

An In-Depth Look at AMPATH StarLight Traffic Accounting and Participant Analysis



A Report By:

John D. Cabarga & Ernesto Rubi,
recipients of the National Science Foundation
Strategic Technologies for the Internet (STI): AMPATH Collaborative
Research and Education Operational and
Functional Support Research Experience for Undergraduates

Award # 331112
August 25, 2003



Supervised by Julio Ibarra, PI &
Heidi Alvarez, Co-PI

Table of Contents

Introduction.....	2
Background.....	2
Methodology.....	3
Traffic Accounting & Participant Analysis.....	4
Current Network Layout.....	8
Conclusions / Recommendations.....	9
Appendix A: 1 st Observation of Traffic from AMPATH Member Networks.....	10
IP Address.....	10
Appendix B: 2 nd Observation of Traffic from US FedNets and Beyond to AMPATH Member Networks.....	24
Appendix C: 2 nd Observation of Traffic from AMPATH Member Networks to US FedNets and Beyond.....	38
Appendix D: Current Network Diagram.....	54

Introduction

The purpose of this report is to demonstrate the benefits of the StarLight link to both US FedNet participants and AMPATH international participants. The data analysis that follows will make evident a heavy usage by US FedNets and Latin American National Research and Education Networks (NRENs) connecting to AMPATH. The StarLight link is crucial in order to enable research traffic to flow between US Federal Networks (FedNets) AMPATH international participants since the Abilene Acceptable Use Policy (AUP) does not permit the transit of international traffic over Abilene to FedNets.

The current Gigabit link infrastructure handles IP, IPv6 and multicast traffic and since its inception in late January has seen usage in excess of 4.3 Terabits per second (Tbps), an average of 733 Gigabits per second (Gbps) a month. With this type of usage it is safe to say the AMPATH StarLight link is a well established route of exchanging information between US FedNets and international peer networks.

Background

The AMericaSPATH (AMPATH) network is an FIU project sponsored in part by the US National Science Foundation CISE directorate, in collaboration with Global Crossing (GC) and other telecommunications product and service providers. Using Global Crossing's terrestrial and submarine optical-fiber networks, AMPATH is interconnecting the research and education (R&E) networks in South and Central America and the Caribbean to US and non-US R&E networks via Internet2's Abilene network and the StarLight International Exchange Point.

The purpose of the AMPATH project is to allow participating countries to contribute to the research and development of applications for the advancement of Internet technologies. The mission of AMPATH is to serve as the pathway for Research and Education Networking in the Americas and to the World and to be the International Exchange Point for Latin America and the Caribbean R&E networks. Additionally AMPATH fosters collaboration for grand challenge e-Science and Educational Outreach to underserved populations both in the US and abroad.

The AMPATH pathway provides the 'bridging link' between Central and South America participant countries and the world's R&E networks. It is with this express purpose that the StarLight/STARTAP infrastructure was established. StarLight, the optical STAR TAP, is an advanced optical infrastructure and proving ground for network services optimized for high-performance applications¹. The Science, Technology, And Research Transit Access Point, or *STAR TAP*, is a persistent infrastructure also funded by the National Science Foundation to facilitate the long-term interconnection and interoperability of advanced international networking. *STAR TAP* exists in support of applications, performance measuring and technology evaluations and connects with the Ameritech Network Access Point (NAP) in Chicago, enabling network traffic to flow to international collaborators from over 150 U.S. leading-edge research universities, institutions, and supercomputing centers.

¹ <http://www.startap.net/starlight/ABOUT/>

Methodology

The data was collected using Cisco IOS's Sampled NetFlow feature on AMPATH's GSR 12012 router. Sample data was collected at intervals of 1 week each on two occasions; two one-day observations were also made. The first set was collected May 16th through May 22nd; the second set of data was collected June 1st through June 8th. Two more observations were made during June 24th and June 25th. These data sets not only cover two different months but also different time spans during both months. Information was collected purposely on non-overlapping dates to ensure that applications or regularly scheduled transfers from research centers would not affect our readings.

NetFlow is an accounting mechanism that is able to capture a large set of traffic statistics which include protocol, port, etc. These data sets can be further analyzed for purposes of planning, accounting, billing or network analysis. For this particular research project we used NetFlow to obtain readings of incoming and outgoing traffic from our AMPATH / StarLight link. Two distinct NetFlow commands were used.

First, to apply an input filter to the interface in order to gather the necessary data we used the NetFlow command:

```
flow-cat *filename* | flow-filter -I 62 | flow-stat -f9 -S2 | more
```

This command gives NetFlow the SNMP number of the interface which we want to analyze (in this case 62). For the output traffic analysis the NetFlow command:

```
flow-cat *filename* | flow-filter -i 62 | flow-stat -f9 -S2 | more
```

was used. Notice that in both of these commands we have omitted the true filenames of our observation in order to demonstrate that the various naming schemes can be in place. All NetFlow would need is the appropriate filename for the time period in which the observations are taking place.

Router configuration is also a crucial piece of the research taking place, since it is the router that samples the traffic that will later be analyzed. In our particular case AMPATH's router is configured for:

```
ip flow-export version 5  
ip flow-sampling-mode packet-interval 100
```

From the above configuration we see that NetFlow v5 is being used; however, the most telling configuration aspect above is the sampling mode which looks at only 1 out of 100 packets. This interval allows for accurate traffic accounting while maintaining a safe CPU level. Sampled NetFlow allows network administrators not to have to look at every single switched packet, which can become challenging (if at all possible) at the high switching rates of this particular Cisco 12000 series router. There is one very important thing to keep in mind: when looking at the statistics for this interface, since the traffic was sampled at an interval of 1 out of 100 packets, the traffic figures should be multiplied by a factor of 100 once the analysis has been completed.

Not accounting for ‘true traffic’ will result in severely underestimated figures, which can have a definite impact on the research being carried out. One more convenient NetFlow feature is that it exports the sampled data from each configured interface to a destination specified on the router. In our case:

ip flow-export destination 131.94.191.101 2058

The above IP address resolves to a FreeBSD UNIX system that listens on port 2058 for incoming NetFlow exports from different devices on campus. The directory in which the data resides is located at: /raid/netflow/flows/gsr.ampath.net

Using these tools we are confident our data set represents an accurate record of traffic through the AMPATH StarLight link.

Traffic Accounting & Participant Analysis

With the information provided from NetFlow, we were able to find the IP addresses from each of our top daily users. All IP addresses are registered to their corresponding institutions and each one of these registrations also carries with it the pertinent contact information for each network. The contact information was obtained using a simple ‘whois’ command.

If during the course of our NetFlow analysis we obtained the IP 131.94.128.2 as one of the top daily users we would then proceed to find the information about this network/host using the following UNIX command:

whois 131.94.128.2@whois.arin.net

The above command queries a WHOIS server hosted by ARIN (American Registry for Internet Number) and returns information relevant to our study such as institution name, network block assigned and contact information for either network administrators or a Network Operations Center (NOC) that might be hosted by the participant institution. During the course of our study we found that not only was ARIN involved but also since hosts from all around the globe send traffic through this interface we had to query other registries. LACNIC (Latin America), APNIC (Asia-Pacific) among others were registries which we had to utilize in order to find the contact information for our participants.

After obtaining contact information for each participant shown on the NetFlow data, a formal letter was sent to each participant network explaining the purpose of our research project and how their participation in this research activity will help to ensure continued research and education along with advanced network connectivity. In the letter we also asked that they visit a website in which some questions pertinent to our research would be asked. A separate letter *and* site was designed in Spanish, specifically for those users who would be more comfortable with Spanish than the original English version.

The English URL is:

http://www.florida.edu/ampath/application_info_req.asp

The Spanish URL is:

http://www.florida.edu/ampath/application_info_req_esp.asp

Both of these sites contain a brief survey form with specific questions regarding the nature of the research that participant institutions are undertaking. One such example of a question that can be found in our survey asked these institutions which other research networks they are currently peering with. This helped us discover where traffic/data from this particular user was going after connecting through the StarLight/AMPATH link. Another question asked was for specific contact person and contact information for that particular research institution. This helped us obtain another form of communication with our peer research networks other than the e-mail extracted from the simple 'whois' command issued based on the 'NetFlow' data.

Behind both of these ASP forms an MS-Access database will hold all submissions. With this database, we are able to receive data submitted by our users and utilize this information to further assist us with follow-up for this project.

Data Observations:

In the most in-depth part of our report, we were able to analyze the data obtained into two distinct sets. The first set, which we will call 'first observation', refers to a one-week span, more specifically the third week in May 2003. Having used the NetFlow tool to obtain the IPs of the top 30 daily users for this period we created a set of seven MS Excel spreadsheets. Each one of these documents lists the top 30 users sorted by amount of bandwidth-utilized daily.

Having used the 'whois' UNIX command as previously described to gather information about each network, we were able to construct detailed tables describing the daily usage. Each daily table contains not only the IP of the member network connecting through AMPATH but also the name of the particular institution that the IP range is registered to. This way we were able to easily identify not only the participating universities and research centers but also aggregate to the national level. During data analysis of our first observation three different sections were considered. The first was the total amount of bandwidth used by the top 30 daily users; usually in Gigabytes. The second set that we considered was the usage totals by country (i.e. – Argentina 305 Mb), this helped set the stage for the final set of numbers which became evident; these were the percentage utilization of each member network during the period chosen for data analysis.

