

??????...

<http://www.fortinet.com/products/fortigate/60C.html>

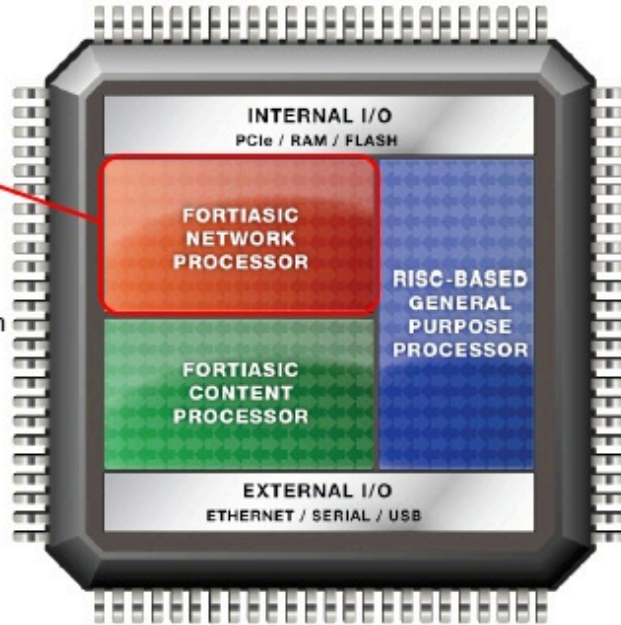
?????????????

???!...

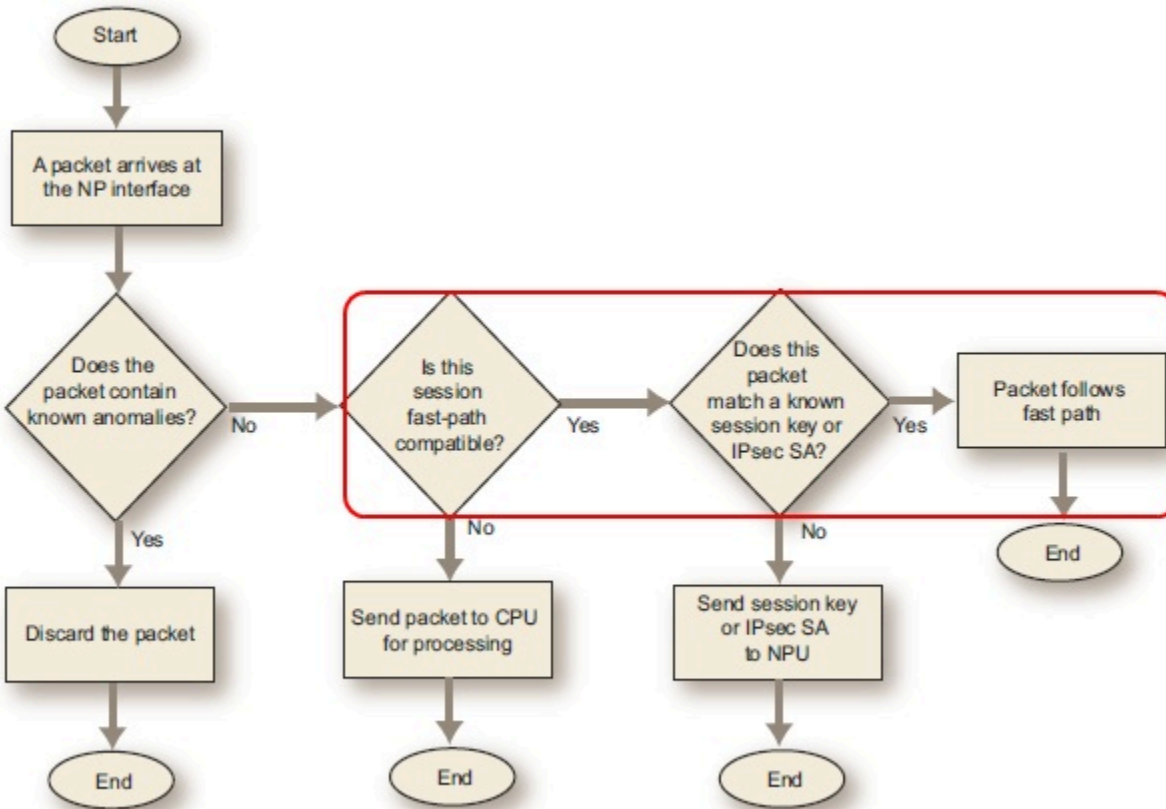
??UTM???, ???80C, 110C, 111C?????.....

?????????????!

- Wire-speed firewall performance at any packet size with dynamic address translation
- VPN acceleration
- Anomaly-based intrusion prevention, checksum offload, and packet defragmentation
- Traffic shaping and priority queuing



?????Hardware???, ???????????...



?????????SoC???, ??????NP+CP+CPU?????

????????NP...

????????????...

FortiASIC??FastPath????????????packet I/O processing...

