

## **Sun Ray Bandwidth vs. Citrix**

One of the most misunderstood things about any thin client protocol is the required bandwidth. At Sun we tell customers that you should have 384 Kbps per live session for a good user experience. Citrix however uses a marketing number of "on average" 20 Kbps per second.

A smart person should ask exactly how long the period of time that average is over and what was the user doing. Sadly I don't run into too many smart people when talking about thin client bandwidth. Usually they miss the key word "average" and ask why the Sun Ray protocol (Appliance Link Protocol, or ALP) needs so much more than Citrix. As you can imagine this difference causes great concern over where to place devices in remote office scenarios. Should the Sun Ray Server be kept local to the DTU's to minimize network traffic? Can Citrix really operate @ 20 Kbps while displaying a full screen 24 bit desktop? You decide (*Note to viewers...My voice is not lispy like that..damn flash compression!*)

Note that this is not an exercise to bash Citrix. I have nothing but love and respect for Citrix. They have great software and vision. Furthermore no other company has done more to advance thin client computing than Citrix. This is an attempt to separate marketing speak from the facts. The only thing worse than letting marketing folks speak to technical details is having executive types regurgitate marketing speak about technical details. The only bad thing I can say about Citrix is that they won't wake up and smell the Java and write a recent ICA Client for Solaris x86.

So what can we say about averages? Really nothing. Averages are about as useful in recommending thin client bandwidth needs as they are for telling you how to dress for Las Vegas. Las Vegas has an average temperature of 75 degrees. What that average doesn't tell you though is that it is not uncommon for summer temps to near 120 degrees and winter temps to get in the 30 degree ranges. You could wind up either suffering from heat stroke or freezing to death if you dressed for the average.

So let's compare apples and apples and drop the term average and see what Sun Ray requires and what Citrix requires doing relatively the same thing. First let me explain the test environment so you can duplicate it on your own.

### **Hardware**

The following hardware was used for testing:

- Desktop Unit = Sun Ray 1G
- Monitor = 24" LCD @ 1920x1200
- Sun Ray Server = Sun Ray V250
- Dual 1.2 GHz UIII-i Processors
- 8 GB RAM
- Citrix Server = Sun W2100Z
- Dual AMD Opteron 246 (2 GHz)
- 2 GB RAM
- Windows PC (for ICA Client Tests)
- Dual AMD Opteron 246 (2 GHz)
- 2 GB RAM

## **Software**

The Following Software was used:

- Solaris 9 Update 7
- Sun Ray Server 3.1
- Citrix ICA Client for Solaris SPARC 8.26
- Citrix Presentation Server 4.0 (Windows)
- Windows 2003 Server SP1
- OpenOffice 2.0 (Solaris)
- Microsoft Office 2003 (Windows)
- Firefox 1.0.7 (Solaris)
- Mozilla Thunderbird 1.0.7 (Solaris/Windows)
- Internet Explorer (Windows)
- Windows XP Professional SP2 (Citrix Client)
- Citrix Metaframe Program Neighborhood 9.0 (Windows)

## **Network Monitoring**

All network traffic was measured by using Ethereal Network protocol analyzer. Ethereal was executed on both the Citrix Server and the Sun Ray Server. One instance of Ethereal monitored the data between the Citrix Server and the PC and another instance monitored the traffic between the Sun Ray Server and the Sun Ray DTU. Filters were then used to remove any other network traffic that did not pertain to the test.

## **Methodology**

To simulate what a typical office worker might do, a 10 minute routine was performed by an actual person. While it is possible to automate these routines with scripting technologies, this method of testing does not represent the keystrokes and the mouse movements that a real user would create. The productivity test was comprised of the following actions:

- Log in
- Check email
- Respond to three emails
- Download two attachments (less than 1 Mb each) to from two separate emails
- Open a new word processing document. Type the following paragraph into document and save:

Enterprise deployments indicate that only 25-40% of DTU's in a failover group are typically active at any given time. For example, recent samples taken from a campus with nearly 1450 Sun Ray terminals only 433 DTU, or 30%, were active. Utilization will vary by the role of the user. For example, a call center may have much higher usage rate since the agents are using their terminals more often than an average office worker.