As an example, during May 16, our first day of observation, the total usage was a combined 9.7 Gigabytes. Brazil occupied the top spot with 72.9% of this total bandwidth; next the University of Puerto Rico used 9.8% of the total bandwidth and next followed FIU, Chile (REUNA) and Argentina (RETINA) with 10.7%, 9.8% and 3.4% respectively. The following are the rest of the daily figures that we gathered at the conclusion of each observation: **

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

May 17th 2003:

<i>Total Usage</i>	7,128,429,500
<i>Usage by Country:</i>	
<i>Brazil</i>	4,253,255,400
<i>Chile</i>	935,003,500
<i>UPR</i>	1,059,761,200
<i>Argentina</i>	292,744,200
<i>FIU</i>	457,853,200
<i>NASA</i>	129,812,000
<i>Usage Breakdown:</i>	
<i>Brazil</i>	59.7%
<i>Chile</i>	13.1%
<i>UPR</i>	14.9%
<i>Argentina</i>	4.1%
<i>FIU</i>	6.4%
<i>NASA</i>	1.8%

May 18th 2003:

<i>Total Usage</i>	12,534,095,400
<i>Usage by Country:</i>	
<i>Brazil</i>	5,988,536,500
<i>Chile</i>	1,077,280,700
<i>UPR</i>	5,031,446,600
<i>Argentina</i>	0
<i>FIU</i>	309,090,800
<i>NASA</i>	127,740,800
<i>Usage Breakdown:</i>	
<i>Brazil</i>	47.8%
<i>Chile</i>	8.6%
<i>UPR</i>	40.1%
<i>Argentina</i>	0.0%
<i>FIU</i>	2.5%
<i>NASA</i>	1.0%

May 19th 2003:

<i>Total Usage</i>	9,683,403,800
<i>Usage by Country:</i>	
<i>Brazil</i>	6,639,342,700
<i>Chile</i>	1,010,917,600
<i>UPR</i>	1,523,835,900
<i>Argentina</i>	0
<i>FIU</i>	325,905,600
<i>NASA</i>	183,402,000
<i>Usage Breakdown:</i>	
<i>Brazil</i>	68.6%
<i>Chile</i>	10.4%
<i>UPR</i>	15.7%
<i>Argentina</i>	0.0%
<i>FIU</i>	3.4%
<i>NASA</i>	1.9%

May 20th 2003:

<i>Total Usage</i>	10,790,991,300
<i>Usage by Country:</i>	
<i>Brazil</i>	4,707,947,200
<i>Chile</i>	3,750,741,700
<i>UPR</i>	338,315,600
<i>Argentina</i>	0
<i>FIU</i>	1,219,130,400
<i>NASA</i>	0
<i>Usage Breakdown:</i>	
<i>Brazil</i>	43.6%
<i>Chile</i>	34.8%
<i>UPR</i>	3.1%
<i>Argentina</i>	0.0%
<i>FIU</i>	11.3%
<i>NASA</i>	0.0%

May 21st, 2003:

<i>Total Usage</i>	11,023,778,000
<i>Usage by Country:</i>	
<i>Brazil</i>	8,665,916,300
<i>Chile</i>	747,051,300
<i>UPR</i>	1,080,695,500
<i>Argentina</i>	0
<i>FIU</i>	787,581,000
<i>NASA</i>	0
<i>Usage Breakdown:</i>	
<i>Brazil</i>	78.60%
<i>Chile</i>	6.80%
<i>UPR</i>	9.80%
<i>Argentina</i>	0.00%
<i>FIU</i>	7.10%
<i>NASA</i>	0.00%

May 22nd 2003:

<i>Total Usage</i>	6,724,536,800
<i>Usage by Country:</i>	
<i>Brazil</i>	4,626,194,600
<i>Chile</i>	490,556,000
<i>UPR</i>	1,282,814,400
<i>Argentina</i>	0
<i>FIU</i>	324,971,800
<i>NASA</i>	0
<i>Usage Breakdown:</i>	
<i>Brazil</i>	68.8%
<i>Chile</i>	7.3%
<i>UPR</i>	19.1%
<i>Argentina</i>	0.0%
<i>FIU</i>	4.8%
<i>NASA</i>	0.0%

***Note: Since Brazil, Chile and Argentina had multiple institutions on the top 30 user list we made the decision to aggregate these into one country. Any time we refer to these countries we are really citing the multiple institutions that are connecting to Internet2 within the country.*

As we can see from our data observations, universities and centers transmitting data to AMPATH from South America upstream to the different FedNets have a large bandwidth footprint. On an average during this data collection period the top 30 hosts sent 9.645 Gigabytes of data! Brazil was the heaviest user by far, representing on an average 61.2% of all traffic. UPR was second with 17.1% of daily traffic on an average. These two were followed by REUNA (Chile 13.5%); FIU (5.92%) and NASA/Ames Research Center (0.78%) along with RETINA (0.68%).

Our second observation consisted of analyzing not a half-duplex traffic situation as before, where only traffic being received from South American member networks was analyzed; but instead all traffic being sent and received by this link. The effect of studying traffic being received from StarLight was as expected, a fairly large collection of US FedNets and also international networks that frequent the AMPATH/StarLight link.

This second set of data was obtained during the first week of June, this was a time purposely chosen so that we could obtain data from non-overlapping weeks in different months. Traffic was analyzed in the same way as in the first observation, only this time our data samples were larger since we included all traffic across the StarLight router interface. Again we built tables with the particular IPs and names of those top 30 users

using the link; this time however, there was a slight difference in the analysis. Instead of breaking down traffic figures by countries as before, we decided to concentrate on the aggregate bandwidth being utilized by all top 30 daily hosts.

That approach yielded interesting results; and these are listed in our next table.

	Traffic (US FedNets and Beyond)	Traffic (South Am. Member Nets)
<i>June 1st</i>	3,761,375,400 or 3.76 Gb	5,419,593,100 bytes or 5.42 Gb
<i>June 2nd</i>	16,276,361,200 or 16.28 Gb	16,723,112,700 bytes or 16.72 Gb
<i>June 3rd</i>	14,711,981,300 or 14.71 Gb	9,796,568,200 bytes or 9.79 Gb
<i>June 4th</i>	22,475,993,500 or 22.48 Gb	11,112,262,300 bytes or 11.11 Gb
<i>June 5th</i>	18,036,703,300 or 18.04 Gb	13,872,820,400 bytes or 13.88 Gb
<i>June 6th</i>	19,430,142,000 or 19.43 Gb	12,086,268,400 bytes or 12.1 Gb
<i>June 7th</i>	14,777,694,800 or 14.78 Gb	6,619,119,400 bytes or 6.62 Gb
<i>June 8th</i>	13,482,069,100 or 13.48 Gb	4,743,034,000 bytes or 4.74 Gb
Average Traffic:	15.37 Gb	10.05 Gb

As we can see from the above results, the traffic from the US FedNets on an average outweighs the traffic being received from South American member networks. This is a very important fact to keep in mind; it underlines the usage characteristics of the various US FedNets and beyond. Worldwide, as shown in Appendix B, where the second observation results are located, universities and research centers frequently use this link as a means for research.

Another crucial part of our research that is still ongoing seeks to gather feedback from users of these member networks. Although feedback was still being gathered at the time this report was finalized, we will make it a high priority in our near future to append to this report, or any future publications, responses we obtain from researches who actively use this AMPATH/StarLight resource.

Current Network Layout

Please see *Appendix D* for a detailed network diagram and our current network schema. The AMPATH/StarLight link currently resides on the AMPATH GSR 12012 series, a donation from Cisco Systems, Inc. The link connecting AMPATH to Starlight is a Gigabit Ethernet link provisioned as a Layer 2 IP VPN tunnel over Global Crossing's MPLS private network. It is a Gigabit Ethernet link that is connected to StarLight via an MPLS cloud. This Layer 2 configuration permits end networks to conveniently establish bilateral peering relationships.

Conclusions / Recommendations

As is evident from the data gathered and analyzed we see a clear and consistent utilization of the AMPATH/StarLight link from US FedNets, international research organizations and universities. The extent of usage shown in the analysis of our observations warrants not only the necessary condition of a reliable link but the establishment of funding sources that will guarantee the existence of this research tool. We therefore urge such funding be obtained, but also advocate the creation of an AMPATH/StarLight network procurement/reliability group once funding has been identified. This group would be immediately responsible for overseeing the network operations aspect of the connection and would then meet regularly to discuss improvements in order to also assure continued service; meaning no single point of failure on this link. Final network design and recommendations would be given to the appropriate entity and the network restructured to provide realization of this goal.

Appendix A: 1st Observation of Traffic from AMPATH Member Networks

May 16th, 2003

<i>IP Address</i>	<i>Flows</i>	<i>Octets</i>	<i>Packets</i>	<i>Source Domain</i>
143.106.11.155	472	10452089	7005	<i>(Brazil) Universidade de Sao Paulo</i>
200.135.30.165	340	7359573	5267	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
143.107.229.48	3864	6749919	8374	<i>(Brazil) Universidade de Sao Paulo</i>
131.94.123.92	5	6214260	4424	<i>FIU – Engineering</i>
143.107.237.49	185	5544752	3738	<i>(Brazil) Universidade de Sao Paulo</i>
200.18.53.37	14	5213027	3483	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
143.107.94.90	93	4622647	3094	<i>(Brazil) Universidade de Sao Paulo</i>
200.145.131.201	357	3741725	2937	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
143.106.23.153	291	3654649	5868	<i>(Brazil) Universidade de Sao Paulo</i>
146.83.218.216	164	3505844	2393	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
157.92.28.103	35535	3342703	46020	<i>(Argentina) Universidad Nacional de Buenos Aires</i>
200.135.30.158	137	2826273	1994	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
200.2.112.205	213	2754735	2096	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
143.106.113.7	165	2738322	1847	<i>(Brazil) Universidade Estadual de Campinas – UNICAMP</i>
131.94.133.131	1587	2511335	2041	<i>FIU – Terraflly</i>
200.136.52.249	631	2331244	3347	<i>(Brazil) Comitê Gestor da Internet no Brasil</i>
146.83.166.34	182	2139795	1837	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
152.92.5.146	859	2133293	1879	<i>(Brazil) UERJ – Universidade do Estado do Rio de Janeiro</i>
146.83.2.248	100	2029684	1834	<i>(Chile) Red Universitaria Nacional (REUNA)</i>

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

136.145.94.27	2645	1991404	5291	(UPR) Agricultural Experimental Station
131.94.133.48	1103	1707991	1243	FIU – grid1.cs.fiu.edu
143.106.124.184	138	1657465	1109	(Brazil) Universidade de Sao Paulo
143.107.1.250	2	1638652	1192	(Brazil) Universidade de Sao Paulo
143.107.239.109	522	1579023	1418	(Brazil) Universidade de Sao Paulo
136.145.54.46	107	1552350	1055	(UPR) Agricultural Experimental Station
143.106.116.9	278	1540428	1352	(Brazil) Universidade de Sao Paulo
143.107.208.13	508	1522428	1246	(Brazil) Universidade de Sao Paulo
200.145.36.46	10	1435418	1027	(Brazil) Comitê Gestor da Internet no Brasil
143.107.183.237	230	1393513	1129	(Brazil) Universidade de Sao Paulo
136.145.62.45	79	1367428	1709	(UPR) Agricultural Experimental Station

Total Usage 9,725,196,900 bytes (9.7 Gb)

Usage by Country:

Brazil 7,088,917,500 bytes (7.1 Gb)
Chile 767,532,300 bytes (767 Mb)
UPR 953,382,900 bytes (953 Mb)
Argentina 334,270,300 bytes (334 Mb)
FIU 1,043,358,600 bytes (1.05 Gb)

Usage Breakdown:

Brazil 72.9%
 Chile 7.9%
 UPR 9.8%
 Argentina 3.4%
 FIU 10.7%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