????????????(?????)...

```

FWP60C3G11012569 (global) # get hard cpu
Processor      : FA526id(wb) rev 1 (v41)
model name     : FortiSOC
BogoMIPS      : 524.28
Features       : swp half thumb

Hardware       : FSoC_ASIC
Revision       : 0000
Serial         : 0000000000000000
Imp: 0x66 Arch: 0x5 Part: 0x626 Ver: 0x1
Ctype: 7 DSize: 6 DASS: 8 DLEN: 32 ISize: 6 IASS: 8 ILEN: 32
Unified TLB: Associativity 4
0x00003177 HUM: En Vec Base:0xffff0000 IC:En BP:Dis RomP:Dis
SysP:En WB:Dis DC: En Align:En
0x00000007 SB: En DB:En RS:En

FWP60C3G11012569 (global) # get hard stat
Model name: FortiWiFi-60C
ASIC version: CP0
ASIC SRAM: 64M
CPU: FortiSOC
RAM: 442 MB
Compact Flash: 7669 MB /dev/sdb
Hard disk: 7640 MB /dev/sdb
USB Flash: 3818 MB
Wifi Chipset: Atheros AR5416
WiFi firmware version: 0.9.17.1

```

CPU??, ??????, ?80C?Celeron 600MHz??...

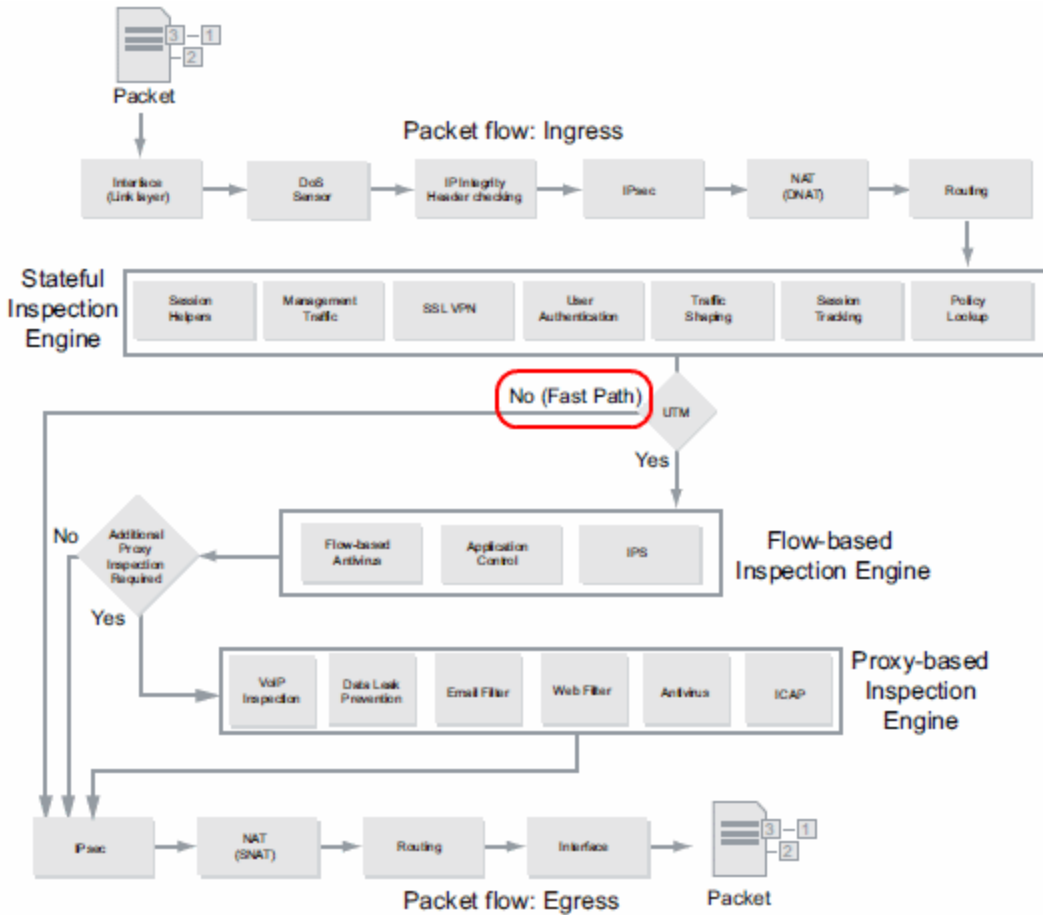
????NP+CP???

???CP0??????...

???UTM????????!..

????????????NP?????

????????????packet??NP?FastPath?..



????????, UTM???  
 Traffic Shaping????, ???UTM??...  
 FastPath??????CLI????:

```
FWP60C3G11012569 (global) # diag npu nplite fastpath
disable      disable hardware accelerated fastpath
enable       enable hardware accelerated fastpath

FWP60C3G11012569 (global) # diag npu nplite fastpath enable
<Enter>
```

??Session Monitor????????packet????FastPath??ASIC??(????NPU?????)...

