

# **POZNAŃ** **SUPERCOMPUTING AND** **NETWORKING** **CENTER**



**Introduction to PsPing**  
**- a new Microsoft Windows tool for measuring**  
**network performance**

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## Sysinternals Suite

Sysinternals Suite is a set of advanced system utilities for Microsoft Windows systems

- Created in 1996 by Mark Russinovich and Bryce Cogswell
- Acquired by Microsoft in 2006
- Currently includes 70+ tools
  - File and Disk Utilities
  - Networking Utilities
  - Process Utilities
  - Security Utilities
  - System Information Utilities
  - Miscellaneous Utilities
- Graphical and CLI versions of tools
- Free to install and use
- <http://technet.microsoft.com/en-us/sysinternals>

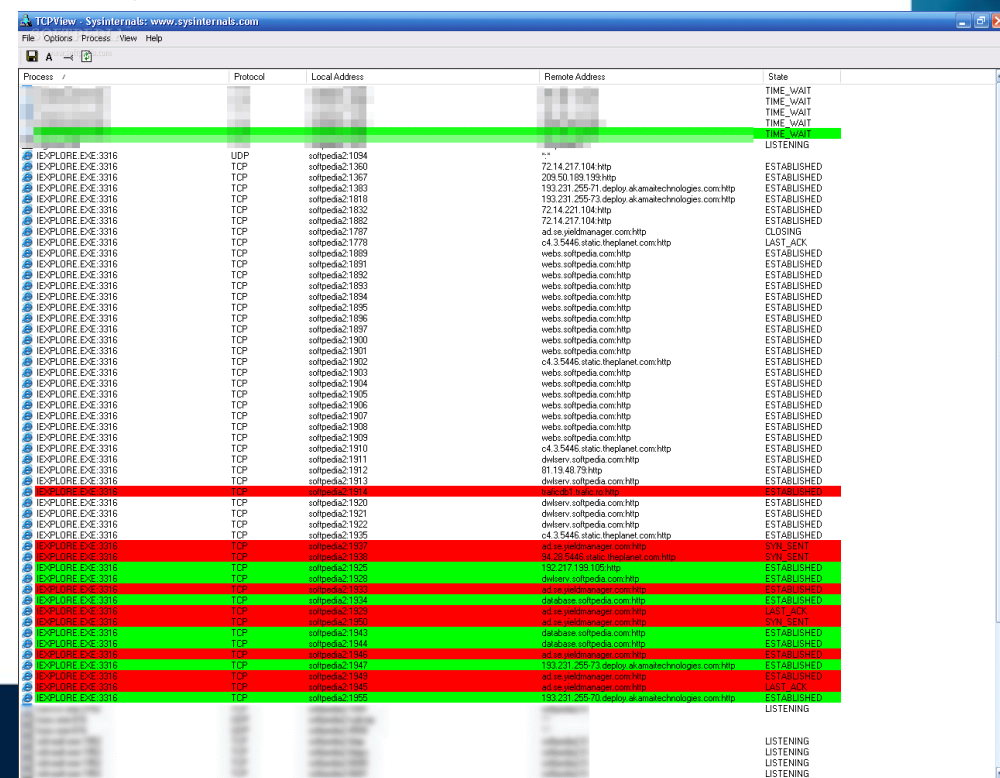
## Sysinternals Suite

### Sysinternals Networking Utilities

- [AD Explorer](#)  
Active Directory Explorer is an advanced Active Directory (AD) viewer and editor.
- [AD Insight](#)  
AD Insight is an LDAP (Light-weight Directory Access Protocol) real-time monitoring tool aimed at troubleshooting Active Directory client applications.
- [AdRestore](#)  
Undelete Server 2003 Active Directory objects.
- [PipeList](#)  
Displays the named pipes on your system, including the number of maximum instances and active instances for each pipe.
- [PsFile](#)  
See what files are opened remotely.
- [PsTools](#)  
The PsTools suite includes command-line utilities for listing the processes running on local or remote computers, running processes remotely, rebooting computers, dumping event logs, and more.
- [ShareEnum](#)  
Scan file shares on your network and view their security settings to close security holes.
- [TCPView](#)  
Active socket command-line viewer.
- [Whois](#)  
See who owns an Internet address.