May 17th, 2003

IP Address	Flows	Octets	Packets	Source Domain
143.107.229.48	3591	8181391	8570	<i>(Brazil) Universidade de Sao Paulo</i>
192.65.176.43	27	7666565	5356	<i>Arecibo Observatory - National Astronomy and Ionosphere Center</i>
143.107.162.156	1088	7473443	5674	<i>(Brazil) Universidade de Sao Paulo</i>
146.83.127.92	766	5096216	4123	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
131.94.112.139	75	2957440	2107	<i>FIU – Engineering</i>
157.92.28.103	26539	2927442	66851	<i>(Argentina) Universidad Nacional de Buenos Aires</i>
150.164.19.227	436	2353254	2567	<i>(Brazil) Universidade Federal de Minas Gerais</i>
143.107.162.140	170	2266793	1551	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.253.167	1294	2241140	1803	<i>(Brazil) Universidade de Sao Paulo</i>
146.83.123.93	67	1957428	1473	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
143.107.229.194	936	1860557	1496	<i>(Brazil) Universidade de Sao Paulo</i>
143.106.56.197	1736	1830769	3650	<i>(Brazil) Universidade de Sao Paulo</i>
136.145.37.79	44002	1760280	44007	<i>(UPR) Agricultural Experimental Station</i>
200.20.94.77	568	1743068	1546	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
143.107.92.243	282	1707959	1161	<i>(Brazil) Universidade de Sao Paulo</i>
131.94.133.48	988	1621092	1102	<i>FIU – Terraflly</i>
143.107.235.15	732	1583937	1644	<i>(Brazil) Universidade de Sao Paulo</i>
200.144.93.3	1391	1542278	2108	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
146.164.44.5	284	1501792	1048	<i>(Brazil) Federal University of Rio de Janeiro</i>
143.107.239.10	1585	1424185	2506	<i>(Brazil) Universidade de Sao Paulo</i>
146.83.4.3	83	1340949	1093	<i>(Chile) Red Universitaria Nacional (REUNA)</i>

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

200.144.37.239	747	1339395	2060	(Brazil) Comit� Gestor da Internet no Brasil
139.229.1.72	10	1298120	2357	NASA – Ames Research Center / California
143.107.229.186	579	1187876	1033	(Brazil) Universidade de Sao Paulo
136.145.94.27	2010	1170767	3758	(UPR) Agricultural Experimental Station
143.107.229.46	142	1120640	976	(Brazil) Universidade de Sao Paulo
150.162.102.221	567	1116754	1383	(Brazil) Universidade Federal de Santa Catarina
143.106.113.92	391	1054748	866	(Brazil) Universidade de Sao Paulo
200.144.37.252	306	1002575	1001	(Brazil) Comit� Gestor da Internet no Brasil
146.83.217.122	698	955442	1725	(Chile) Red Universitaria Nacional (REUNA)

Total Usage 7,128,429,500

Usage by Country:

Brazil 4,253,255,400 bytes (4.25 Gb)
Chile 935,003,500 bytes (935 Mb)
UPR 1,059,761,200 bytes (1.06 Gb)
Argentina 292,744,200 bytes (292 Mb)
FIU 457,853,200 bytes (457 Mb)
NASA 129,812,000 bytes (129 Mb)

Usage Breakdown:

Brazil 59.7%
Chile 13.1%
UPR 14.9%
Argentina 4.1%
FIU 6.4%
NASA 1.8%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

May 18th, 2003

IP Address	Flows	Octets	Packets	Source Domain
192.65.176.43	7	45747788	31868	Arecibo Observatory - National Astronomy and Ionosphere Center
143.107.180.87	2333	8824614	6699	(Brazil) Universidade de Sao Paulo
143.107.161.158	1861	8247540	6450	(Brazil) Universidade de Sao Paulo
143.107.162.156	847	7593379	5872	(Brazil) Universidade de Sao Paulo
146.83.123.93	153	5944059	4165	(Chile) Red Universitaria Nacional (REUNA)
146.164.47.215	49	4194348	2803	(Brazil) Federal University of Rio de Janeiro
143.107.229.48	1843	3941118	3827	(Brazil) Universidade de Sao Paulo
200.20.189.245	514	3538566	2904	(Brazil) Comit� Gestor da Internet no Brasil
200.2.112.205	235	3185546	2434	(Chile) Universidad Austral de Chile
143.107.244.186	415	2706860	2025	(Brazil) Universidade de Sao Paulo
143.107.229.46	414	2590520	2229	(Brazil) Universidade de Sao Paulo
136.145.94.27	2699	2518426	5612	(UPR) Agricultural Experimental Station
136.145.62.144	35	2048252	1369	(UPR) Agricultural Experimental Station
143.107.239.10	2057	2042997	3593	(Brazil) Universidade de Sao Paulo
143.107.96.233	931	1657905	1906	(Brazil) Universidade de Sao Paulo
146.83.126.1	185	1643202	1735	(Chile) Red Universitaria Nacional (REUNA)
200.145.181.135	527	1636568	1263	(Brazil) Comit� Gestor da Internet no Brasil
150.162.18.4	278	1610622	1282	(Brazil) Universidade Federal De Snata Catarina
131.94.133.48	984	1591660	1095	(FIU) - grid1.cs.fiu.edu
143.106.92.200	697	1537879	1731	(Brazil) Universidade Estadual de Campinas – UNICAMP
131.94.115.219	110	1499248	1306	(FIU) - Engineering

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

200.18.159.45	397	1445392	1180	(Brazil) Comitê Gestor da Internet no Brasil
143.107.235.15	870	1398484	1812	(Brazil) Universidade de Sao Paulo
143.106.113.92	515	1324359	1118	(Brazil) Universidade de Sao Paulo
139.229.1.72	7	1277408	2320	NASA – Ames Research Center / California
200.20.119.180	101	1209702	812	(Brazil) Comitê Gestor da Internet no Brasil
143.107.229.186	824	1144236	1549	(Brazil) Universidade de Sao Paulo
146.164.44.5	102	1085575	752	(Brazil) Federal University of Rio de Janeiro
143.107.253.167	466	1085136	819	(Brazil) Universidade de Sao Paulo
200.136.161.252	801	1069565	1313	(Brazil) Comitê Gestor da Internet no Brasil

Total Usage 12,534,095,400

Usage by Country:

Brazil 5,988,536,500 bytes (5.99 Gb)
Chile 1,077,280,700 bytes (1.08 Gb)
UPR 5,031,446,600 bytes (5.03 Gb)
Argentina 0 bytes
FIU 309,090,800 bytes (309 Mb)
NASA 127,740,800 bytes (127 Mb)

Usage Breakdown:

Brazil 47.8%
 Chile 8.6%
 UPR 40.1%
 Argentina 0.0%
 FIU 2.5%
 NASA 1.0%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

May 19th, 2003

IP Address	Flows	Octets	Packets	Source Domain
143.107.161.158	1799	9016936	7433	(Brazil) Universidade de Sao Paulo
143.106.106.105	118	7883962	5276	(Brazil) Universidade Estadual de Campinas – UNICAMP
136.145.171.31	2	7761172	8225	(UPR) Agricultural Experimental Station
146.83.167.39	3	7593816	6658	(Chile) Red Universitaria Nacional (REUNA)
150.162.23.1	743	6025260	4764	(Brazil) Universidade Federal De Snata Catarina
143.107.162.156	886	4453708	3565	(Brazil) Universidade de Sao Paulo
136.145.188.93	129	4013535	2696	(UPR) Agricultural Experimental Station
200.145.173.68	408	3896083	2903	(Brazil) Comitê Gestor da Internet no Brasil
200.144.120.50	678	3641895	3390	(Brazil) Comitê Gestor da Internet no Brasil
200.131.253.94	118	3186305	2139	(Brazil) Comitê Gestor da Internet no Brasil
150.162.0.138	555	2936781	2329	(Brazil) Universidade Federal De Snata Catarina
143.107.180.87	929	2888105	2512	(Brazil) Universidade de Sao Paulo
143.107.195.227	293	2731743	2785	(Brazil) Universidade de Sao Paulo
143.107.19.143	1314	2574058	4244	(Brazil) Universidade de Sao Paulo
146.83.217.17	661	2515360	2259	(Chile) Red Universitaria Nacional (REUNA)
143.107.94.90	85	2425908	1627	(Brazil) Universidade de Sao Paulo
200.9.201.218	320	2142125	2677	(Brazil) Comitê Gestor da Internet no Brasil
136.145.101.131	146	2023060	1443	(UPR) Agricultural Experimental Station
157.86.204.10	223	1893165	1474	(Brazil) Fundacao Oswaldo Cruz (FIOCRUZ)
139.229.33.14	40	1834020	1327	(NASA) - Ames Research Center / California
200.137.208.15	965	1716337	1750	(Brazil) Comitê Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

131.94.133.48	1107	1660107	1240	(FIU) - grid1.cs.fiu.edu
143.107.239.10	1349	1616038	2396	(Brazil) Universidade de Sao Paulo
131.94.133.131	1052	1598949	1332	(FIU) Terraflly
200.144.93.3	1093	1588997	1979	(Brazil) Comit� Gestor da Internet no Brasil
200.18.53.37	77	1459560	1043	(Brazil) Comit� Gestor da Internet no Brasil
143.106.92.200	526	1454992	1520	(Brazil) Universidade de Sao Paulo
200.128.62.168	985	1447471	1903	(Brazil) Comit� Gestor da Internet no Brasil
136.145.153.122	24	1440592	963	(UPR) Agricultural Experimental Station
143.107.229.194	707	1413998	1258	(Brazil) Universidade de Sao Paulo

Total Usage 9,683,403,800

Usage by Country:

Brazil 6,639,342,700 bytes (6.64 Gb)
Chile 1,010,917,600 bytes (1.01 Gb)
UPR 1,523,835,900 bytes (1.52 Gb)
Argentina 0 bytes
FIU 325,905,600 bytes (326 Mb)
NASA 183,402,000 bytes (183 Mb)

Usage Breakdown:

Brazil 68.6%
 Chile 10.4%
 UPR 15.7%
 Argentina 0.0%
 FIU 3.4%
 NASA 1.9%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

