not sure this matters)

System -> Acceleration
[x] Enable VT-x/AMD-V
[x] Enable Nested Paging

Display -> Video
Extended Features: [x] Enable 3D Acceleration (not sure this matters)

Storage -> Attributes
Name: IDE
Type: PIIIX4
[x] Use Host I/O Cache

Audio ->
[x] Enable Audio
Host Audio Driver: CoreAudio (Can be PulseAudio or otherwise for Linux, etc. Shouldn't be hard to set this)
Audio Controller: Soundblaster 16

Network -> Adapter 1
Attached to: NAT
-> Advanced
Adapter Type: Intel PRO/1000 MT Server
Promiscuous Mode: Deny (Not sure this matters)

Note: Enabling USB 2.0 Controll in 'Ports -> USB' works just fine in 9front, mounting under /shr flawlessly as long as the host has the Virtualbox Extension Pack running.
3.3.3 – Virtio

Current versions of qemu/kvm and virtualbox as of 3.1 support faster paravirtualized devices. Presently, 9front provides drivers for virtio hard disk and network.

The virtio-blk disk device should show up as: /dev/sdF0

The virtio-scsi disk device should show up as: /dev/sd00