

??????...

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

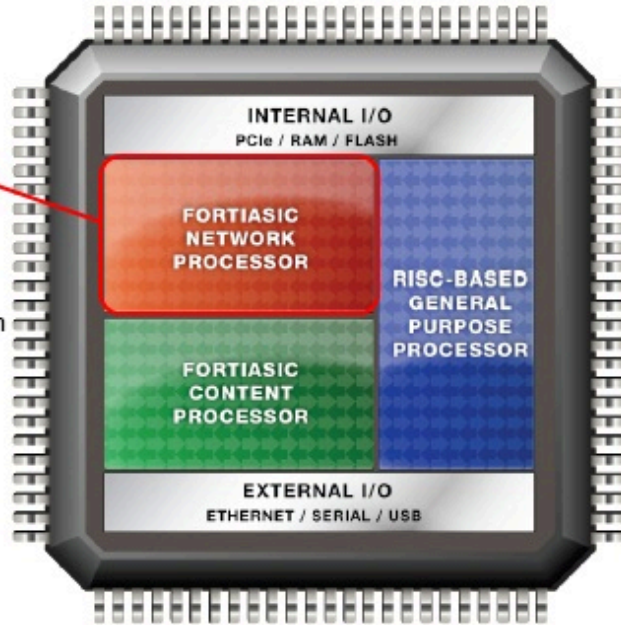
?????????????

???!...

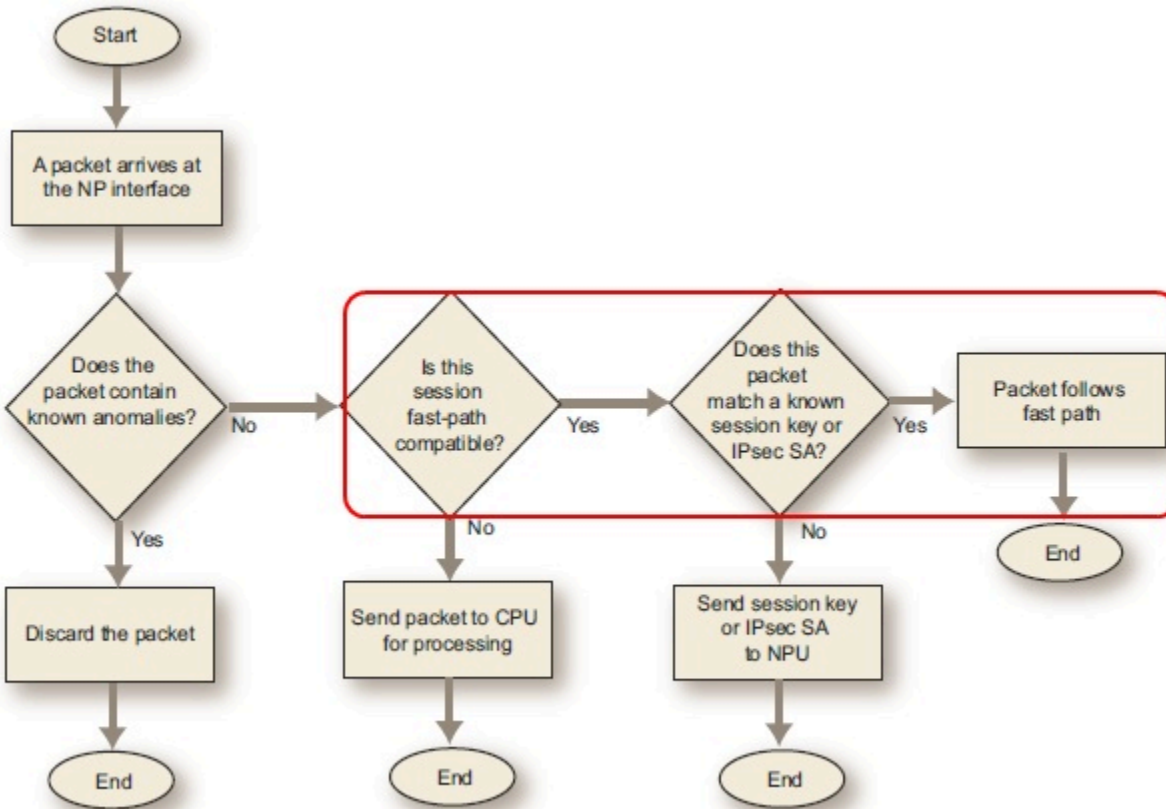
??UTM???, ???80C, 110C, 111C?????.....

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

- 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??...