May 20th, 2003

IP Address	Flows	Octets	Packets	Source Domain
146.83.167.39	12	19520196	16409	(Chile) Red Universitaria Nacional (REUNA)
146.83.6.95	561	16415461	16938	(Chile) Red Universitaria Nacional (REUNA)
192.65.176.43	14	7748564	5387	Arecibo Observatory - National Astronomy and Ionosphere Center
131.94.118.244	2	6617928	5425	FIU – Engineering
143.107.162.156	1115	4527428	3486	(Brazil) Universidade de Sao Paulo
143.107.19.143	45	4381549	3329	(Brazil) Universidade de Sao Paulo
143.107.18.135	528	4284066	3716	(Brazil) Universidade de Sao Paulo
143.107.232.170	1962	3850283	5861	(Brazil) Universidade de Sao Paulo
200.128.25.19	165	3269950	3308	(Brazil) Comitê Gestor da Internet no Brasil
143.107.32.24	271	2709042	2183	(Brazil) Universidade de Sao Paulo
146.164.22.12	49	2611095	1867	(Brazil) Federal University of Rio de Janeiro
200.18.43.134	219	2528296	1805	(Brazil) Comitê Gestor da Internet no Brasil
143.107.93.232	297	2420579	2027	(Brazil) Universidade de Sao Paulo
136.145.62.134	944	2096778	1594	(UPR) Agricultural Experimental Station
200.136.245.82	269	2073329	1475	(Brazil) Comitê Gestor da Internet no Brasil
131.94.133.131	44	1944494	1304	(FIU) Terraflly
131.94.133.48	183	1835013	1229	(FIU) - grid1.cs.fiu.edu
131.94.130.174	1130	1793869	1436	FIU - fox.cs.fiu.edu
146.164.123.144	1123	1689776	1274	(Brazil) Federal University of Rio de Janeiro
143.106.10.51	375	1662190	1298	(Brazil) Universidade Estadual de Campinas – UNICAMP

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

200.145.131.201	17	1661020	1123	(Brazil) Comit� Gestor da Internet no Brasil
143.107.229.207	33	1640109	1168	(Brazil) Universidade de Sao Paulo
200.10.21.172	98	1571760	1187	(Chile) Universidad de la Frontera / Temuco
143.106.27.128	26	1443397	984	(Brazil) Universidade Estadual de Campinas – UNICAMP
150.164.232.148	161	1424664	1242	(Brazil) Universidade Federal de Minas Gerais
136.145.169.159	282	1286378	1341	(UPR) Agricultural Experimental Station
161.24.96.65	391	1260560	852	(Brazil) CTA - Centro Tecnico Aeroespacial
143.107.170.132	67	1231651	1046	(Brazil) Universidade de Sao Paulo
143.107.202.219	268	1221125	1102	(Brazil) Universidade de Sao Paulo
200.145.182.78	672	1189363	1400	(Brazil) Comit� Gestor da Internet no Brasil

Total Usage 10,790,991,300 bytes (10.8 Gb)

Usage by Country:

Brazil 4,707,947,200 bytes (4.71 Gb)
Chile 3,750,741,700 bytes (3.75 Gb)
UPR 338,315,600 bytes (338 Mb)
Argentina 0 bytes
FIU 1,219,130,400 bytes (1.22 Gb)
NASA 0 bytes

Usage Breakdown:

Brazil 43.6%
Chile 34.8%
UPR 3.1%
Argentina 0.0%
FIU 11.3%
NASA 0.0%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

May 21st, 2003

IP Address	Flows	Octets	Packets	Source Domain
143.107.232.170	1354	14986879	11454	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.80.238	915	8832179	7865	<i>(Brazil) Universidade de Sao Paulo</i>
150.164.25.141	964	8229810	8151	<i>(Brazil) Universidade Federal de Minas Gerais</i>
136.145.101.146	3	7609000	5526	<i>(UPR) Agricultural Experimental Station</i>
146.83.6.95	6	7470513	6560	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
200.132.73.104	383	5545100	3724	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
146.164.36.17	51	5082759	3416	<i>(Brazil) Federal University of Rio de Janeiro</i>
131.94.133.131	3175	4810059	4006	<i>(FIU) Terraflly</i>
200.144.145.30	99	4684939	3159	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
143.107.162.156	1797	4080242	3415	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.161.158	1131	3339657	2723	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.228.21	46	3339531	2239	<i>(Brazil) Universidade de Sao Paulo</i>
200.17.97.42	467	3132209	2806	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
143.107.1.250	28	2574661	1880	<i>(Brazil) Universidade de Sao Paulo</i>
146.164.47.151	588	2433107	1740	<i>(Brazil) Federal University of Rio de Janeiro</i>
150.164.72.220	66	2309296	2066	<i>(Brazil) Universidade Federal de Minas Gerais</i>
200.136.214.182	301	2163686	1998	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
200.145.87.208	34	1984900	1326	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
136.145.177.91	858	1875611	3899	<i>(UPR) Agricultural Experimental Station</i>
200.20.228.44	453	1720253	2117	<i>(Brazil) Comit� Gestor da Internet no Brasil</i>
143.107.229.48	1081	1631464	2006	<i>(Brazil) Universidade de Sao Paulo</i>

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

131.94.235.32	3	1593806	1160	(FIU – BBC) Hospitality Management Department
143.106.41.78	466	1569011	1678	(Brazil) Universidade Estadual de Campinas – UNICAMP
200.144.120.50	465	1523383	2362	(Brazil) Comit� Gestor da Internet no Brasil
131.94.133.48	994	1471945	1120	(FIU) Terraflly (Grid1.cs.fiu.edu)
143.107.228.235	1203	1430772	2287	(Brazil) Universidade de Sao Paulo
136.145.160.167	135	1322344	892	(UPR) Agricultural Experimental Station
143.107.239.115	248	1230641	1151	(Brazil) Universidade de Sao Paulo
146.164.38.6	1022	1135729	2915	(Brazil) Federal University of Rio de Janeiro
143.107.235.99	649	1124294	1146	(Brazil) Universidade de Sao Paulo

Total Usage 11,023,778,000 bytes (11.1 Gb)

Usage by Country:

Brazil 8,665,916,300 bytes (8.67 Gb)
Chile 747,051,300 bytes (747 Mb)
UPR 1,080,695,500 bytes (1.10 Gb)
Argentina 0 bytes
FIU 787,581,000 bytes (787 Mb)
NASA 0 bytes

Usage Breakdown:

Brazil 78.6%
 Chile 6.8%
 UPR 9.8%
 Argentina 0.0%
 FIU 7.1%
 NASA 0.0%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

May 22nd, 2003

IP Address	Flows	Octets	Packets	Source Domain
136.145.185.32	2	7704776	8163	<i>(UPR) Agricultural Experimental Station</i>
143.107.162.156	2135	5182513	4347	<i>(Brazil) Universidade de Sao Paulo</i>
200.144.145.30	234	3991967	2691	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
200.145.131.201	130	3647825	3930	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
131.94.133.131	2080	3249718	2669	<i>(FIU) Terraflly</i>
136.145.54.125	53	3136664	2270	<i>(UPR) Agricultural Experimental Station</i>
200.128.60.129	1014	3072431	2950	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
146.83.7.6	86	3022568	2151	<i>(Chile) Red Universitaria Nacional (REUNA)</i>
150.162.60.155	975	2283555	2068	<i>(Brazil) Universidade Federal De Santa Catarina</i>
200.20.123.13	40	2211437	1479	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
143.107.235.15	1040	2167694	1913	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.19.143	1158	2131493	3506	<i>(Brazil) Universidade de Sao Paulo</i>
146.164.30.102	104	2008424	1344	<i>(Brazil) Federal University of Rio de Janeiro</i>
136.145.84.24	1	1986704	1420	<i>(UPR) Agricultural Experimental Station</i>
200.17.97.40	317	1961022	1503	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
143.107.200.66	12	1918932	1309	<i>(Brazil) Universidade de Sao Paulo</i>
200.9.99.172	9	1882992	1257	<i>(Chile) University of Chile</i>
143.106.28.83	492	1810886	3134	<i>(Brazil) Universidade Estadual de Campinas – UNICAMP</i>
200.20.228.56	729	1626579	2869	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
143.107.170.132	471	1244320	1139	<i>(Brazil) Universidade de Sao Paulo</i>
143.107.231.100	801	1209104	2100	<i>(Brazil) Universidade de Sao Paulo</i>

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

200.129.241.196	12	1143072	765	(Brazil) Comit� Gestor da Internet no Brasil
143.107.163.180	848	1128345	1688	(Brazil) Universidade de Sao Paulo
157.86.156.1	47	1122184	852	(Brazil) Fundacao Oswaldo Cruz (FIOCRUZ)
143.107.76.191	352	1082436	818	(Brazil) Universidade de Sao Paulo
200.131.230.225	282	1073591	833	(Brazil) Comit� Gestor da Internet no Brasil
150.162.10.86	253	1070666	826	(Brazil) Universidade Federal De Santa Catarina
143.107.161.158	546	1070115	1033	(Brazil) Universidade de Sao Paulo
146.164.47.151	312	1058564	728	(Brazil) Federal University of Rio de Janeiro
150.162.110.100	483	1044791	922	(Brazil) Universidade Federal De Santa Catarina

Total Usage 6,724,536,800 bytes (6.72 Gb)

Usage by Country:

Brazil 4,626,194,600 bytes (4.63 Gb)
Chile 490,556,000 bytes (490 Mb)
UPR 1,282,814,400 bytes (1.28 Gb)
Argentina 0 bytes
FIU 324,971,800 bytes (325 Mb)
NASA 0 bytes

Usage Breakdown:

Brazil 68.8%
Chile 7.3%
UPR 19.1%
Argentina 0.0%
FIU 4.8%
NASA 0.0%

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

This represents only the usage numbers and percentage breakdown for the top 30 users on this link for this particular time frame. We extend this assumption to the rest of the traffic and assert that it is safe to assume that the rest of traffic will look like this.