## TCPView

- detailed listings of all TCP and UDP endpoints
- including the local and remote addresses
- state of TCP connections.
- reports the name of the process that owns the endpoint. - Windows Server 2008, Vista, and XP, TCPView also
- provides a more informative and conveniently presented subset of the Netstat program that ships with Windows.
- Tcpcvcon, a command-line version with the same functionality.



## PsPing

- a command-line utility
- for measuring network performance.
- In addition to **standard ICMP ping** functionality, it can report:
  - the **latency of connecting to TCP ports**,
  - the **latency of TCP round-trip** communication between systems,
  - the **TCP bandwidth** available to a connection between systems.
  - Besides obtaining min, max, and average values in 0.01ms resolution, you can also use PsPing to generate histograms of the results that are easy to import into spreadsheets.
  - IPv4, IPv6
  - <http://technet.microsoft.com/en-us/sysinternals/jj729731>

## PsPing – ICMP ping

- When ICMP ping is blocked - you can try tcp ping instead (next slide)

```
c:\win7-ap\sysinternals>psping amazon.com

PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

Pinging 72.21.211.176 with 32 bytes of data:
5 iterations (warmup 1) ping test:
Error pinging 72.21.211.176:
Request timed out.
Error pinging 72.21.211.176:
Request timed out.

    Sent = 1, Received = 0, Lost = 1 (100% loss),
    Minimum = 0.00ms, Maximum = 0.00ms, Average = 0.00ms
Control C
```

## PsPing – tcp ping

- Usefull when ICMP is blocked
- Example of tcp ping output

```
c:\win7-ap\sysinternals>psping amazon.com:80

PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

TCP connect to 72.21.214.128:80:
5 iterations (warmup 1) connecting test:
Connecting to 72.21.214.128:80 (warmup): 116.22ms
Connecting to 72.21.214.128:80: 114.73ms
Connecting to 72.21.214.128:80: 113.85ms
Connecting to 72.21.214.128:80: 113.73ms
Connecting to 72.21.214.128:80: 113.91ms

TCP connect statistics for 72.21.214.128:80:
  Sent = 4, Received = 4, Lost = 0 (0% loss),
  Minimum = 113.73ms, Maxiumum = 114.73ms, Average = 114.06ms
```

## PsPing – TCP latency test

TCP latency usage:

1. server: `psping [[-6]][-4] <-s source:sourceport>`
2. client: `psping [[-6]][-4] [-h [buckets]] [-r] <-l requestsize>] <-n count> [-w <count>] <destination:destport>`

- h Print histogram (default bucket count is 20).
- l Request size.
- n Number of sends/receives.
- r Receive from the server instead of sending.
- w Warmup with the specified number of iterations (default is 5).
- 4 Force using IPv4.
- 6 Force using IPv6.

The server can serve both latency and bandwidth tests and remains active until you terminate it with Control-C.



## PsPing – latency test

### 1. Set psping

```
C:\Program Files (x86)\sysinternals>psping -s [2001:808:2:3105::27]:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

Type Control-C to exit.
Waiting for connection on 2001:808:2:3105::27:8080: Connected
```

### 2. Run as client for testing – IPv6

```
C:\Program Files (x86)\sysinternals>psping -l 8192 [2001:808:2:3105::27]:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

TCP latency test connecting to 2001:808:2:3105::27:8080: Connected
9 iterations (warmup 5) sending 8192 bytes latency test: 100%

TCP roundtrip latency statistics (post warmup):
Sent = 4, Size = 8192, Total Bytes: 32768,
Minimum = 1.49ms, Maximum = 3.37ms, Average = 2.42ms
```

