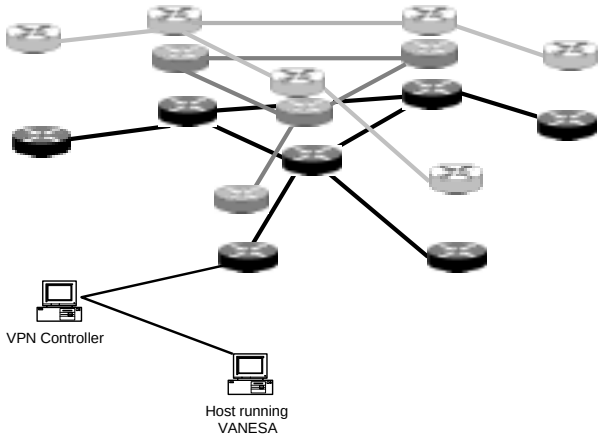
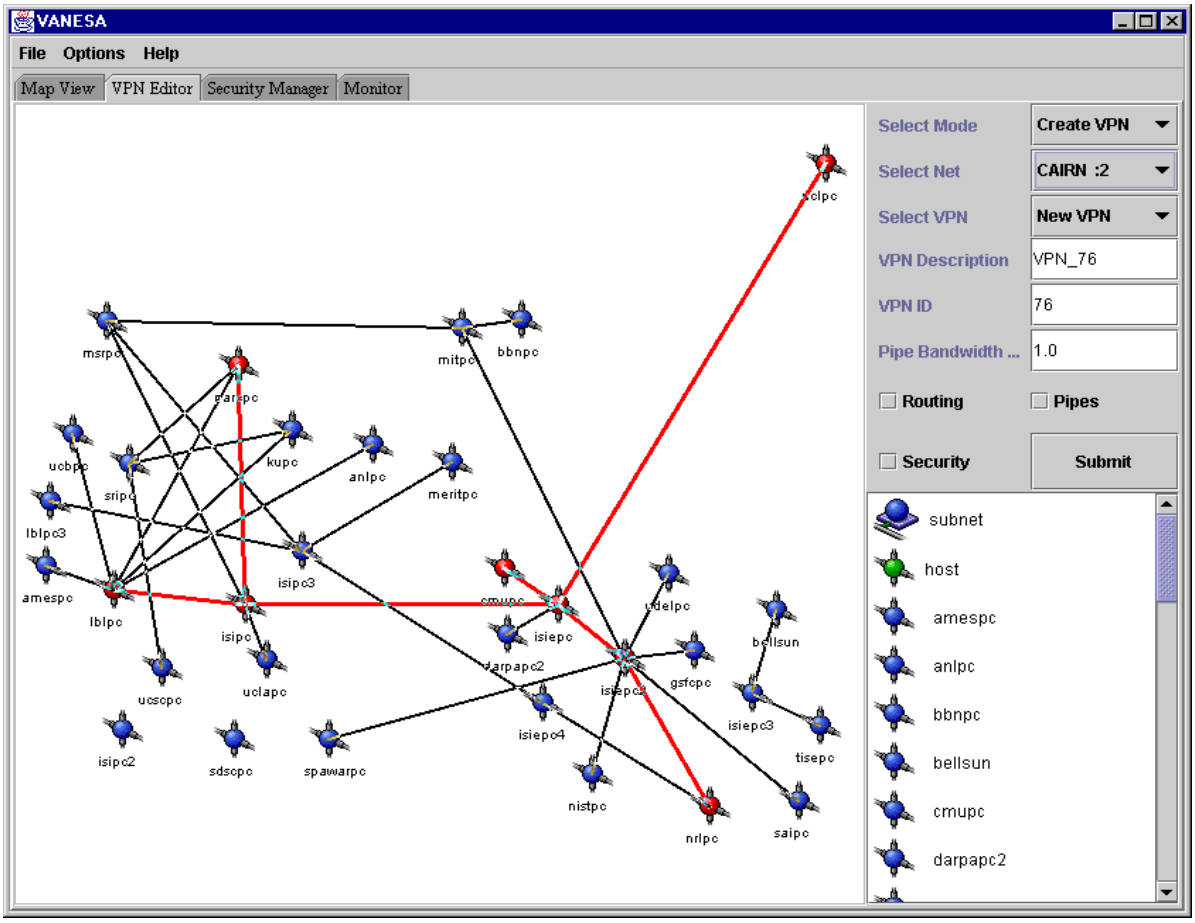
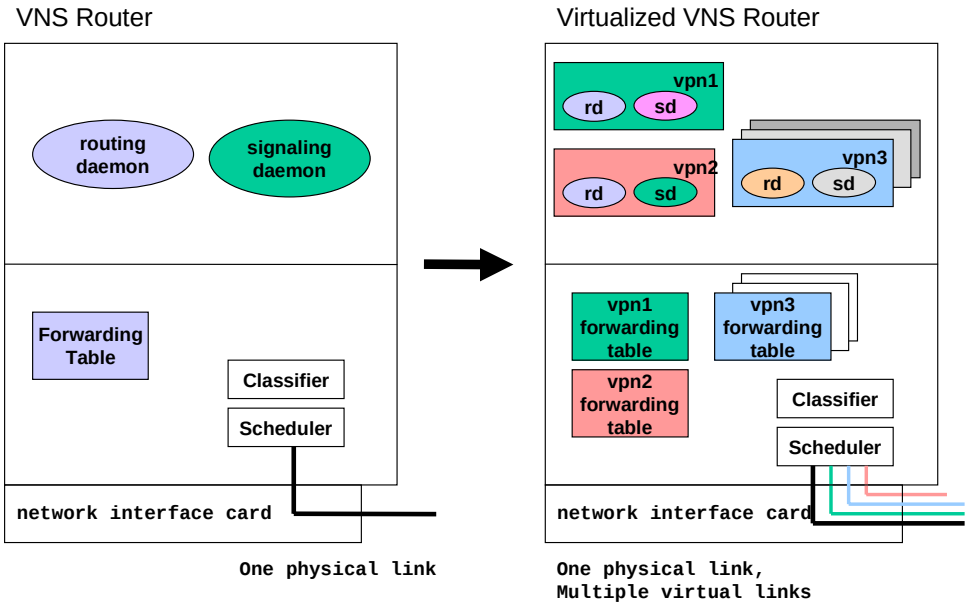