Appendix B: 2nd Observation of Traffic from US FedNets and Beyond to AMPATH Member Networks

June 1st, 2003

IP Address	Flows	Octects	Packets	Source Domain
129.105.116.2	264	13306334	13164	(US) Northwestern University (Chemistry)
128.104.110.130	478	7023198	5483	(US) University of Wisconsin-Madison (Engineering Center)
168.115.122.145	173	1982620	1435	(South Korea) Dong-A University Computer Center
206.220.240.220	2033	1411033	5470	(US) Multicast Host - Ameritech ATM Exchange Point
163.24.167.57	2186	1119681	3303	(Taiwan) Ministry of Education computer Center
142.51.43.108	24	1056949	708	(Canada) Laurentian University
130.225.11.132	861	1045406	946	(Denmark) Danish Computer Centre for Research and Education
210.32.0.3	64	832736	777	(China) Zhejiang Medical University
164.125.56.193	123	773845	580	(South Korea) Pusan National University
211.101.232.2	621	755669	719	(China) Beijing WuHong Culture Center
128.220.26.64	6	738436	521	(US) Johns Hopkins University
211.182.231.77	1064	734068	2581	(South Korea) Pusan National University
192.91.246.189	34	662598	1636	(Switzerland) CERN, European Laboratory for Particle Physics
210.104.106.71	146	652476	691	(South Korea) Allocated / Portable - KRNIC
140.115.225.49	23	571663	474	(Taiwan) Ministry of Education computer Center
128.104.206.107	226	475200	825	(US) University of Wisconsin-Madison (Engineering Center)
128.104.206.103	221	465984	809	(US) University of Wisconsin-Madison (Engineering Center)
129.255.16.171	145	443894	523	(US) University of Iowa (Weeg Computing Center)
128.104.109.6	175	418979	300	(US) University of Wisconsin-Madison (Engineering Center)
129.241.137.91	14	385235	262	(Norway) Norwegian University of Science and Technology
216.47.129.121	387	369380	602	(US) Illinois Institute of Technology
128.105.103.11	77	333455	264	(US) University of Wisconsin-Madison (Engineering Center)
209.7.140.140	37	321396	352	(US) Illinois Century Network
198.37.26.69	23	301662	243	(US) Illinois Institute of Technology

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

128.255.179.238	209	300781	330	(US) University of Iowa (Weeg Computing Center)
163.24.167.92	463	241796	746	
211.184.27.161	193	240019	220	(South Korea) Seoul - Mapo Middle School
144.92.73.178	254	219889	382	(US) MAAC - Madison Wisconsin
129.241.139.174	132	219864	227	(Norway) Norwegian University of Science and Technology
140.192.180.236	4	209508	140	(US) DePaul University

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

June 3rd, 2003

IP Address	Flows	Octects	Packets	Source Domain
130.199.80.215	203	83133196	61469	(US) Brookhaven National Laboratory
192.91.246.189	179	7127595	17896	(Switzerland) CERN / European Laboratory for Particle Physics
129.105.116.2	368	6979381	6927	(US) Northwestern University
128.104.110.130	443	5928968	4691	(US) University of Wisconsin-Madison
130.243.5.62	176	5515379	3690	(Sweden) University College of Gavle
148.114.252.11	791	4102480	2772	(US) NASA / Ames Research Center
142.227.138.73	61	3506209	3181	(Canada) Canadian Department of Information
140.221.9.138	214	2828923	1904	(US) DePaul University
128.105.103.11	666	2509932	1940	(US) University of Wisconsin-Madison
140.192.176.131	178	2357957	1587	(US) DePaul University
202.119.81.120	93	2246357	1499	(China) Nanjing University of Science and Technology
128.157.9.25	385	1914898	1375	(US) NASA / Ames Research Center
143.248.92.221	516	1668152	1259	(South Korea) Korea Institute of Technology
206.220.240.220	2113	1508047	5786	(US) Ameritech ATM Exchange Point
144.92.35.95	8	1429512	1438	(US) MACC / Wisconsin
131.225.224.45	720	1348145	4895	(US) Chicago - FermiLab
140.122.199.139	480	1174472	793	(Taiwan) National Taiwan Normal University
128.135.228.163	746	1101116	24239	(US) University of Chicago
131.156.177.46	2	1101033	880	(US) Northern Illinois University
140.192.183.247	54	911815	609	(US) DePaul University
129.57.34.117	27	874152	619	(US) Continuous Electronic Beam Accelerator Facility (SURA/CEBAF)
192.160.227.246	89	855944	574	(US) Sandia National Laboratories
204.121.6.57	383	843839	653	(US) Los Alamos National Laboratory
128.104.200.91	53	834868	558	(US) University of Wisconsin-Madison
203.64.119.61	215	818773	626	(Taiwan) Taiwan Academic Network
130.242.58.26	38	813969	760	(Sweden) Swedish National Defence College

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

128.104.109.6	200	795272	569	(US) University of Wisconsin-Madison
128.183.39.29	202	776528	534	(US) NASA / Ames Research Center
130.225.11.132	576	718664	665	(Denmark) Danish Computer Centre for Research and Education
131.193.14.113	10	709373	685	(US) University of Illinois at Chicago
128.104.248.83	274	684864	982	(US) University of Wisconsin-Madison

June 4th, 2003

IP Address	Flows	Octects	Packets	Source Domain
130.199.80.215	240	107314848	78901	(US) Brookhaven National Laboratory
148.114.252.11	1703	17704986	11917	(US) NASA / Ames Research Center
128.135.86.32	198	15373317	10941	(US) University of Chicago
128.135.88.207	158	14949408	13467	(US) University of Chicago
129.105.116.2	368	7879790	7834	(US) Northwestern University
128.104.110.130	527	7401345	5846	(US) University of Wisconsin-Madison
130.236.224.38	47	6138269	4094	(Sweden) University of Linkoping-UNIT
130.199.206.79	52	4494612	3312	(US) Brookhaven National Laboratory
128.105.103.11	435	4458718	3008	(US) University of Wisconsin-Madison
128.135.62.57	40	4267382	4515	(US) University of Chicago
210.107.133.57	64	3899316	2775	(South Korea) KISTI / KREONet
128.135.108.151	154	3673551	3271	(US) University of Chicago
132.216.181.22	104	3072821	2797	(Canada) McGill University
192.91.246.189	187	2971177	5035	(Switzerland) CERN, European Laboratory for Particle Physics
140.192.183.198	106	2027390	1598	(US) DePaul University
193.11.44.206	11	1900088	1268	(Sweden) Sodertorns Hogskola
128.135.146.207	375	1672734	1289	(US) University of Chicago
128.255.60.46	449	1632128	1690	(US) University of Iowa
140.192.176.131	118	1567916	1068	(US) DePaul University
206.220.240.220	2059	1556310	5867	(US) Ameritech ATM Exchange Point
198.37.26.69	291	1316859	1013	(US) Illinois Institute of Technology
193.232.206.6	92	1211529	1097	(Russia) People's Friendship University of Russia
128.135.228.163	204	1071300	26770	(US) University of Chicago
140.221.9.138	408	1037610	764	(US) Argonne National Laboratory
128.135.116.61	78	1009598	924	(US) University of Chicago
136.176.108.75	1155	901791	1808	(US) Bradley University
130.225.11.132	757	892274	835	(Denmark) Danish Computer Centre for Research and Education

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

130.243.5.62	32	867434	581	(Sweden) University of Gavle
216.47.129.121	1353	864899	2037	(US) Illinois Institute of Technology
140.221.9.9	117	838576	560	(US) Argonne National Laboratory
144.92.39.64	292	791959	774	(US) MACC / Wisconsin

June 5th, 2003

IP Address	Flows	Octects	Packets	Source Domain
130.199.80.215	110	43451556	32119	(US) Brookhaven National Laboratory
128.135.86.32	286	24039205	17086	(US) University of Chicago
148.114.252.11	1983	15225168	10227	NASA / Ames Research Center
210.107.133.57	230	12682808	9006	(South Korea) KISTY / KREONet
140.221.9.138	2380	11230452	7804	(US) Argonne National Laboratory
129.105.116.2	388	7477079	7425	(US) Northwestern University
128.104.110.130	514	7341059	5755	(US) University of Wisconsin-Madison
128.135.157.191	19	7015256	4685	(US) University of Chicago
140.192.175.64	227	5827576	3895	(US) DePaul University
128.105.103.11	840	4452171	3043	(US) University of Wisconsin-Madison
192.101.109.54	737	3534704	2501	(US) Pacific Northwest National Laboratory
140.136.227.25	224	3485412	2330	(Taiwan) FuJen Catholic University
192.91.246.189	122	3118791	8527	(Switzerland) CERN, European Laboratory for Particle Physics
140.184.82.101	104	2715208	2524	(Canada) St. Mary's University
216.125.251.169	64	2624460	1873	(US) Illinois Century Network
192.203.218.206	46	2571730	1750	(US) Brookhaven National Laboratory
140.192.181.64	477	2566277	2512	(US) DePaul University
140.192.180.115	122	2178933	1460	(US) DePaul University
140.135.26.171	472	2014104	2728	(Taiwan) Chung Yuan Christian University
131.225.225.245	54	1933500	1289	(US) FermiLab / Illinois
128.135.146.207	470	1873794	1435	(US) University of Chicago
140.192.183.198	39	1738887	1247	(US) DePaul University
144.92.40.150	78	1556564	1038	(US) MACC / Wisconsin
165.132.105.134	297	1555788	1124	(South Korea) Yonsei University
206.220.240.220	2031	1537163	5838	(US) Ameritech ATM Exchange Point
128.104.248.83	570	1480612	2126	(US) University of Wisconsin-Madison
131.193.223.132	244	1321297	940	(US) University of Illinois at Chicago

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

<i>128.255.60.46</i>	<i>386</i>	<i>1305018</i>	<i>1339</i>	<i>(US) University of Iowa</i>
<i>142.104.7.23</i>	<i>46</i>	<i>1271949</i>	<i>1133</i>	<i>(Canada) University of Victoria</i>
<i>155.230.8.222</i>	<i>1528</i>	<i>1240512</i>	<i>2310</i>	<i>(South Korea) Kyungpook National University</i>

June 6th, 2003

IP Address	Flows	Octects	Packets	Source Domain
130.199.80.215	182	60676468	44776	(US) Brookhaven National Laboratory
128.104.27.92	33	19705988	13142	(US) University of Wisconsin-Madison
148.114.252.11	2513	17841409	12020	(US) NASA/Ames Research Center
140.192.175.64	331	8889660	5944	(US) DePaul University
131.225.225.245	244	8510160	5679	(US) FermiLab / Illinois
128.117.215.217	87	8069006	5486	(US) National Center for Atmospheric Research
128.104.110.130	464	7130720	5602	(US) University of Wisconsin-Madison
129.105.116.2	294	6985843	6941	(US) Northwestern University
128.135.204.113	46	5838088	3894	(US) University of Chicago
131.225.224.90	359	5304135	3577	(US) FermiLab / Illinois
202.119.81.120	859	3761471	2509	(China) Nanjing University of Science and Technology
130.199.206.67	52	3668220	2757	(US) Brookhaven National Laboratory
210.47.28.254	264	3432781	2329	(China) Northeast Normal University
128.135.62.98	90	3356462	2411	(US) University of Chicago
198.116.65.32	424	3103273	2181	(US) NASA/Ames Research Center
128.105.103.11	434	3059773	2074	(US) University of Wisconsin-Madison
128.104.38.152	28	2710924	1811	(US) University of Wisconsin-Madison
130.199.206.61	27	2286660	1667	(US) Brookhaven National Laboratory
144.92.159.164	125	1974360	1955	(US) MACC / Illinois
140.192.232.45	110	1931852	1805	(US) DePaul University
194.47.14.39	101	1844236	1711	(Sweden) Halmstad University
128.135.136.147	190	1527675	1076	(US) University of Chicago
206.220.240.220	1991	1515588	5735	(US) Ameritech ATM Exchange Point
198.9.9.17	264	1506155	1051	(US) NASA/Ames Research Center
128.104.248.83	577	1473850	1486	(US) University of Wisconsin-Madison
198.37.27.13	509	1451240	1087	(US) Illinois Institute of Technology