#	Protocol	Src Address	Src Port	Src NAT IP	Src NAT Port	Dst Address	Dst Port	Policy ID	Expiry (sec)	Duration (sec)	FortiASIC
1	tcp	10.71.63.64	1346		62926	210.71.228.34	80	9	294	5	NPLite
2	tcp	10.71.63.64	1347		50639	210.71.228.34	80	9	294	5	NPLite
3	tcp	10.71.63.64	1344		50636	210.71.228.34	80	9	294	5	NPLite
4	tcp	10.71.63.64	1345		58829	210.71.228.34	80	9	294	5	NPLite
5	tcp	10.71.63.64	1350		34250	210.71.228.34	80	9	294	5	NPLite
6	tcp	10.71.63.64	1351		38347	210.71.228.34	80	9	294	5	NPLite
7	tcp	10.71.63.64	1348		42440	210.71.228.34	80	9	294	5	NPLite
8	tcp	10.71.63.64	1349		46537	210.71.228.34	80	9	294	5	NPLite
9	tcp	10.71.63.64	1338		61878	210.71.228.34	80	9	286	13	NPLite
10	tcp	10.71.63.64	1339		61879	210.71.228.34	80	9	294	5	NPLite
11	tcp	10.71.63.64	1342		58802	210.71.228.34	80	9	294	5	NPLite
12	tcp	10.71.63.64	1343		54707	210.71.228.34	80	9	294	5	NPLite
13	tcp	10.71.63.64	1341		9649	210.71.228.34	80	9	294	5	NPLite
14	tcp	10.71.63.64	1362		5598	210.71.228.34	80	9	295	5	NPLite
15	tcp	10.71.63.64	1363		5599	210.71.228.34	80	9	295	5	NPLite
16	tcp	10.71.63.64	1360		13788	210.71.228.34	80	9	294	5	NPLite
17	tcp	10.71.63.64	1361		30173	210.71.228.34	80	9	294	5	NPLite

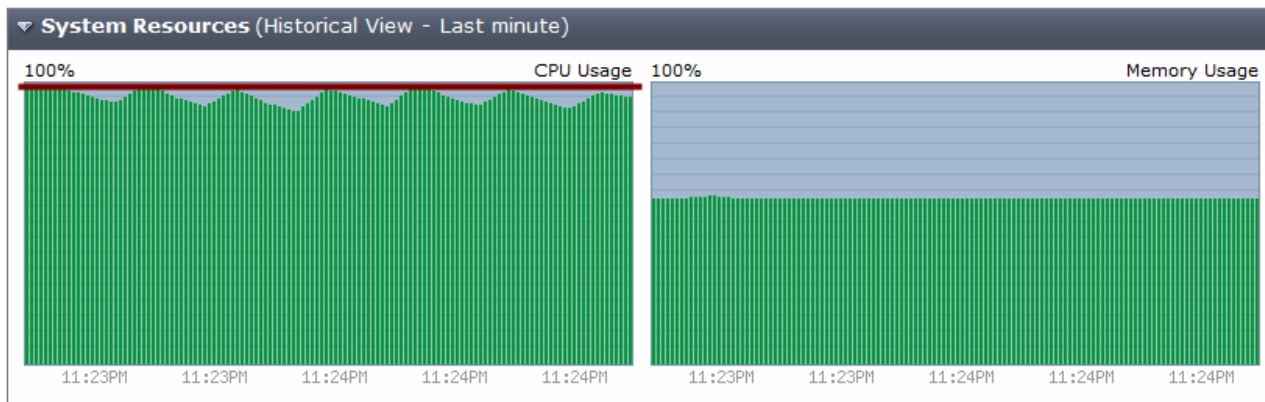
????????, ???????...

File name	#	Size	Completed	Percent	Elapsed	Left	Speed
test_200m.zip		200.00MB	85.45MB	42%	00:01:03	00:01:24	
test_100m.zip		100.00MB	93.29MB	93%	00:01:03	00:00:05	
test_250m.zip		250.00MB	85.96MB	34%	00:01:03	00:02:05	
test_400m.zip		400.00MB	93.28MB	23%	00:01:03	00:03:30	