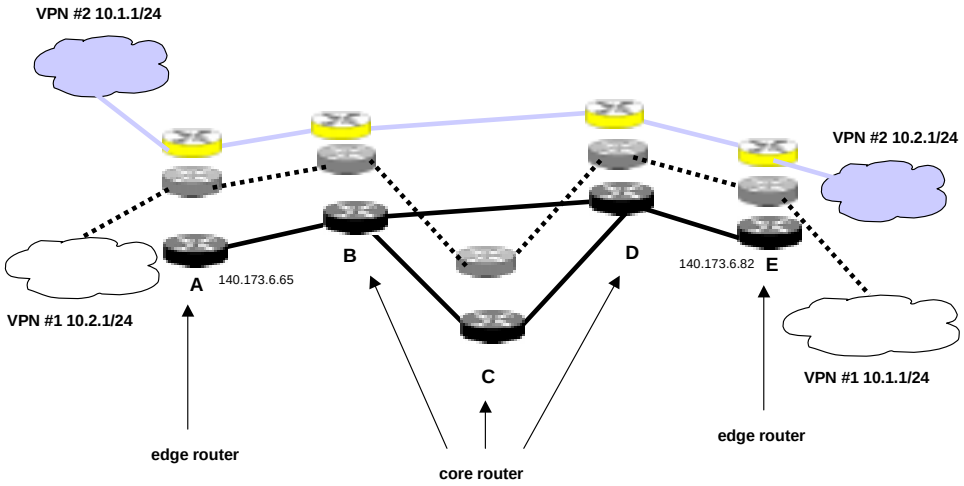
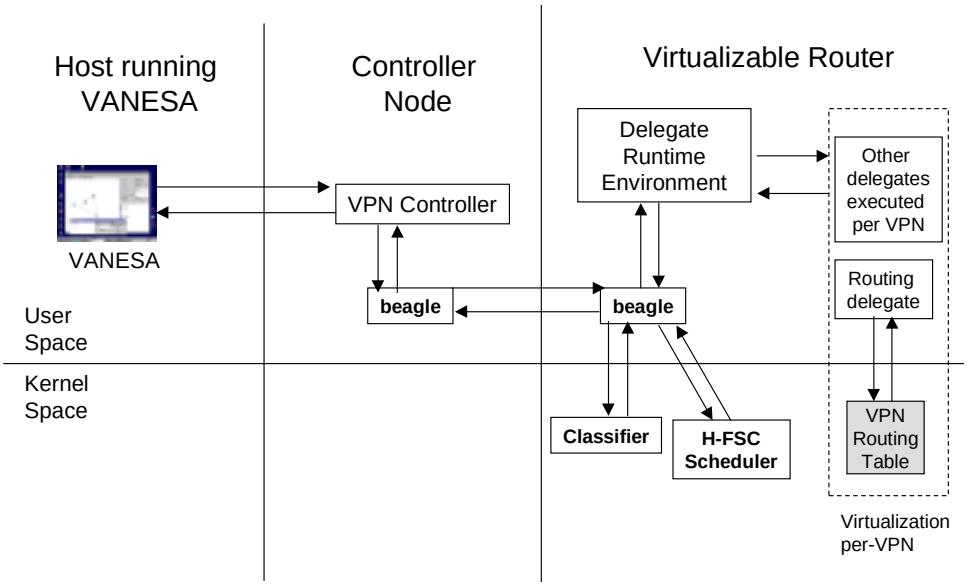
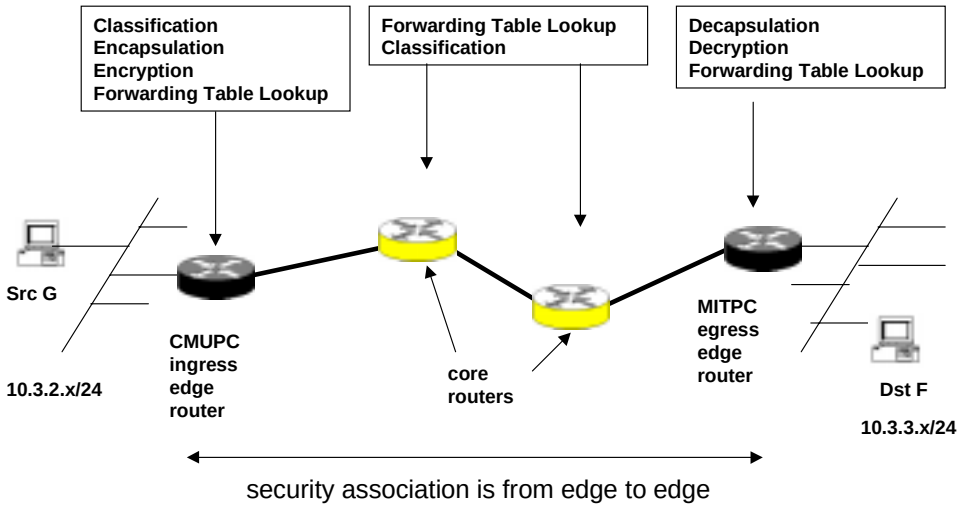