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

132.216.181.22	32	1406792	1288	(Canada) McGill University
198.128.85.32	54	1368094	975	(US) Lawrence Livermore Berkeley Laboratory
144.92.199.124	310	1358564	969	(US) MACC / Illinois
130.225.2.178	29	1348318	952	(Denmark) Danish Computer Centre for Research and Education
140.192.175.82	353	1263655	995	(US) DePaul University

June 7th, 2003

IP Address	Flows	Ooctets	Packets	Source Domain
130.199.80.215	138	66112876	48866	(US) Brookhaven National Laboratory
128.117.215.217	391	34172845	23244	(US) National Center for Atmospheric Research
129.105.116.2	296	10430354	10380	(US) Northwestern University
128.104.110.130	477	6921154	5450	(US) University of Wisconsin-Madison
128.105.103.11	204	3965754	2685	(US) University of Wisconsin-Madison
198.37.27.13	425	2162168	1655	(US) Illinois Institute of Technology
140.130.114.124	325	2021820	1566	(Taiwan) Ministry of Education ComputerCenter
144.92.209.67	48	1934784	1299	(US) MACC/Illionis
128.104.111.3	109	1638153	1342	(US) University of Wisconsin-Madison
206.220.240.220	2056	1615887	5942	(US) Ameritech ATM Exchange Point
129.139.52.196	156	1597226	1299	(US) Army Armament Research Development and Engineering Center / NJ
198.37.26.69	337	1398899	1097	(US) Illinois Institute of Technology
131.178.192.156	1976	1117005	4411	(Mexico) Instituto Tecnologico y de Estudios Superiores de Monterrey
202.194.15.24	320	1114114	744	(China) Shandong University
131.104.127.118	3	960894	863	(Canada) University of Guelph
137.43.51.115	1789	956080	3828	(Ireland) University College Dublin
128.255.60.46	310	898771	954	(US) University of Iowa
132.206.7.90	21	853963	575	(Canada) McGill University
210.32.0.3	42	762819	747	(China) Zhejiang Medical University
128.248.155.111	402	755460	563	(US) University of Illinois at Chicago
129.57.32.67	75	753988	675	(US) Continuous Electronic Beam Accelerator Facility (SURA/CEBAF) / VA
210.204.108.131	570	674168	639	(South Korea) Korea Network Information Center
144.92.157.92	364	666972	518	(US) MACC/Illionis
132.206.92.178	122	661456	12112	(Canada) McGill University
211.185.47.66	599	655934	655	(South Korea) Korea Network Information Center
194.226.180.227	23	588608	439	(Russia) Novosibirsk Scientific Center Network
194.47.14.39	19	538816	496	(Sweden) Halmstad University
130.225.11.132	431	492864	471	(Denmark) Danish Computer Centre for Research and Education

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

<i>140.138.244.211</i>	<i>419</i>	<i>460992</i>	<i>685</i>	<i>(Taiwan) Ministry of Education ComputerCenter</i>
<i>131.193.187.119</i>	<i>50</i>	<i>459024</i>	<i>307</i>	<i>(US) University of Illinois at Chicago</i>
<i>140.113.126.31</i>	<i>80</i>	<i>433100</i>	<i>329</i>	<i>(Taiwan) Ministry of Education ComputerCenter</i>

June 8th, 2003

IP Address	Flows	Octects	Packets	Source Domain
130.199.80.215	93	33676680	24879	(US) Brookhaven National Laboratory
140.192.177.195	500	28846032	20555	(US) DePaul University
128.117.215.217	209	19078260	12965	(US) National Center for Atmospheric Research
140.192.173.48	54	16355314	21711	(US) DePaul University
128.104.110.130	433	5710039	4476	(US) University of Wisconsin-Madison
132.216.181.22	120	4884232	4583	(US) McGill University
140.127.177.17	12	3145500	2097	(Taiwan) Kaohsiung Regional Education Network
206.220.240.220	2057	1602300	5809	(US) Ameritech ATM Exchange Point
132.206.92.178	160	1559624	17646	(US) McGill University
66.158.28.218	162	1371534	1041	(US) Illinois Century Network
132.208.166.190	44	1358204	974	(Canada) Universite du Quebec a Montreal
131.178.192.156	2002	1155469	4447	(Mexico) Instituto Tecnologico y de Estudios Superiores de Monterrey
198.37.27.13	122	1154809	888	(US) Illinois Institute of Technology
129.240.83.23	89	1151930	1078	(Norway) University of Oslo
131.202.176.62	243	1142220	766	(Canada) University of New Brunswick
130.225.11.132	929	1101687	1042	(Denmark) Danish Computer Centre for Research and Education
202.194.15.24	307	1060500	707	(China) Shandong University
129.57.32.67	330	977088	1471	(US) Continuous Electronic Beam Accelerator Facility (SURA/CEBAF) / VA
137.43.51.115	1990	955215	4185	(Ireland) University College Dublin
140.192.183.109	577	821555	752	(US) DePaul University
152.61.4.6	16	819888	551	(US) EROS Data Center / US
216.124.227.98	192	749532	501	(US) CoreComm Limited
134.208.20.99	28	717024	479	(Taiwan) Ministry of Education Computer Center
210.204.108.131	604	700371	666	(South Korea) Cheongju Dong Middle School
211.250.59.253	612	695229	679	(South Korea) Daechung Middle School
66.158.27.218	80	613228	461	(US) Illinois Century Network
210.29.195.131	67	605488	408	(China) Changzhou Teachers College Of Technology
140.192.196.131	592	603576	1434	(US) DePaul University

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

192.38.83.208	292	576496	873	(US) Danish Network for Research and Education
128.8.120.175	103	560141	525	(US) University of Maryland
137.224.222.111	71	550516	395	(Netherlands) Agricultural University Wageningen
198.37.26.69	93	521010	398	(US) Illinois Institute of Technology

Appendix C: 2nd Observation of Traffic from AMPATH Member Networks to US FedNets and Beyond

June 1st , 2003

IP Address	Flows	Octets	Packets	Source Domain
143.106.116.9	71	7652639	5121	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.107.11.117	1398	5959994	4644	(Brazil) Universidade de Sao Paulo
136.145.82.62	84	4897080	3288	(UPR) Agricultural Experimental Station
143.107.235.15	213	3163653	2389	(Brazil) Universidade de Sao Paulo
143.107.231.236	309	2700697	2342	(Brazil) Universidade de Sao Paulo
146.164.250.185	89	2698856	2305	(Brazil) Federal University of Rio de Janeiro
146.83.217.122	95	2490578	1721	(Chile) Red Universitaria Nacional (REUNA)
157.86.113.27	127	2480658	1784	(Brazil) Fundacao Oswaldo Cruz (FIOCRUZ)
200.137.204.2	920	1886283	1597	(Brazil) Comite Gestor da Internet no Brasil
200.20.189.251	190	1663045	1405	(Brazil) Comite Gestor da Internet no Brasil
200.145.131.202	147	1494589	1332	(Brazil) Comite Gestor da Internet no Brasil
131.94.115.219	683	1441981	1384	(FIU) Engineering
200.145.86.170	72	1355883	1249	(Brazil) Comite Gestor da Internet no Brasil
131.94.227.35	525	1329068	933	(FIU) Biscayne Bay Campus
143.106.41.7	169	1314015	1522	(Brazil) Universidade Estadual de Campinas - UNICAMP
131.94.145.162	582	1237368	935	(FIU) University Park Campus
143.107.231.54	463	1195572	1155	(Brazil) Universidade de Sao Paulo
200.17.79.42	665	1064529	19413	(Brazil) Comite Gestor da Internet no Brasil
143.106.16.142	633	1029078	1055	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.107.231.100	11	913548	611	(Brazil) Universidade de Sao Paulo
143.107.180.85	189	882523	740	(Brazil) Universidade de Sao Paulo
150.162.60.122	942	718539	1893	(Brazil) Universidade Federal de Santa Catarina
200.19.131.49	407	700567	646	(Brazil) Comite Gestor da Internet no Brasil
143.107.99.109	345	698032	735	(Brazil) Universidade de Sao Paulo

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

146.134.9.9	443	686019	1634	(Brazil) Laboratorio Nacional de Computacao Cientifica
143.107.239.115	51	650743	546	(Brazil) Universidade de Sao Paulo
200.145.183.51	298	639283	661	(Brazil) Comite Gestor da Internet no Brasil
200.145.202.95	421	630580	494	(Brazil) Comite Gestor da Internet no Brasil
200.136.177.89	19	620531	446	(Brazil) Comite Gestor da Internet no Brasil

June 2nd, 2003

IP Address	Flows	Octects	Packets	Source Domain
136.145.82.62	233	38930402	25974	(UPR) Agricultural Experimental Station
200.9.99.172	7181	25066984	16934	(Chile) University of Chile
136.145.84.24	328	24306750	16228	(UPR) Agricultural Experimental Station
146.164.36.17	152	12538637	8428	(Brazil) Federal University of Rio de Janeiro
136.145.178.40	4	8462164	6358	(UPR) Agricultural Experimental Station
136.145.180.17	4	7177328	5398	(UPR) Agricultural Experimental Station
131.94.130.171	98	5040549	3675	FIU (Computer Science)
143.106.50.203	35	4909937	3663	(Brazil) Universidade Estadual de Campinas - UNICAMP
200.145.131.202	252	4022490	3426	(Brazil) Comite Gestor da Internet no Brazil
131.94.98.86	592	3278319	2587	(FIU) University Technology Services
131.94.133.131	1789	2880393	2316	FIU (Computer Science)
200.128.60.129	641	2825017	2243	(Brazil) Comite Gestor da Internet no Brazil
131.94.227.35	909	2690416	1915	FIU (Biscayne Bay Campus)
143.107.170.132	426	2335254	1863	(Brazil) Universidade de Sao Paulo
157.86.113.27	113	2297084	1666	(Brazil) Fundacao Oswaldo Cruz (FIOCRUZ)
200.137.162.10	106	1882438	1267	(Brazil) Comite Gestor da Internet no Brazil
131.94.115.219	716	1781170	1671	FIU (Engineering)
146.83.216.150	510	1644636	2050	(Chile) Red Universitaria Nacional (REUNA)
143.107.132.115	637	1535061	26597	(Brazil) Universidade de Sao Paulo
143.107.71.24	36	1480162	1100	(Brazil) Universidade de Sao Paulo
200.19.175.3	495	1469441	1160	(Brazil) Comite Gestor da Internet no Brazil
146.83.195.31	150	1286087	976	(Chile) Red Universitaria Nacional (REUNA)
143.106.10.51	114	1281281	901	(Brazil) Universidade Estadual de Campinas - UNICAMP
136.145.62.134	21	1255072	839	(UPR) Agricultural Experimental Station
200.10.21.172	674	1126759	867	(Chile) Universidade de la Frontera
198.32.252.51	289	1000949	4293	FIU - AMPATH (VRVS.ampath.net)
143.106.50.76	238	981249	1019	(Brazil) Universidade Estadual de Campinas - UNICAMP
200.144.120.50	250	976940	763	(Brazil) Comite Gestor da Internet no Brazil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