## PsPing – latency test & histogram output

1. Psping with -h Print histogram

```
C:\Program Files (x86)\sysinternals>psping -l 8192 -h 10 [2001:808:2:3105::27]:8080

PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

TCP latency test connecting to 2001:808:2:3105::27:8080: Connected
9 iterations (warmup 5) sending 8192 bytes latency test: 100%

TCP roundtrip latency statistics (post warmup):
  Sent = 4, Size = 8192, Total Bytes: 32768,
  Minimum = 1.61ms, Maximum = 7.86ms, Average = 4.26ms

Latency Count
1.61      2
2.30      0
3.00      0
3.69      0
4.39      0
5.08      1
5.77      0
6.47      0
7.16      1
7.86      0
```

## PsPing – bandwidth test IPv4

- **Internal IPv4 (Virtual Switch)** interface between two windows 7 in VMware

1. Set psping

```
C:\Program Files (x86)\sysinternals>psping -s 10.134.0.28:8080

PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

Type Control-C to exit.
Waiting for connection on 10.134.0.28:8080:
```

2. Run as client for testing

```
C:\Program Files (x86)\sysinternals>psping -b -l 8192 -n 100000 10.134.0.28:8080

PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

TCP bandwidth test connecting to 10.134.0.28:8080: Connected
100005 iterations (5 warmup) sending 8192 bytes bandwidth test: 100%

TCP bandwidth statistics:
Sent = 100000, Size = 8192, Total Bytes: 819200192,
Minimum = 79.32 MB/s, Maximum = 80.69 MB/s, Average = 79.32 MB/s
```

## PsPing – bandwidth test IPv6

- **Internal IPv6 (Virtual Switch)** interface between two windows 7 in VMware

1. Set psping

```
C:\Program Files (x86)\sysinternals>psping -s [2001:808:2:3100::33]:8080
```

```
PsPing v1.0 - ping, latency, bandwidth measurement utility  
Copyright (C) 2012 Mark Russinovich  
Sysinternals - www.sysinternals.com
```

```
Type Control-C to exit.
```

```
Waiting for connection on 2001:808:2:3100::33:8080: Connected
```

2. Run as client for testing

```
C:\Program Files (x86)\sysinternals>psping -b -l 8192 -n 100000 [2001:808:2:3100::33]:8080
```

```
PsPing v1.0 - ping, latency, bandwidth measurement utility  
Copyright (C) 2012 Mark Russinovich  
Sysinternals - www.sysinternals.com
```

```
TCP bandwidth test connecting to 2001:808:2:3100::33:8080: Connected  
100005 iterations (5 warmup) sending 8192 bytes bandwidth test: 100%
```

```
TCP bandwidth statistics:
```

```
Sent = 100000, Size = 8192, Total Bytes: 819200192,  
Minimum = 90.56 MB/s, Maximum = 124.06 MB/s, Average = 107.14 MB/s
```

## PsPing – bandwidth test IPv4

- **External IPv4** interface between two windows 7 in VMware connected via Gigabit eth switch
  1. Set psping

```
C:\Program Files (x86)\sysinternals>psping -s 10.99.0.1:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com
Type Control-C to exit.
Waiting for connection on 10.99.0.1:8080: Connected
```

2. Run as client for testing

```
C:\Program Files (x86)\sysinternals>psping -s 10.99.0.1:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com
Type Control-C to exit.
Waiting for connection on 10.99.0.1:8080: Connected
100005 iterations (5 warmup) receiving 8192 bytes bandwidth test: 100%
TCP bandwidth statistics:
Received = 100000, Size = 8192, Total Bytes: 819208192
Minimum = 50.31 MB/s, Maximum = 52.12 MB/s, Average = 50.88 MB/s
```

## PsPing – bandwidth test IPv6

- **External IPv6** interface between two windows 7 in VMware connected via Gigabit eth switch
1. Set psping

```
C:\Program Files (x86)\sysinternals>psping -s [2001:808:2:3105::27]:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com
Type Control-C to exit.
Waiting for connection on 2001:808:2:3105::27:8080: Connected
```