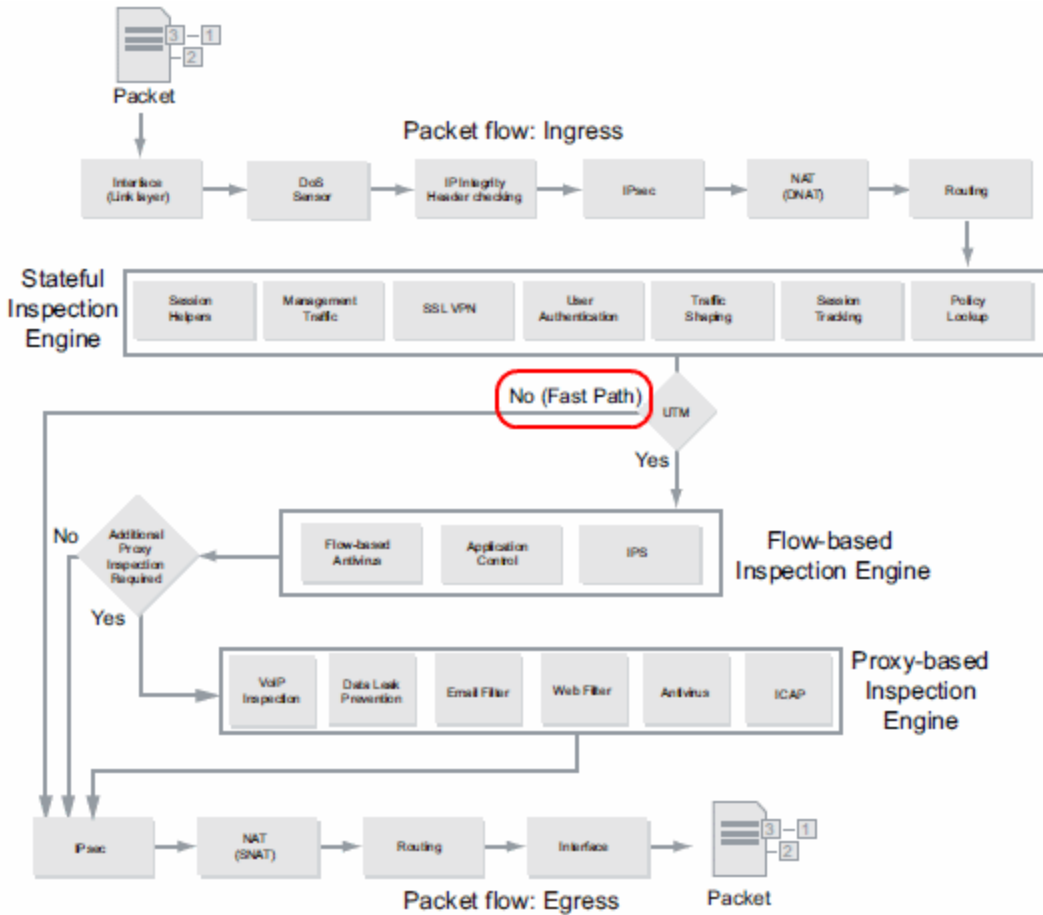
????NP+CP???

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

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

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

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



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

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

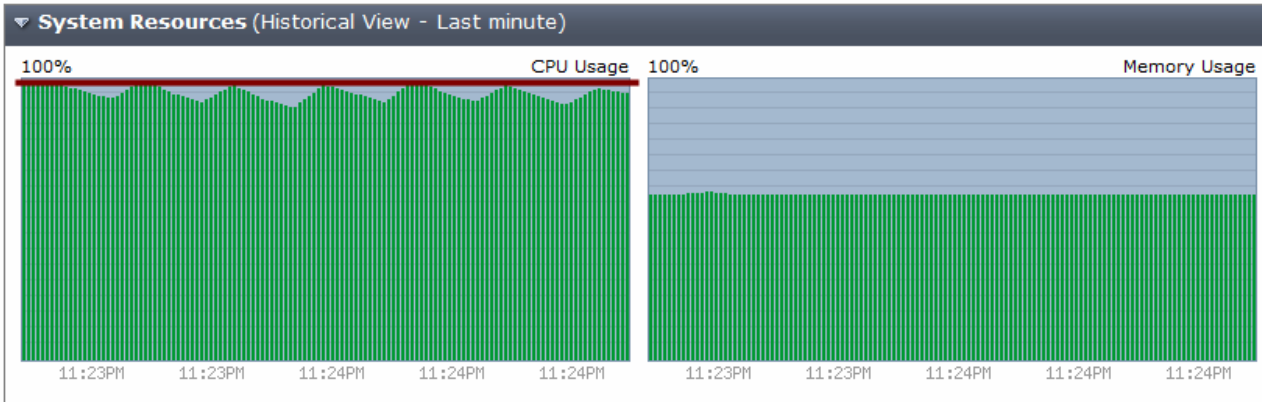
??????????, ?????????..