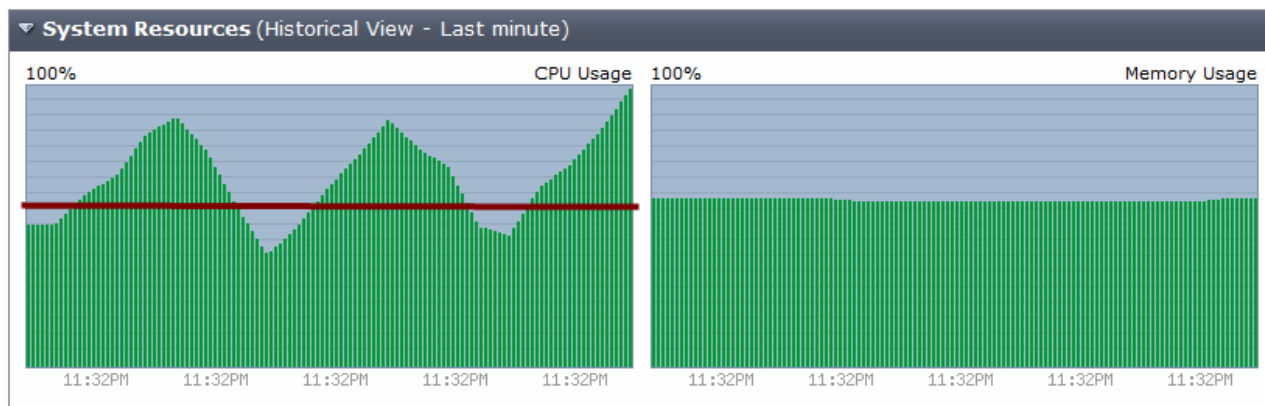
同時下載, 每一個下載切割10個threads

??FastPath??NP?????????..

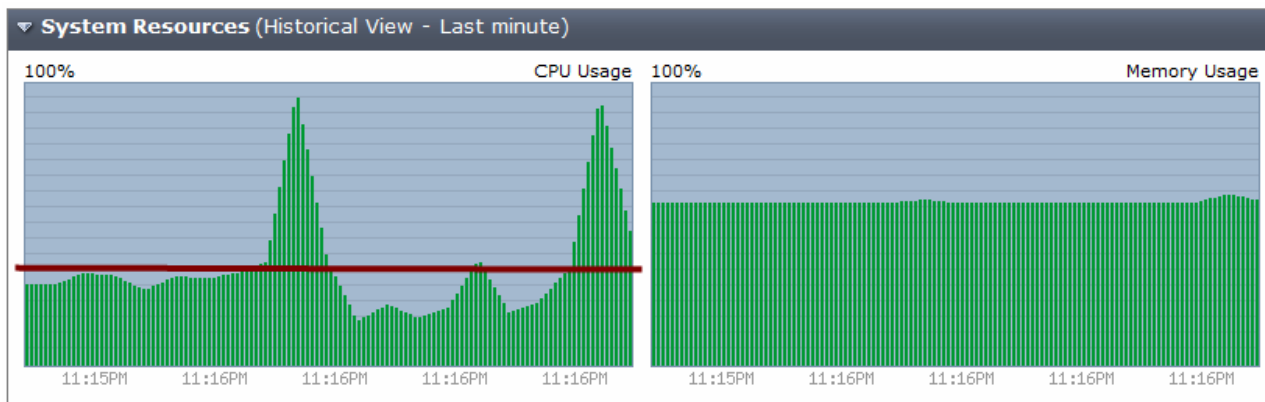
??60C, ??????????...



??80C, 80C??NP, ??????????CPU?????...



60C??NP??FastPath?????????:



?????????, NP??FastPath?????????....

CPU????????????...  
 ??UTM??, ???????, ??????!...  
 ?????????????????...  
 ?????!????FortiAP??FortiWiFi??VAP??...  
 ???!VAP??PHY????packet????NP??, ???CPU????...  
 ?????!..????????????AP??60C, ?????NP????...

1. ?????LACP, ???PHY...
2. ?????Jumbo Frame
3. NPU?????AP?wireless packet(?VAP???), ???3rd-party AP??...  
 ASIC NPU basically can't processing WiFi unit(wireless) logical interface.
4. ???UTM(CP0????), ?????????????????...  
 5. ?????VDOM, ?????2~3???
6. DRAM????, ???...
7. ??VLAN, ??TRUNK(VLAN???packet(tagged)??NPU??)
8. ??AP??, ???Rogue AP detection, ???CPU??, ?????FortiAP?monitor, ???????...
9. ?????CLI??, ?????????????(??Fortinet KB, ??????????)
10. FortiOS 4.0MR3????, ?????..
11. IPSec/SSL VPN??CP0/NPU??ASIC?????(\*?????)...  
 12. rev.2 ?60C??8GB FLASH????, ??(\*~!@#\$\$%^&\*())...
13. ??Web caching, ??FLASH???, ???!..
14. ??RJ-45 to RS-232 console line, ??USB cable, ???FortiExplorer..