2. Run as client for testing

```
C:\Program Files (x86)\sysinternals>psping -b -l 8192 -n 100000 [2001:808:2:3105::27]:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com
TCP bandwidth test connecting to 2001:808:2:3105::27:8080: Connected
100005 iterations (5 warmup) sending 8192 bytes bandwidth test: 100%
TCP bandwidth statistics:
Sent = 100000, Size = 8192, Total Bytes: 819200192,
Minimum = 44.37 MB/s, Maximum = 56.69 MB/s, Average = 49.37 MB/s
```

## Iperf 2.0.5 – bandwidth test IPv4

- **External IPv4** interface between two windows 7 in VMware connected via Gigabit eth switch

### 1. server

```
C:\Program Files (x86)\sysinternals>iperf
Usage: iperf [-s|-c host] [options]
Try 'iperf --help' for more information.

C:\Program Files (x86)\sysinternals>iperf -s -w 8192
-----
Server listening on TCP port 5001
TCP window size: 8.00 KByte
-----
```

### 2. Run as client for testing

```
C:\Program Files (x86)\sysinternals>iperf -c 10.99.0.1 -w 8192
-----
Client connecting to 10.99.0.1, TCP port 5001
TCP window size: 8.00 KByte
-----
[164] local 10.99.0.2 port 51495 connected with 10.99.0.1 port 5001
[ ID] Interval      Transfer      Bandwidth
[164] 0.0-10.1 sec  1.10 GBytes   941 Mbits/sec
```

## Iperf 2.0.5 vs psping 1.0

- **External IPv4** interface between two windows 7 in VMware connected via Gigabit eth switch
- psping

```
TCP bandwidth test connecting to 2001:808:2:3105::27:8080: Connected
100005 iterations (5 warmup) sending 8192 bytes bandwidth test: 100%

TCP bandwidth statistics:
Sent = 100000, Size = 8192, Total Bytes: 819208192,
Minimum = 44.37 MB/s, Maximum = 56.69 MB/s, Average = 49.37 MB/s
```

- iperf

```
C:\Program Files (x86)\sysinternals>iperf -c 10.99.0.1 -w 8192
-----
Client connecting to 10.99.0.1, TCP port 5001
TCP window size: 8.00 KByte
-----
[164] local 10.99.0.2 port 51495 connected with 10.99.0.1 port 5001
[ ID] Interval      Transfer    Bandwidth
[164] 0.0-10.1 sec  1.10 GBytes  941 Mbits/sec
```



## Iperf 2.0.5 vs psping 1.0 (2)

- **External IPv4** interface between two windows 7 in VMware connected via Gigabit eth switch
- Psping – sending 100.000.000 bytes

```
C:\Program Files (x86)\sysinternals>psping -b -l 100000000 10.99.0.1:8080
PsPing v1.0 - ping, latency, bandwidth measurement utility
Copyright (C) 2012 Mark Russinovich
Sysinternals - www.sysinternals.com

TCP bandwidth test connecting to 10.99.0.1:8080: Connected
9 iterations (5 warmup) sending 100000000 bytes bandwidth test: 100%

TCP bandwidth statistics:
Sent = 4, Size = 100000000, Total Bytes: 500000000,
Minimum = 95.14 MB/s, Maximum = 191.30 MB/s, Average = 136.96 MB/s
```

- iperf

```
C:\Program Files (x86)\sysinternals>iperf -c 10.99.0.1 -w 8192
-----
Client connecting to 10.99.0.1, TCP port 5001
TCP window size: 8.00 KByte
-----
[164] local 10.99.0.2 port 51495 connected with 10.99.0.1 port 5001
[ ID] Interval      Transfer      Bandwidth
[164] 0.0-10.1 sec  1.10 GBytes  941 Mbits/sec
```