200.137.204.2	509	945421	821	(Brazil) Comite Gestor da Internet no Brazil
200.2.112.67	1085	912476	2835	(Chile) Universidad Austral de Chile
200.131.6.8	432	910261	1097	(Brazil) Comite Gestor da Internet no Brazil

June 3rd, 2003

IP Address	Flows	Octects	Packets	Source Domain
136.145.84.24	572	40386243	28393	(UPR) Agricultural Experimental Station
143.106.10.59	46	5922431	3963	(Brazil) Universidade Estadual de Campinas - UNICAMP
136.145.33.112	39	5552507	4030	(UPR) Agricultural Experimental Station
143.107.239.115	634	4801291	4246	(Brazil) Universidade de Sao Paulo
150.161.24.250	328	3043016	2442	(Brazil) Universidade Federal de Pernambuco
143.107.132.115	1358	2736015	46831	(Brazil) Universidade de Sao Paulo
131.94.133.131	1808	2685704	2252	FIU (Computer Science)
143.107.170.132	933	2629062	2185	(Brazil) Universidade de Sao Paulo
136.145.178.40	4	2600230	1957	(UPR) Agricultural Experimental Station
146.83.129.161	44	2431621	1629	(Chile) Red Universitaria Nacional (REUNA)
200.144.120.50	567	1924823	1517	(Brazil) Comite Gestor da Internet no Brasil
200.9.99.186	146	1718793	1392	(Chile) University of Chile
200.17.97.42	462	1528826	1674	(Brazil) Comite Gestor da Internet no Brasil
146.164.47.151	344	1504320	1128	(Brazil) Federal University of Rio de Janeiro
200.132.73.86	118	1421486	985	(Brazil) Comite Gestor da Internet no Brasil
150.161.179.189	272	1401279	1194	(Brazil) Universidade Federal de Pernambuco
143.107.161.158	806	1272803	1742	(Brazil) Universidade de Sao Paulo
146.164.2.70	444	1236750	828	(Brazil) Federal University of Rio de Janeiro
200.10.22.116	70	1193662	867	(Chile) Universidad de la Frontera
143.106.57.221	343	1122217	1882	(Brazil) Universidade Estadual de Campinas - UNICAMP
146.164.22.12	237	1100891	1007	(Brazil) Federal University of Rio de Janeiro
146.164.36.17	49	1087831	747	(Brazil) Federal University of Rio de Janeiro
200.20.189.251	107	1032979	833	(Brazil) Comite Gestor da Internet no Brasil
143.107.71.24	90	1010122	812	(Brazil) Universidade de Sao Paulo
143.106.27.128	209	997223	1053	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.107.183.163	115	987413	1033	(Brazil) Universidade de Sao Paulo
146.83.123.227	239	972508	784	(Chile) Red Universitaria Nacional (REUNA)
200.145.86.170	231	972221	802	(Brazil) Comite Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

136.145.56.103	1037	923699	1686	(UPR) Agricultural Experimental Station
150.162.32.116	467	890323	740	(Brazil) Universidade Federal De Snata Catarina
143.107.180.90	485	877393	1047	(Brazil) Universidade de Sao Paulo

June 4th, 2003

IP Address	Flows	Octects	Packets	Source Domain
139.229.8.6	14	25018956	16767	(NASA) Ames Research Center
136.145.54.46	38	24367895	16969	(UPR) Agricultural Experimental Station
136.145.180.17	2	7615968	6010	(UPR) Agricultural Experimental Station
131.94.117.137	585	5148184	4448	FIU - Environmental Engineering
143.107.239.115	489	3823234	3401	(Brazil) Universidade de Sao Paulo
146.83.4.3	677	3438210	3081	(Chile) Red Universitaria Nacional (REUNA)
143.107.132.115	1676	3194144	53704	(Brazil) Universidade de Sao Paulo
143.106.52.138	1227	3079682	4262	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.107.161.158	546	2822720	2174	(Brazil) Universidade de Sao Paulo
143.107.170.132	950	2764066	3067	(Brazil) Universidade de Sao Paulo
131.94.133.131	1713	2456934	2137	FIU - Computer Science
200.17.212.117	14	2103890	1440	(Brazil) Comitê Gestor da Internet no Brasil
143.107.237.118	439	1992255	1564	(Brazil) Universidade de Sao Paulo
150.162.32.116	1396	1905517	2188	(Brazil) Universidade Federal De Snata Catarina
143.107.183.163	832	1898034	2028	(Brazil) Universidade de Sao Paulo
157.92.28.103	5373	1633380	37886	(Argentina) Universidad Nacional de Buenos Aires
146.164.29.5	568	1516403	1377	(Brazil) Federal University of Rio de Janeiro
143.107.45.30	218	1382146	1017	(Brazil) Universidade de Sao Paulo
150.161.24.250	171	1366157	1372	(Brazil) Universidade Federal De Snata Catarina
143.107.180.9	276	1304078	1000	(Brazil) Universidade de Sao Paulo
200.135.30.180	856	1297162	933	(Brazil) Comitê Gestor da Internet no Brasil
200.144.120.50	388	1293165	1022	(Brazil) Comitê Gestor da Internet no Brasil
200.17.77.3	17	1281260	857	(Brazil) Comitê Gestor da Internet no Brasil
143.107.235.15	296	1145621	1211	(Brazil) Universidade de Sao Paulo
150.161.179.189	534	1139923	1274	(Brazil) Universidade Federal de Pernambuco
200.17.97.42	378	1114232	1154	(Brazil) Comitê Gestor da Internet no Brasil
146.164.55.169	448	1099127	855	(Brazil) Federal University of Rio de Janeiro
200.145.131.202	60	1009555	892	(Brazil) Comitê Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

150.161.184.72	138	1008311	821	(Brazil) Universidade Federal de Pernambuco
134.171.161.124	316	1002696	710	(Chile) European Southern Observatory
146.83.129.53	160	899718	962	(Chile) Red Universitaria Nacional (REUNA)

June 5th, 2003

IP Address	Flows	Octects	Packets	Source Domain
192.231.93.38	281	42470556	28778	(UPR) Arecibo Observatory
136.145.54.46	22	18484841	12327	(UPR) Agricultural Experimental Station
200.9.99.172	7887	13458608	8986	(Chile) Universidad de Chile
139.229.8.6	5	8201520	5493	(NASA) Ames Research Center
146.83.6.95	29	6771611	4788	(Chile) Red Universitaria Nacional (REUNA)
139.229.8.3	246	5893100	10438	(NASA) Ames Research Center
198.32.252.51	173	3196060	6169	FIU - AMPATH - (VRVS.ampath.net)
150.162.166.50	371	3062055	2491	(Brazil) Universidade Federal De Snata Catarina
146.83.218.85	41	3055348	3118	(Chile) Red Universitaria Nacional (REUNA)
143.107.71.24	367	3032181	3539	(Brazil) Universidade de Sao Paulo
150.162.76.44	371	2547406	1710	(Brazil) Universidade Federal De Snata Catarina
200.145.36.46	68	2189638	2333	(Brazil) Comite Gestor da Internet no Brasil
143.107.170.132	858	1972983	2315	(Brazil) Universidade de Sao Paulo
143.107.128.35	1495	1898441	4117	(Brazil) Universidade de Sao Paulo
146.83.166.34	4644	1876176	4644	(Chile) Red Universitaria Nacional (REUNA)
150.162.155.89	43	1857192	1244	(Brazil) Universidade Federal De Snata Catarina
200.19.177.65	687	1833386	1486	(Brazil) Comite Gestor da Internet no Brasil
200.17.97.42	359	1699991	1628	(Brazil) Comite Gestor da Internet no Brasil
157.92.28.103	4834	1571822	36350	(Argentina) Universidad Nacional de Buenos Aires
143.107.132.115	1321	1450631	24980	(Brazil) Universidade de Sao Paulo
131.94.133.131	957	1435854	1203	FIU - Computer Science
200.145.131.202	87	1402656	1217	(Brazil) Comite Gestor da Internet no Brasil
143.107.224.205	121	1344364	1554	(Brazil) Universidade de Sao Paulo
143.107.162.156	330	1288975	1000	(Brazil) Universidade de Sao Paulo
150.161.179.189	488	1214868	1118	(Brazil) Universidade Federal de Pernambuco
143.107.80.238	481	1085037	1339	(Brazil) Universidade de Sao Paulo
150.161.183.55	256	1068230	718	(Brazil) Universidade Federal de Pernambuco
146.164.44.5	50	984181	667	(Brazil) Federal University of Rio de Janeiro

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

143.106.106.105	28	834966	560	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.106.52.138	124	784675	755	(Brazil) Universidade Estadual de Campinas - UNICAMP
143.107.206.40	16	760852	508	(Brazil) Universidade de Sao Paulo