- Watch PowerPoint presentation
- Surf these web logs:
  - <http://blogs.sun.com/ThinGuy>
  - <http://blogs.sun.com/christophersaul>
  - <http://blogs.sun.com/jonathan>

View Excel spread sheet. Scroll up and down and change tabs.

Surf to CNN.com and view this URL

<http://www.cnn.com/2005/WORLD/europe/10/14/dutch.arrests>

Check email again

Logout

## Test Cases

Since the goal of this test is to help foster decisions on proper equipment placement in a network topology, it is important that each protocol was observed separately to get their utilization numbers. For the Sun Ray tests, a Gnome desktop was used via a Sun Ray Desktop Unit to perform the productivity test.

Likewise a traditional PC running Windows XP Professional and the Citrix Metaframe Program Neighborhood Client for Windows was used to gather statistics about the ICA sessions for the productivity test.

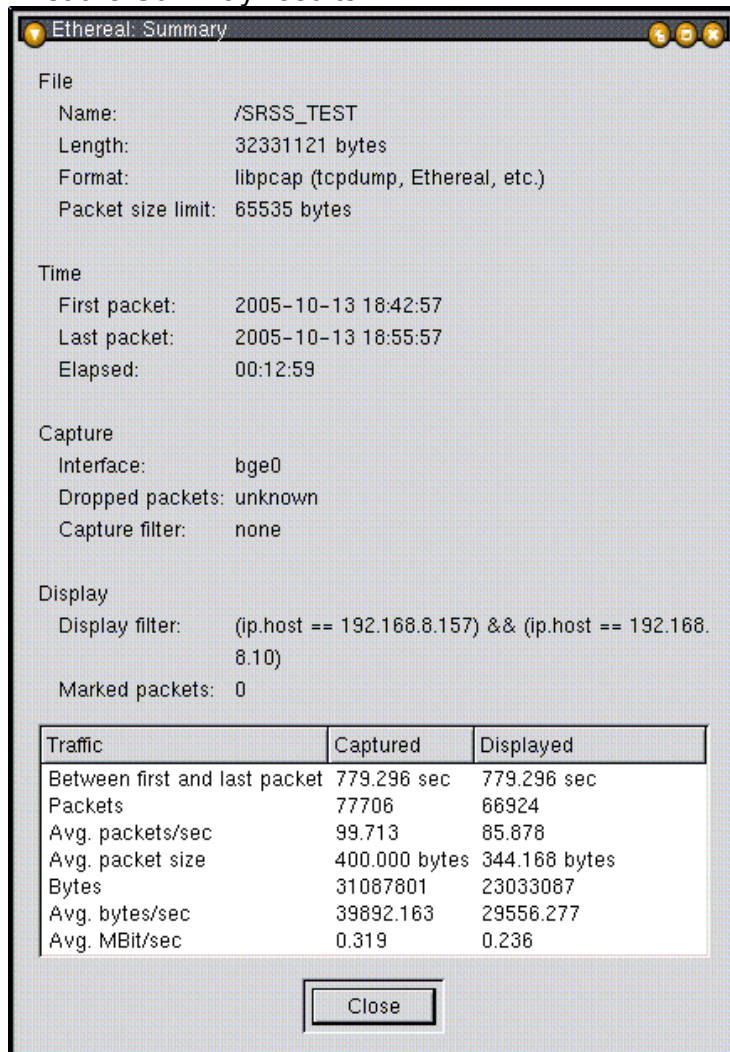
## Results

First, let's talk "averages". Doing these tests the Sun Ray "averaged" 230 Kbps. Citrix averaged 268 Kbps.

What???? What happened to the 20 Kbps marketing number? Did I mention what my "average" Sun Ray bandwidth is while I'm travelling? Do you want to buy some ocean front property in Nevada?