VPN Controller
Host running
VANESA

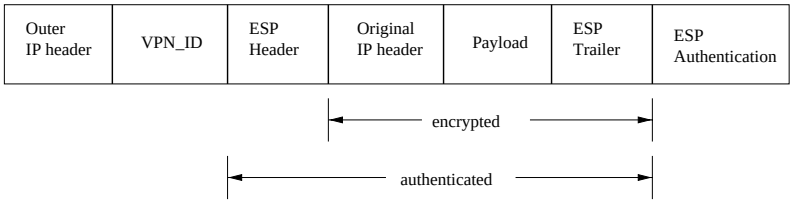

VANESA
File Options Help
Map View VPN Editor Security Manager Monitor
Select Mode Create VPN
Select Net CAIRN :2
Select VPN New VPN
VPN Description VPN_76
VPN ID 76
Pipe Bandwidth ... 1.0
Routing Pipes
Security Submit
subnet
host
amespc
anlpc
bbnpc
bellsun
cmupc
darpapc2
msrpc
mitpc
bbnpc
parcpc
ucbpc
sripc
kupc
anlpc
meritpc
lblpc3
amespc
lblpc
isipc3
isipc
uclapc
ucscpc
isipc2
sdscpc
spawarpc
cmupc
isiepc
darpapc2
isiepc2
isiepc4
nistpc
nrlpc
saipc
gsfcpc
isiepc3
tisepc
bellsun
vclpc

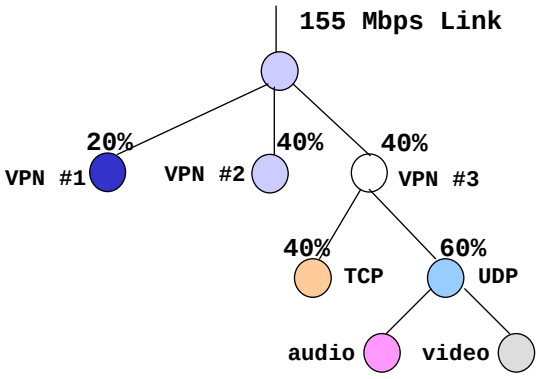

VNS Router
routing daemon
signaling daemon
Forwarding Table
Classifier
Scheduler
network interface card
One physical link
Virtualized VNS Router
vpn1
rd
sd
vpn2
rd
sd
vpn3
rd
sd
vpn1 forwarding table
vpn3 forwarding table
vpn2 forwarding table
Classifier
Scheduler
network interface card
One physical link,
Multiple virtual links