### \*NPU????????

??????????:

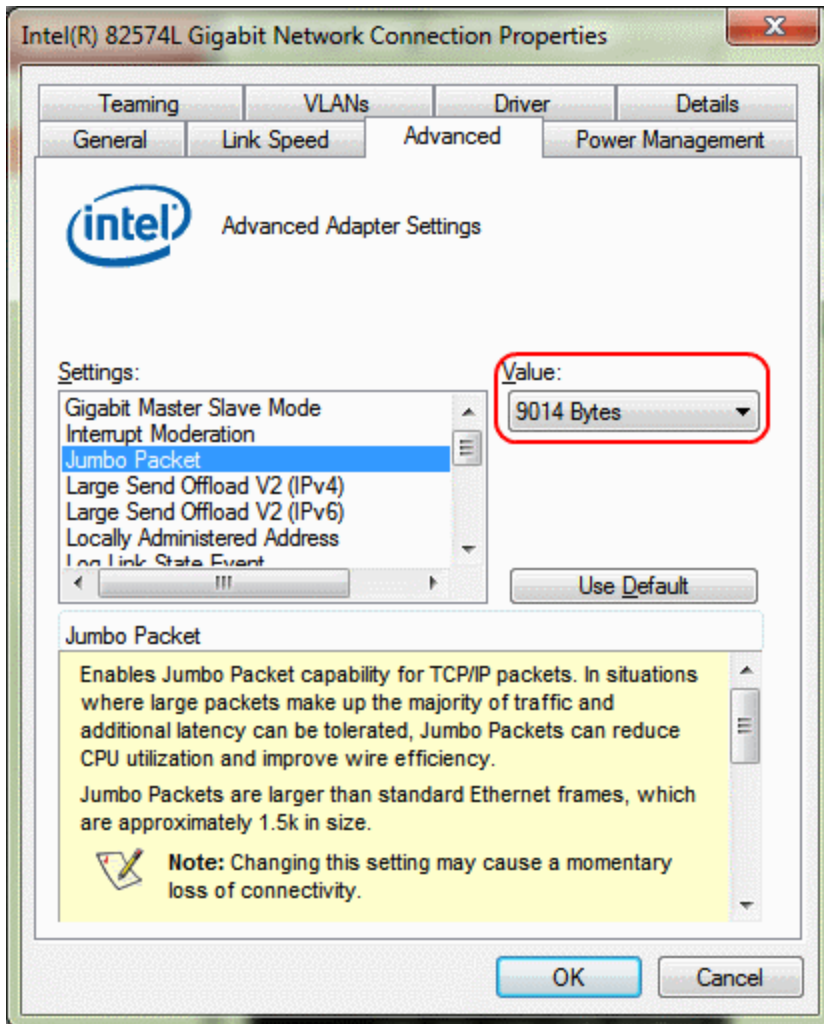
File Server<==>[WAN1]FWF60C[internal]<==>PC01

>>File Server network config:

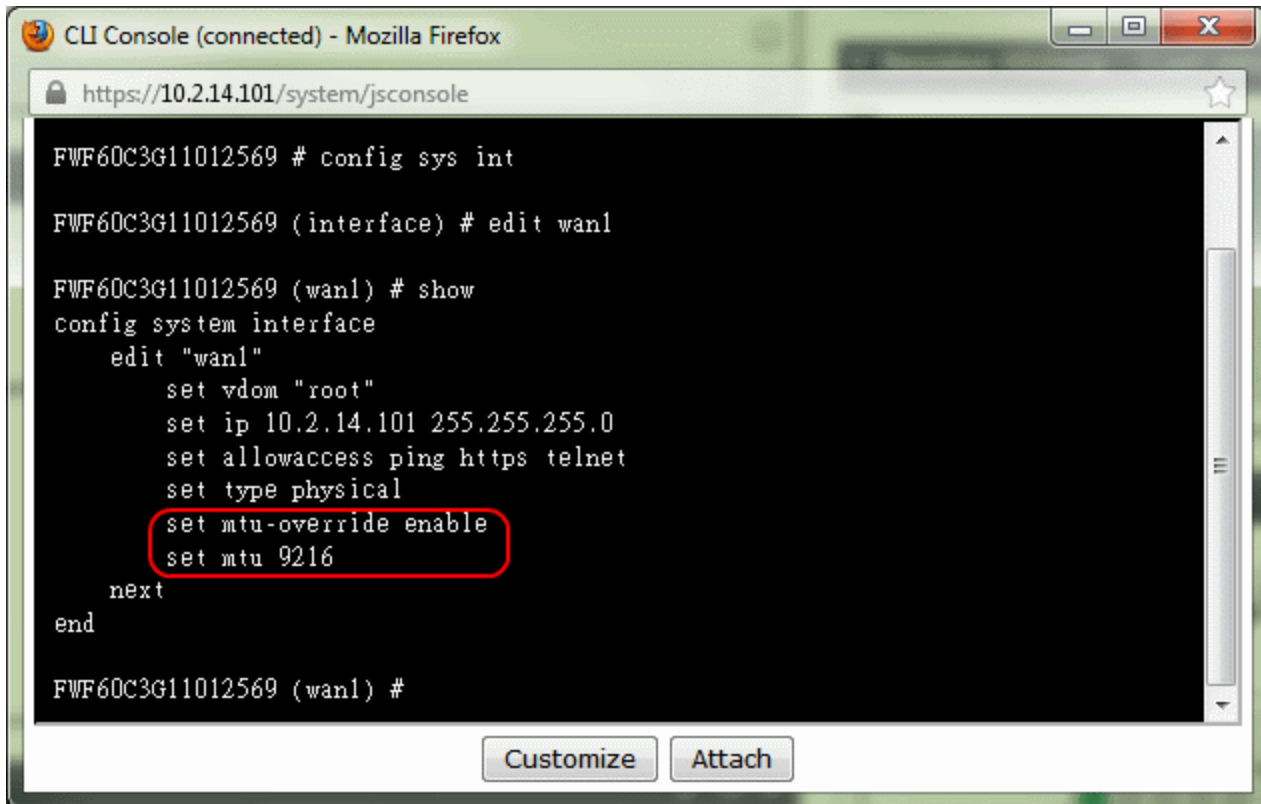
Get network configuration automatically (DHCP)  
 Use manual configuration