Here are the ethereal graphs for each:

First the Sun Ray results:



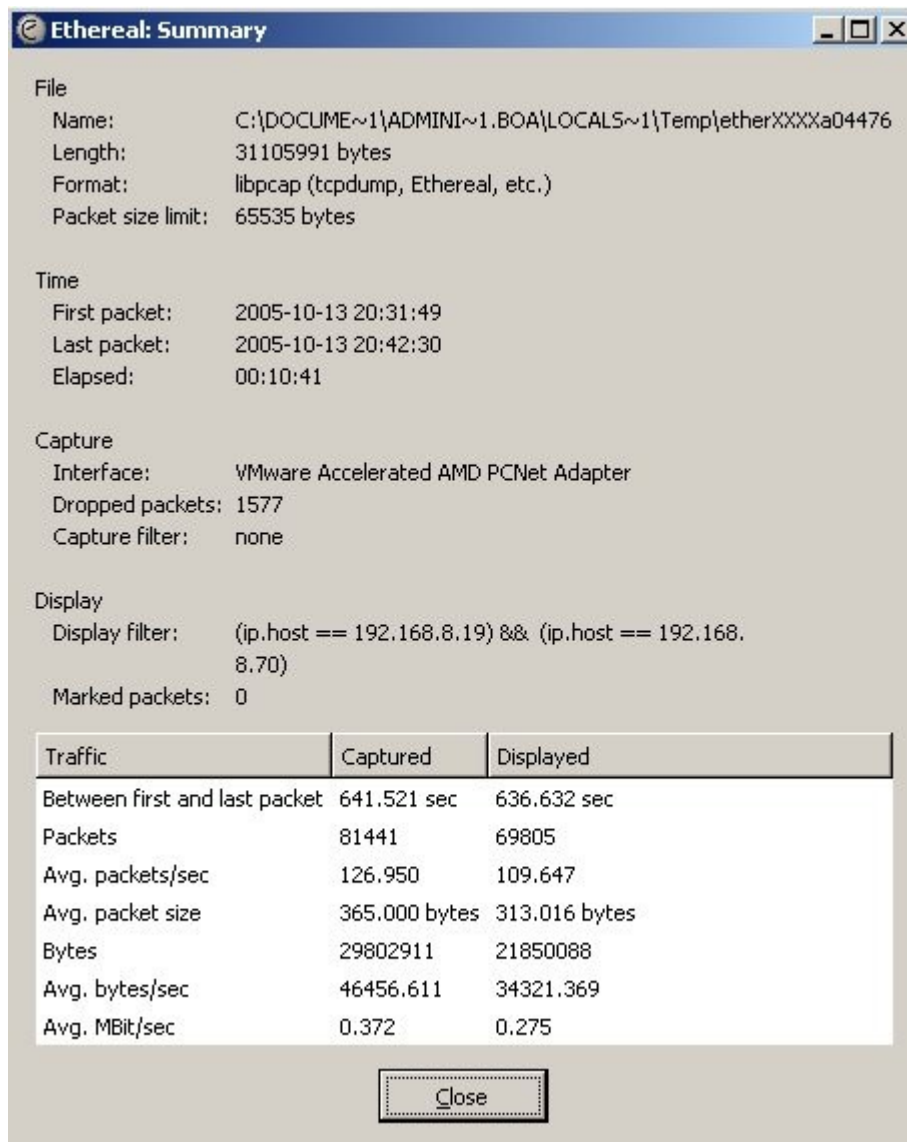
The screenshot shows the 'Ethereal: Summary' window with the following details:

- File:** Name: /SRSS\_TEST, Length: 32331121 bytes, Format: libpcap (tcpdump, Ethereal, etc.), Packet size limit: 65535 bytes
- Time:** First packet: 2005-10-13 18:42:57, Last packet: 2005-10-13 18:55:57, Elapsed: 00:12:59
- Capture:** Interface: bge0, Dropped packets: unknown, Capture filter: none
- Display:** Display filter: (ip.host == 192.168.8.157) && (ip.host == 192.168.8.10), Marked packets: 0