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	

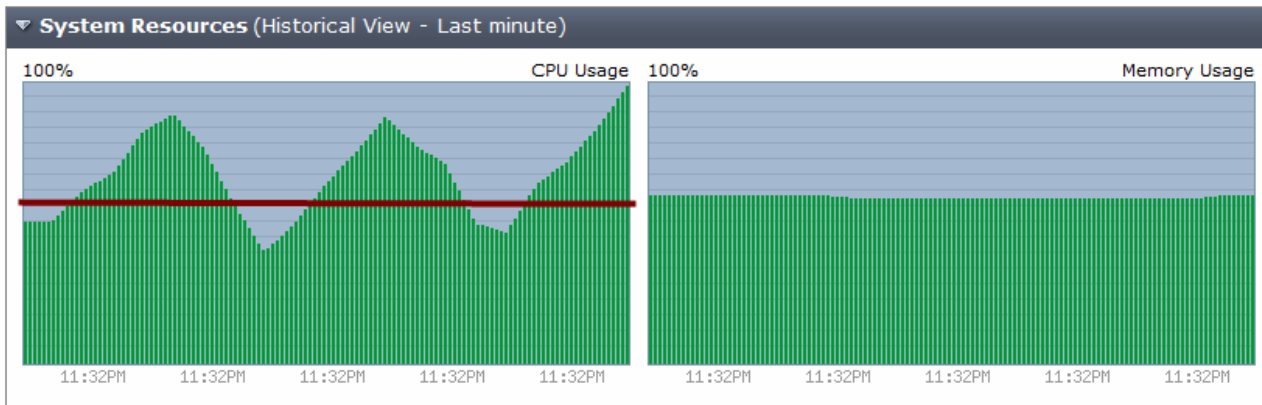
同時下載, 每一個下載切割10個threads

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

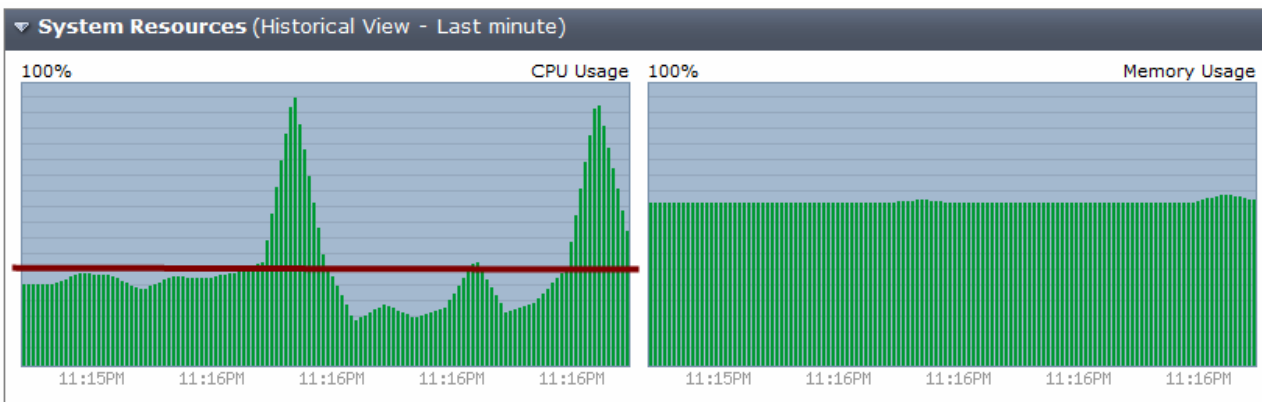
??60C, ??????????...



??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????????

??????????:

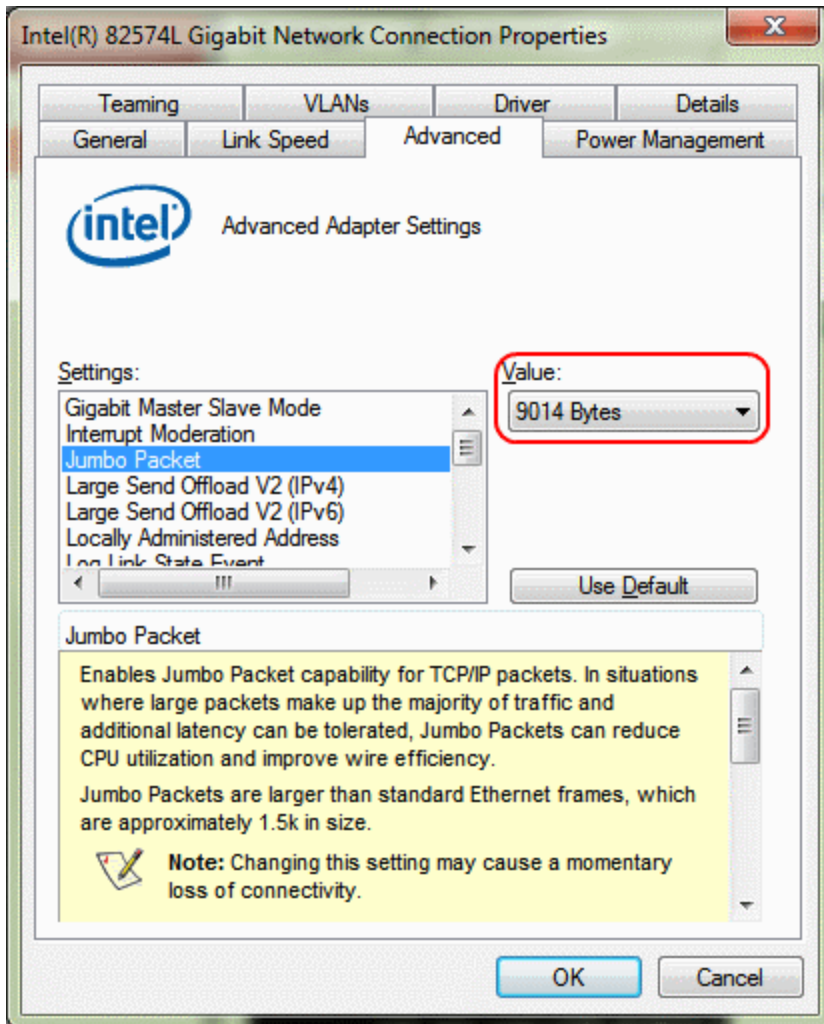
File Server<==>[WAN1]FWF60C[internal]<==>PC01