IP address:   
 Subnet mask:   
 Jumbo Frame:   
 Network Status:   
 Enable VLAN (802.1Q) ⓘ  
 VLAN ID:

>>PC01 network config:



>>FWF60C\$wan1 config:

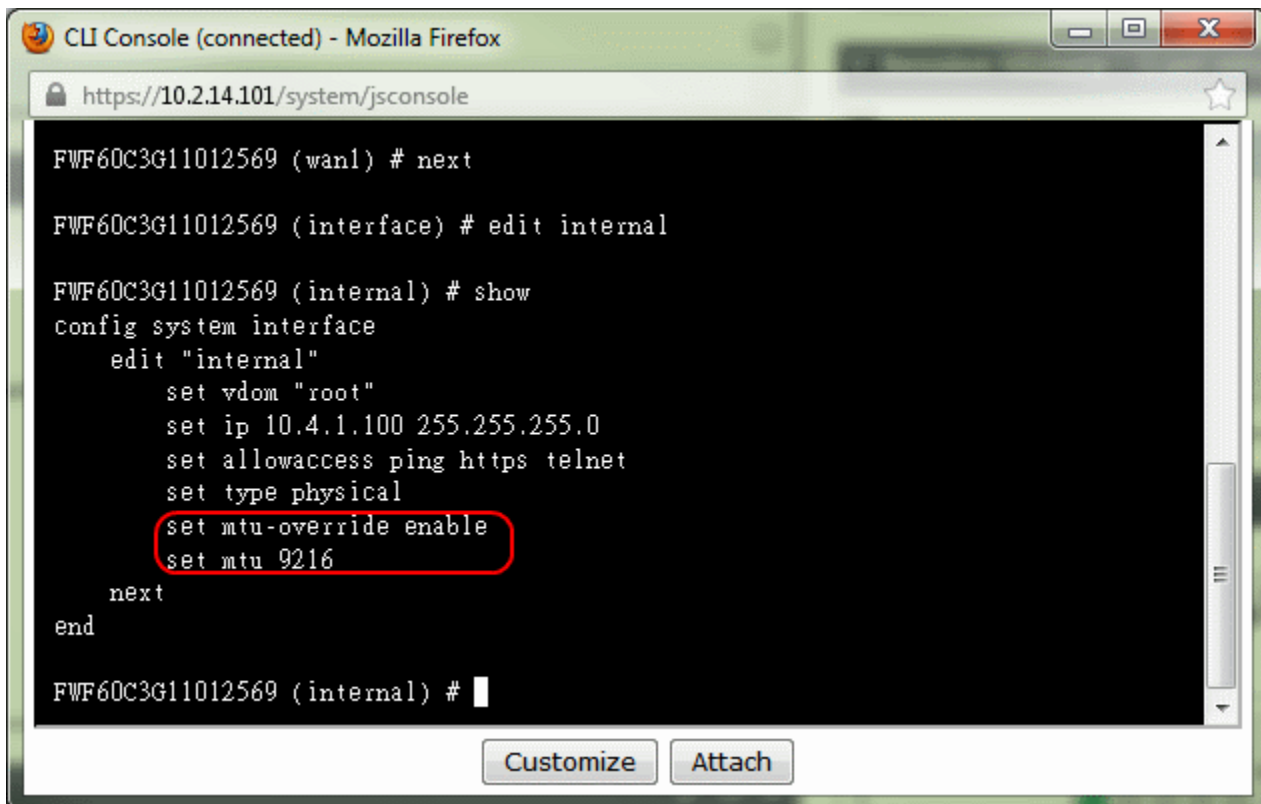


```

CLI Console (connected) - Mozilla Firefox
https://10.2.14.101/system/jsconsole
FWF60C3G11012569 # config sys int
FWF60C3G11012569 (interface) # edit wan1
FWF60C3G11012569 (wan1) # show
config system interface
  edit "wan1"
    set vdom "root"
    set ip 10.2.14.101 255.255.255.0
    set allowaccess ping https telnet
    set type physical
    set mtu-override enable
    set mtu 9216
  next
end
FWF60C3G11012569 (wan1) #

```

>>FWF60C\$internal network config:



```

CLI Console (connected) - Mozilla Firefox
https://10.2.14.101/system/jsconsole
FWF60C3G11012569 (wan1) # next
FWF60C3G11012569 (interface) # edit internal
FWF60C3G11012569 (internal) # show
config system interface
  edit "internal"
    set vdom "root"
    set ip 10.4.1.100 255.255.255.0
    set allowaccess ping https telnet
    set type physical
    set mtu-override enable
    set mtu 9216
  next
end
FWF60C3G11012569 (internal) #

```

>>firewall policy config:

\*\*????FGT unit????LAN?????, ?????routing????, ???NAT??.