Traffic	Captured	Displayed
Between first and last packet	779.296 sec	779.296 sec
Packets	77706	66924
Avg. packets/sec	99.713	85.878
Avg. packet size	400.000 bytes	344.168 bytes
Bytes	31087801	23033087
Avg. bytes/sec	39892.163	29556.277
Avg. MBit/sec	0.319	0.236

Close

Next is the Citrix graph:



The screenshot shows the 'Ethereal: Summary' window. It displays the following information:

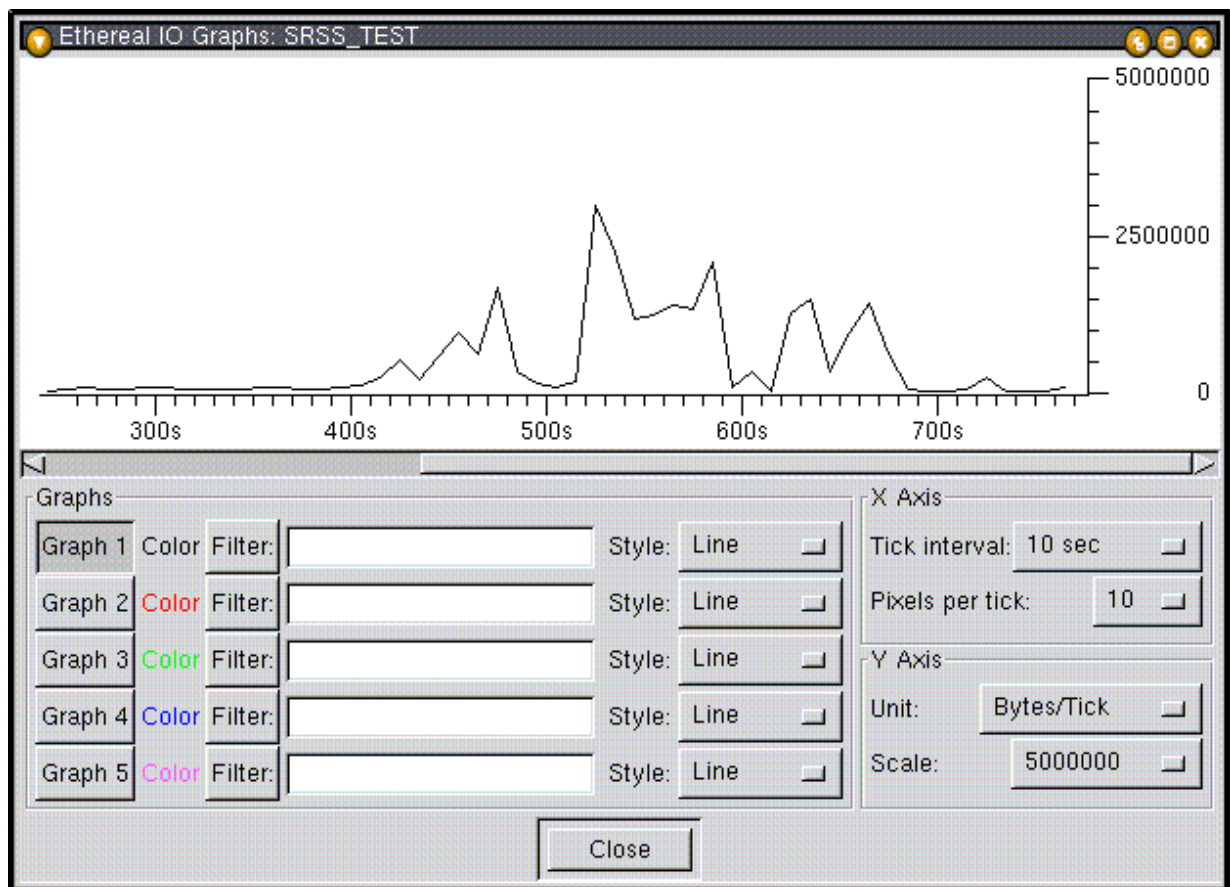
- File:** Name: C:\DOCLUME~1\ADMINI~1\BOA\LOCALS~1\Temp\etherXXXXa04476; Length: 31105991 bytes; Format: libpcap (tcpdump, Ethereal, etc.); Packet size limit: 65535 bytes.
- Time:** First packet: 2005-10-13 20:31:49; Last packet: 2005-10-13 20:42:30; Elapsed: 00:10:41.
- Capture:** Interface: VMware Accelerated AMD PCNet Adapter; Dropped packets: 1577; Capture filter: none.
- Display:** Display filter: (ip.host == 192.168.8.19) && (ip.host == 192.168.8.70); Marked packets: 0.