>>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

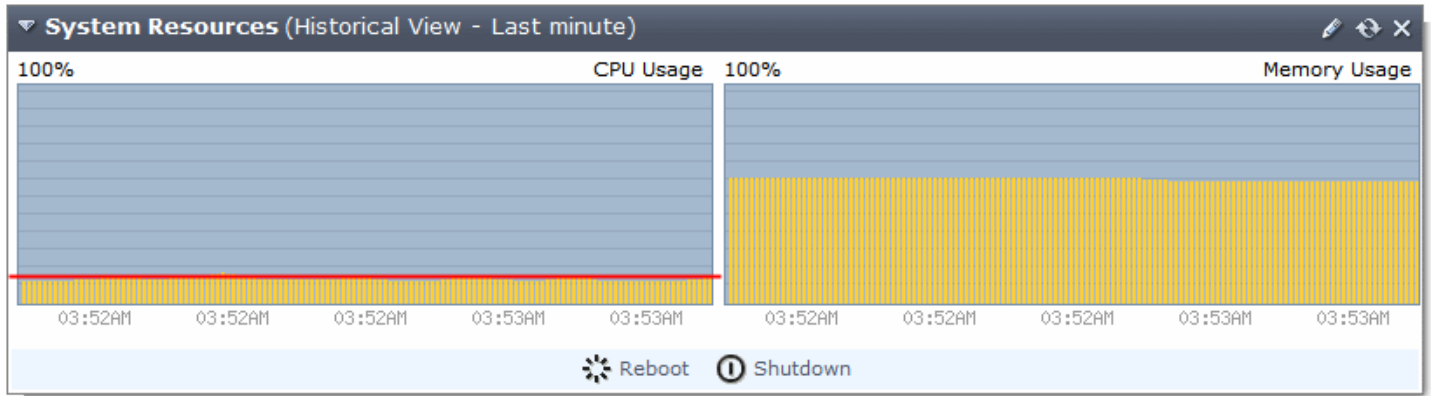
Traffic Shaping

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

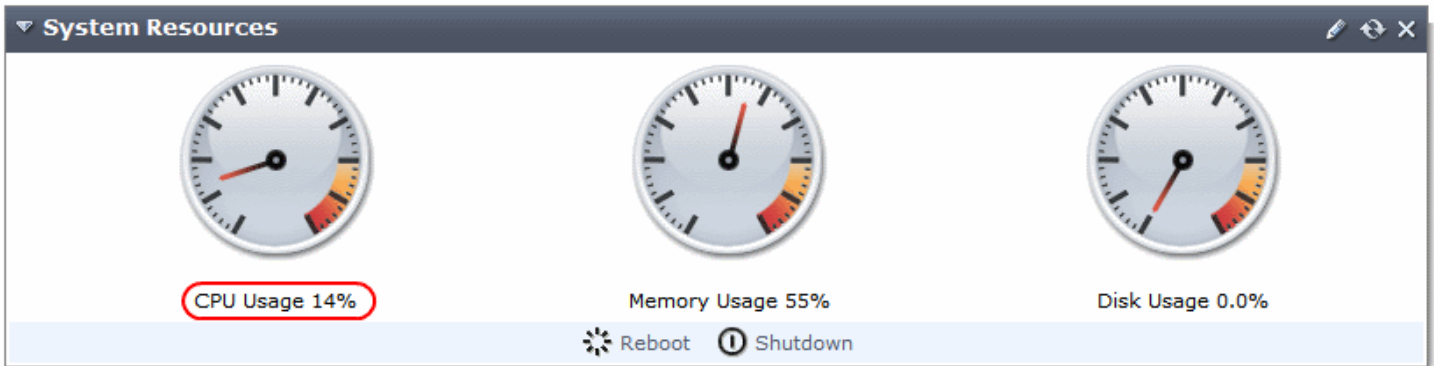
Server/Local file		Direction	Remote file	Size	Priority	Status
admin@10.2.14.190		-->>	/video/Gladiator.2000.10th.An...	21,433,592,...	Normal	Transferring
D:\Temp Files\Gladiator.20...		00:00:17 elapsed	00:04:23 left	5.9%	1,273,757,696 bytes (73.7 MiB/s)	

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

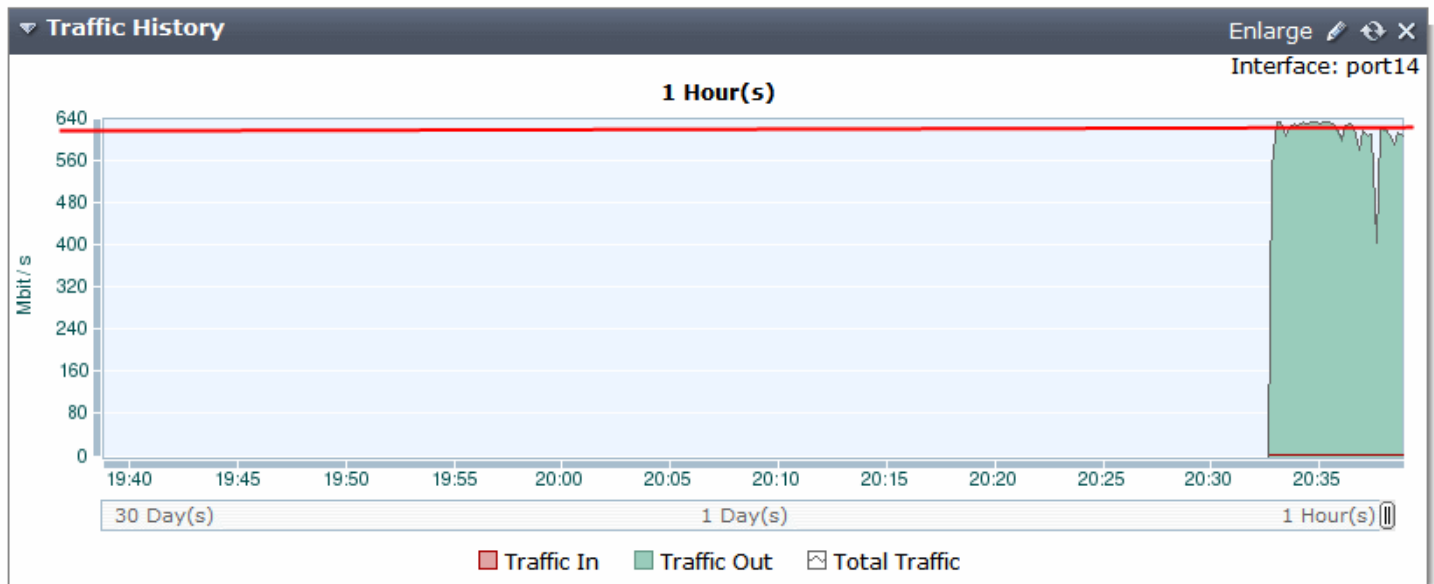




?monitor??????, ???????????:



??????????(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