Policy Type  Firewall  VPN

Policy Subtype  Address  User Identity  Device Identity

Incoming Interface

Source Address  +

Outgoing Interface

Destination Address  +

Schedule

Service  +

Action  +

Enable NAT

Use Destination Interface Address  Fixed Port

Use Dynamic IP Pool

Log Allowed Traffic

**UTM Security Profiles**

- AntiVirus
- Web Filter
- Application Control
- IPS
- Email Filter
- DLP Sensor
- SSL Inspection

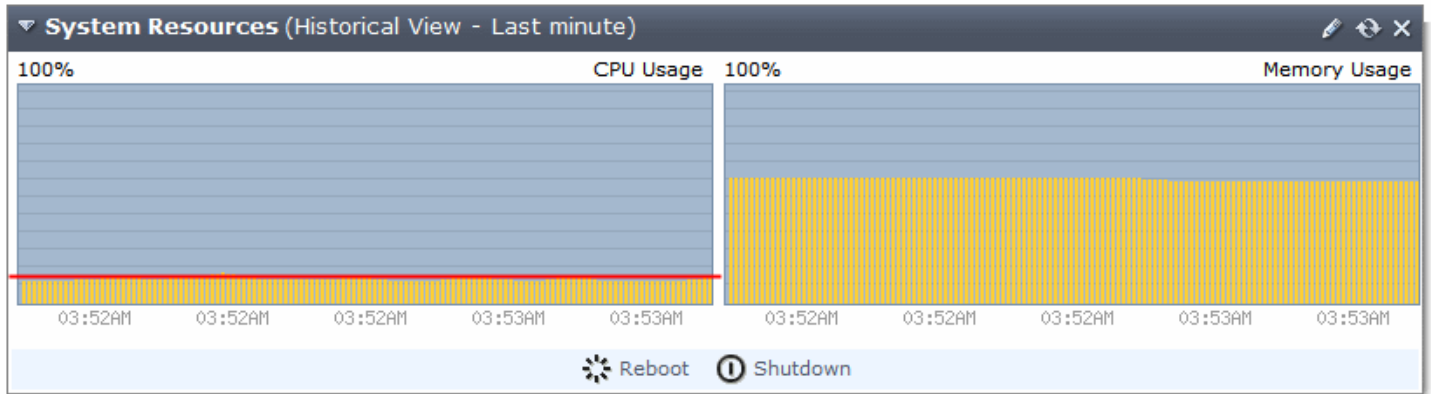
Traffic Shaping

???????, ???????I/O??, ???FTP????:

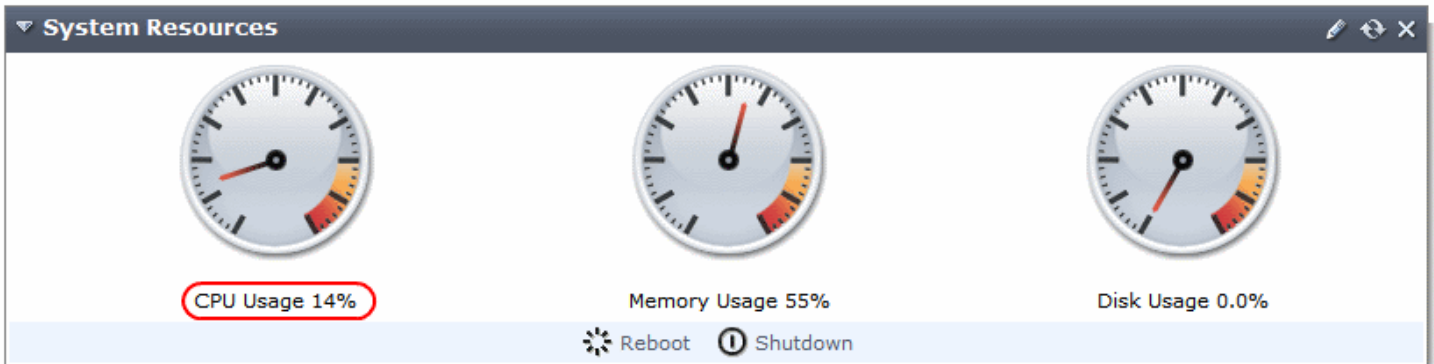
Server/Local file		Direction	Remote file	Size	Priority	Status
admin@10.2.14.190		-->>	/video/Gladiator.2000.10th.An...	21,433,592,...	Normal	Transferring
D:\Temp Files\Gladiator.20...		00:00:17 elapsed	00:04:23 left	5.9%	1,273,757,696 bytes (73.7 MiB/s)	