Traffic	Captured	Displayed
Between first and last packet	641.521 sec	636.632 sec
Packets	81441	69805
Avg. packets/sec	126.950	109.647
Avg. packet size	365.000 bytes	313.016 bytes
Bytes	29802911	21850088
Avg. bytes/sec	46456.611	34321.369
Avg. MBit/sec	0.372	0.275

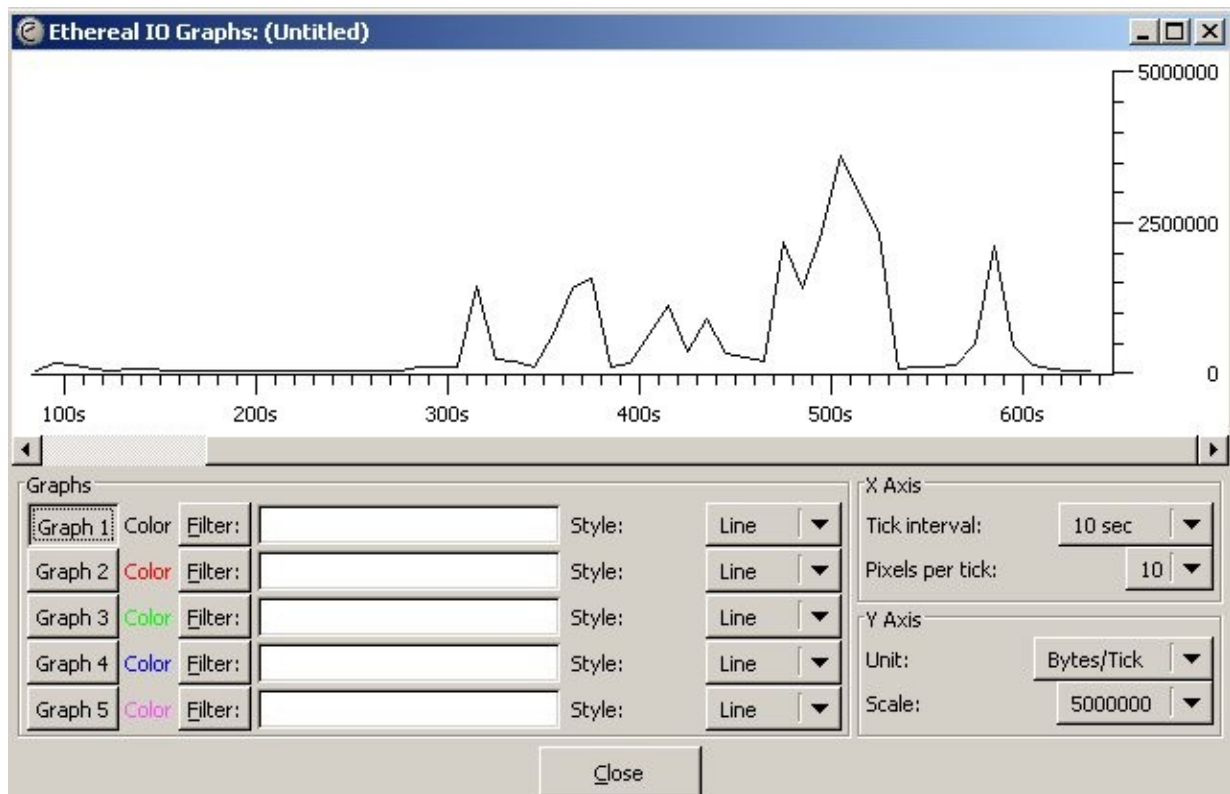
Close

There's the proof in black and white. Well, more colors than that, but you get the point. Or do you? Let's drop the averages and look at the "actual" bandwidth used for each so we can see how high each protocol peaked.