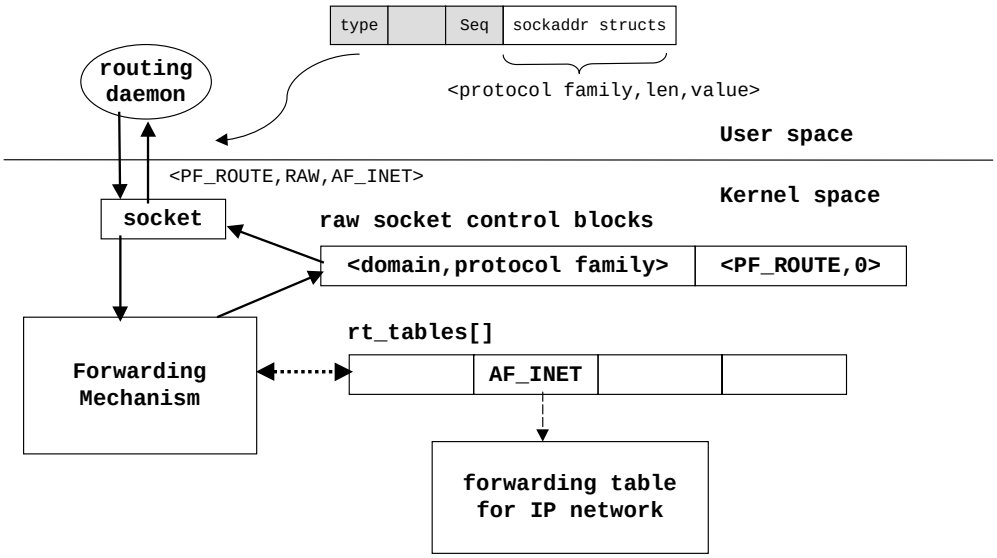

VPN #2 10.1.1/24
VPN #2 10.2.1/24
A
140.173.6.65
B
C
D
140.173.6.82
E
VPN #1 10.2.1/24
VPN #1 10.1.1/24
edge router
core router
edge router

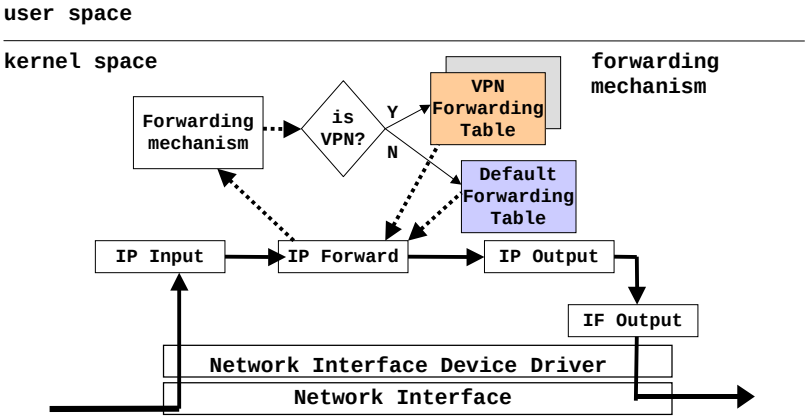

Host running VANESA
Controller Node
Virtualizable Router
VANESA
VPN Controller
Delegate Runtime Environment
Other delegates executed per VPN
Routing delegate
beagle
beagle
User Space
Kernel Space
Classifier
H-FSC Scheduler
VPN Routing Table
Virtualization per-VPN


Classification
Encapsulation
Encryption
Forwarding Table Lookup
Forwarding Table Lookup
Classification
Decapsulation
Decryption
Forwarding Table Lookup
Src G
10.3.2.x/24
CMUPC
ingress
edge
router
core
routers
MITPC
egress
edge
router
Dst F
10.3.3.x/24
security association is from edge to edge


Outer
IP header
VPN_ID
ESP
Header
Original
IP header
Payload
ESP
Trailer
ESP
Authentication
encrypted
authenticated


155 Mbps Link
20%
VPN #1
40%
VPN #2
40%
VPN #3
40%
TCP
60%
UDP
audio
video


type
Seq
sockaddr structs
routing daemon
<protocol family,len,value>
User space
<PF_ROUTE,RAW,AF_INET>
Kernel space
socket
raw socket control blocks
<domain,protocol family>
<PF_ROUTE,0>
rt_tables[]
Forwarding Mechanism
AF_INET
forwarding table for IP network


user space
kernel space
forwarding mechanism
Forwarding mechanism
is VPN?
Y
N
VPN Forwarding Table
Default Forwarding Table
IP Input
IP Forward
IP Output
IF Output
Network Interface Device Driver
Network Interface