??File Server?I/O??, ?????70~80MB/s?????, ???CPU Usage??????????:

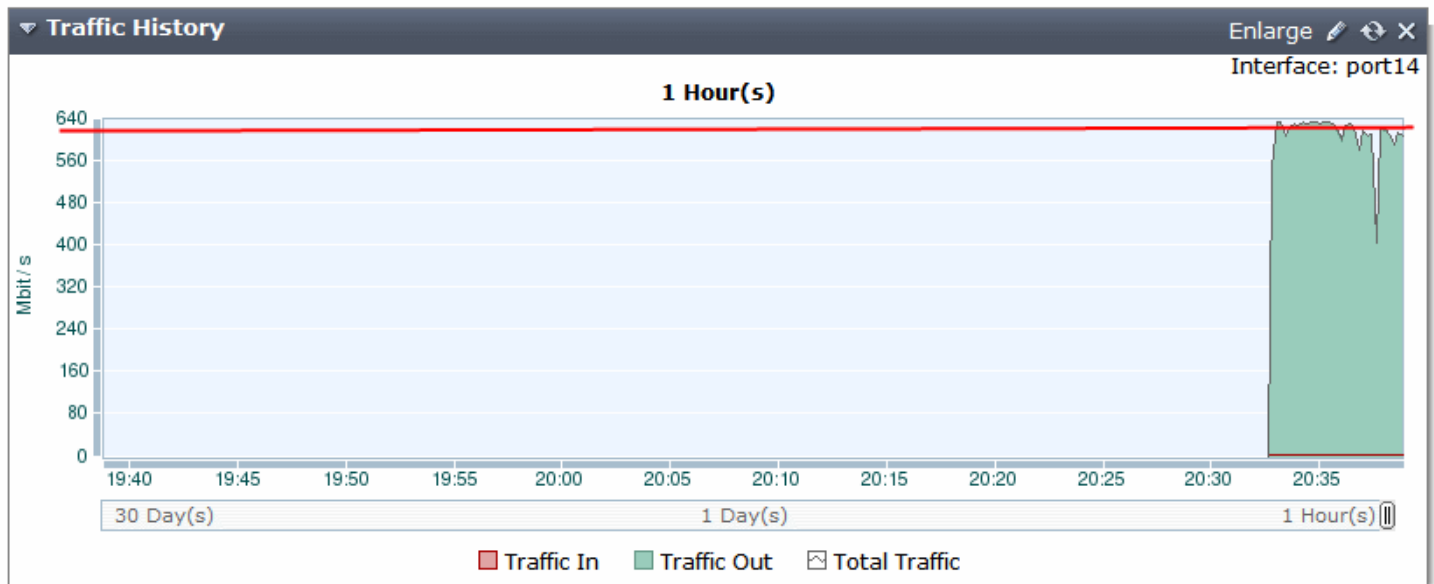




?monitor??????, ???????????:



??????????(Traffic monitor)????:



??NPU?????I/O????????????, ???FWF60C????????...

#	Src	Dst	Policy ID	Device	Application Name	Bytes (Sent/Received)	FortiASIC	Duration
1	10.4.1.10:51191	119.235.235.91:443	1	N/A	N/A	144	NPLite	1,732
2	10.4.1.10:51026	157.55.56.142:40016	1	N/A	N/A	144	NPLite	1,884
3	10.4.1.10:52213	211.72.203.62:80	1	N/A	N/A	404	NPLite	94
4	10.4.1.10:52172	211.72.203.62:80	1	N/A	N/A	404	NPLite	163
5	10.4.1.10:51036	10.2.14.190:445	1	N/A	N/A	144	NPLite	1,874
6	10.4.1.10:51066	64.4.61.205:443	1	N/A	N/A	140	NPLite	1,860
7	10.4.1.10:52250	208.91.113.66:80	1	N/A	N/A	144	NPLite	14
8	10.4.1.10:52255	208.91.113.66:80	1	N/A	N/A	1,029	NPLite	13
9	10.4.1.10:52254	208.91.113.66:80	1	N/A	N/A	144	NPLite	14
10	10.4.1.10:52253	208.91.113.66:80	1	N/A	N/A	144	NPLite	14
11	10.4.1.10:52252	208.91.113.66:80	1	N/A	N/A	922	NPLite	14
12	10.4.1.10:52256	208.91.113.66:80	1	N/A	N/A	1,025	NPLite	13
13	10.4.1.10:52233	10.2.13.100:8010	1	N/A	N/A	52	-	56
14	10.4.1.10:52249	10.2.13.100:8010	1	N/A	N/A	52	-	16
15	10.4.1.10:52246	10.2.13.100:8010	1	N/A	N/A	52	-	36

有效的NPU加速顯示出, 建立的session不會經過CPU操作, 而是轉發到專屬的ASIC-based processor進行處理。

New Sessions per Second: 0 / Total Concurrent Sessions: 22

1 / 1 Total: 15