Again let's look at the Sun Ray data:

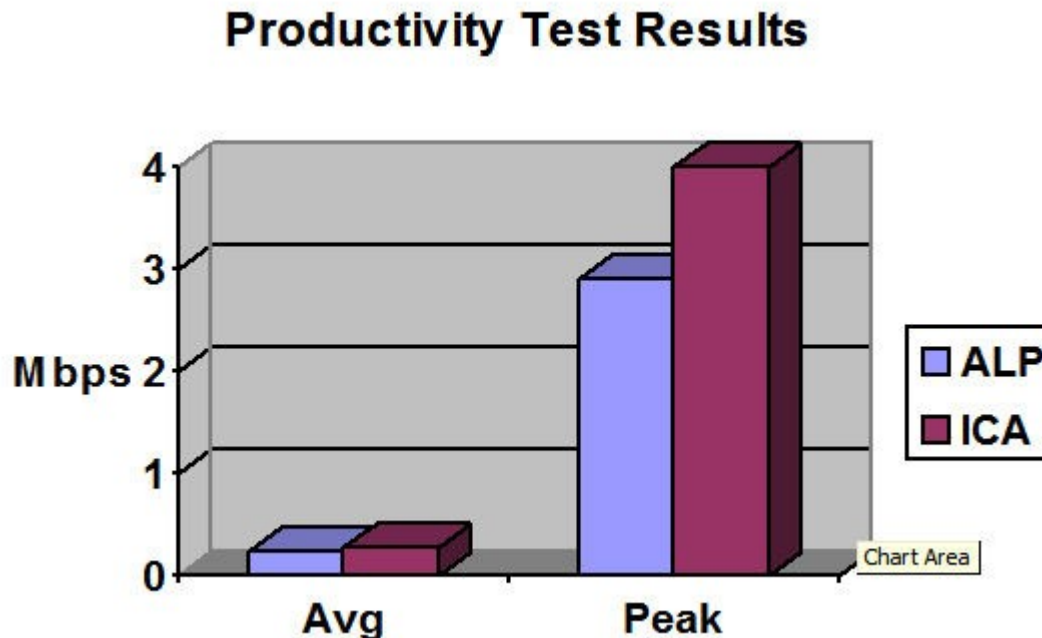


Now let's look at Citrix:



So what does this tell us? It shows us the performing the same tasks, Sun Ray not only required less bandwidth "on average", but is also required less peak bandwidth. Sun Ray peaked around 3 Mbps while Citrix peaked over 4 Mbps. Quite a difference from 20 Kbps don't you think?

Let's graph that:



Hopefully these results will be somewhat eye opening to those out there that are suckers for marketing speak. We've simply got a killer protocol in Sun Ray server. When you consider that the Sun Ray does all this with a 100 Mhz CPU, no OS, zero administration of the desktop, can mount USB mass storage, scanners, HID devices, etc, it's really a very interesting device. A life changing device if I can steal a line from Bob Doolittle.

The bottom line is that you cannot trust averages, or at very least you must understand what the average consists of. Thin client bandwidths are self throttling and will use the bandwidth you give them. You need to run your own tests with real users, real applications, and don't average the results.

Or perhaps a simpler explanation is that marketing folks don't understand the difference in Kbps and KBps.

Source:

[http://blogs.sun.com/roller/page/ThinGuy?entry=sun\\_ray\\_bandwidth](http://blogs.sun.com/roller/page/ThinGuy?entry=sun_ray_bandwidth)

With thanks to Craig Bender