June 6th, 2003

IP Address	Flows	Ooctects	Packets	Source Domain
131.94.195.37	94	24002940	17263	FIU - Mathematics
139.229.8.3	741	20728205	36573	(NASA) Ames Research Center
146.83.7.6	43	19298508	13729	(Chile) Red Universitaria Nacional (REUNA)
136.145.84.24	121	17505794	11681	(UPR) Agricultural Experimental Station
146.83.166.34	17620	7117758	17620	(Chile) Red Universitaria Nacional (REUNA)
200.9.99.172	2522	3526808	2869	(Chile) University of Chile
131.94.133.131	1838	2722498	2225	FIU - Computer Science
143.107.132.115	1620	2389962	38841	(Brazil) Universidade de Sao Paulo
146.164.53.99	736	2310529	1957	(Brazil) Federal University of Rio de Janeiro
200.136.177.89	122	1997214	1425	(Brazil) Comite Gestor da Internet no Brasil
157.92.28.103	5209	1908712	44288	(Argentina) Universidad Nacional de Buenos Aires
136.145.54.40	31	1651281	1184	(UPR) Agricultural Experimental Station
150.163.141.28	519	1592704	1418	(Brazil) Instituto Nacional de Pesquisas Espaciais
136.145.54.46	48	1532373	1082	(UPR) Agricultural Experimental Station
143.107.235.15	456	1324435	1174	(Brazil) Universidade de Sao Paulo
200.19.177.65	435	1294428	1087	(Brazil) Comite Gestor da Internet no Brasil
200.132.35.222	429	1068239	806	(Brazil) Comite Gestor da Internet no Brasil
143.107.97.8	250	966731	727	(Brazil) Universidade de Sao Paulo
143.107.170.132	193	866987	1000	(Brazil) Universidade de Sao Paulo
150.161.184.72	177	783477	612	(Brazil) Instituto Nacional de Pesquisas Espaciais
143.107.229.48	496	749273	1457	(Brazil) Universidade de Sao Paulo
143.107.239.4	869	711574	2671	(Brazil) Universidade de Sao Paulo
200.135.30.165	287	645365	486	(Brazil) Comite Gestor da Internet no Brasil
150.162.198.237	422	615528	675	(Brazil) Universidade Federal De Snata Catarina
157.92.23.145	784	570389	9875	(Argentina) Universidad Nacional de Buenos Aires
136.145.91.148	171	565422	695	(UPR) Agricultural Experimental Station
150.163.3.1	196	543783	10365	(Brazil) Instituto Nacional de Pesquisas Espaciais
200.20.67.25	375	517040	602	(Brazil) Comite Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

143.106.57.221	291	465458	375	(Brazil) Universidade Estadual de Campinas - UNICAMP
157.92.28.42	1391	457812	11443	(Argentina) Universidad Nacional de Buenos Aires
150.164.18.117	309	431457	743	(Brazil) Instituto Nacional de Pesquisas Espaciais

June 7th, 2003

IP Address	Flows	Octects	Packets	Source Domain
139.229.8.3	675	17605717	31103	(NASA) Ames Research Center
131.94.195.37	77	13758101	9792	FIU - Biscayne Bay Campus
200.145.131.202	416	6872271	5907	(Brazil) Comite Gestor da Internet no Brasil
143.107.183.163	499	3246991	2273	(Brazil) Universidade de Sao Paulo
143.106.95.133	223	2535916	1764	(Brazil) Universidade Estadual de Campinas - UNICAMP
139.229.1.3	2	2112937	1418	(NASA) Ames Research Center
143.107.132.115	635	2089573	36197	(Brazil) Universidade de Sao Paulo
143.107.231.236	25	1691994	1247	(Brazil) Universidade de Sao Paulo
200.136.177.89	142	1646962	1153	(Brazil) Comite Gestor da Internet no Brasil
157.92.28.103	1107	1246486	29481	(Argentina) Universidad Nacional de Buenos Aires
136.145.37.79	30449	1218594	30454	(UPR) Agricultural Experimental Station
152.84.100.169	18	1036896	697	(Brazil) Centro Brasileiro de Pesquisas Fisicas
150.162.55.36	163	950046	954	(Brazil) Universidade Federal De Snata Catarina
150.162.25.105	370	735255	563	(Brazil) Universidade Federal De Snata Catarina
143.107.229.48	350	696104	714	(Brazil) Universidade de Sao Paulo
150.161.184.72	543	679420	2236	(Brazil) Universidade Federal de Pernambuco
143.107.239.4	1511	668036	6618	(Brazil) Universidade de Sao Paulo
200.137.204.2	395	666516	700	(Brazil) Comite Gestor da Internet no Brasil
157.92.42.71	36	648512	566	(Argentina) Universidad Nacional de Buenos Aires
146.164.53.99	352	622892	745	(Brazil) Federal University of Rio de Janeiro
143.107.76.191	132	608161	466	(Brazil) Universidade de Sao Paulo
200.133.41.75	696	599682	1092	(Brazil) Comite Gestor da Internet no Brasil
143.107.195.227	167	594779	623	(Brazil) Universidade de Sao Paulo
136.145.38.155	343	542007	379	(UPR) Agricultural Experimental Station
131.94.144.222	173	521449	409	FIU - Student Dorms
136.145.91.148	161	471961	622	(UPR) Agricultural Experimental Station
150.163.141.28	441	453273	676	(Brazil) Universidade Federal de Pernambuco
200.2.112.97	142	450215	343	(Brazil) Comite Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

143.107.211.38	312	443382	487	(Brazil) Universidade de Sao Paulo
150.162.198.237	281	391706	430	(Brazil) Universidade Federal de Santa Catarina
150.163.3.208	1735	385360	9634	(Brazil) Instituto Nacional de Pesquisas Espaciais

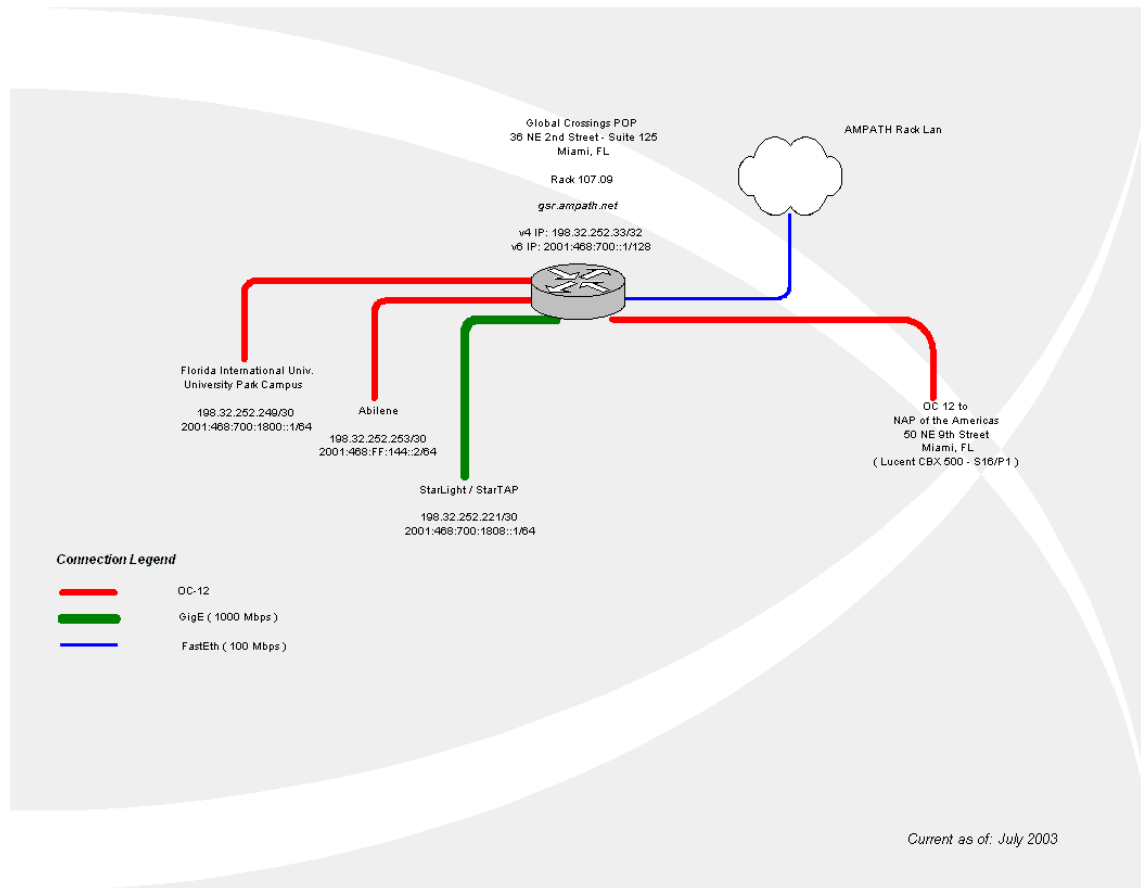
June 8th, 2003

IP Address	Flows	Octects	Packets	Source Domain
136.145.178.40	23	14308902	11041	(UPR) Agricultural Experiemental Station
200.145.131.202	378	5682288	4869	(Brazil) Comite Gestor da Internet no Brasil
200.128.60.129	128	4333437	3144	(Brazil) Comite Gestor da Internet no Brasil
200.129.241.99	173	3922312	2625	(Brazil) Comite Gestor da Internet no Brasil
136.145.84.24	130	2330834	9867	(UPR) Agricultural Experiemental Station
200.136.177.89	8	1958440	1354	(Brazil) Comite Gestor da Internet no Brasil
152.74.25.89	78	1270599	953	(Chile) Universidad de Concepcion
134.171.161.124	338	1200120	849	(Chile) European Souther Observatory (Denmark)
143.107.132.115	208	1023472	17687	(Brazil) Universidade de Sao Paulo
200.144.120.50	36	983187	757	(Brazil) Comite Gestor da Internet no Brasil
200.20.123.228	28	917635	671	(Brazil) Comite Gestor da Internet no Brasil
143.107.183.163	102	707874	487	(Brazil) Universidade de Sao Paulo
157.92.42.71	59	671549	543	(Argentina) Universidad Nacional de Buenos Aires
143.107.180.9	129	669435	513	(Brazil) Universidade de Sao Paulo
150.162.55.36	213	668121	690	(Brazil) Universidade Federal De Snata Catarina
200.145.171.105	402	606806	633	(Brazil) Comite Gestor da Internet no Brasil
200.132.78.66	250	527431	430	(Brazil) Comite Gestor da Internet no Brasil
150.162.198.237	305	519158	465	(Brazil) Universidade Federal De Snata Catarina
200.144.37.252	158	493522	398	(Brazil) Comite Gestor da Internet no Brasil
143.107.161.158	381	490502	778	(Brazil) Universidade de Sao Paulo
150.163.141.28	407	469280	662	(Brazil) Instituto Nacional de Pesquisas Espaciais
200.137.204.2	332	447407	600	(Brazil) Comite Gestor da Internet no Brasil
143.107.96.233	288	431266	498	(Brazil) Universidade de Sao Paulo
200.145.122.50	614	418052	1176	(Brazil) Comite Gestor da Internet no Brasil
152.74.32.53	158	365463	337	(Chile) Universidad de Concepcion
146.164.53.169	295	364011	327	(Brazil) Federal University of Rio de Janeiro
168.96.148.32	114	353183	541	(Argentina) Asociacion Civil Ciencia Hoy (RETINA)
200.234.128.95	162	345132	277	(Brazil) Comite Gestor da Internet no Brasil

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis

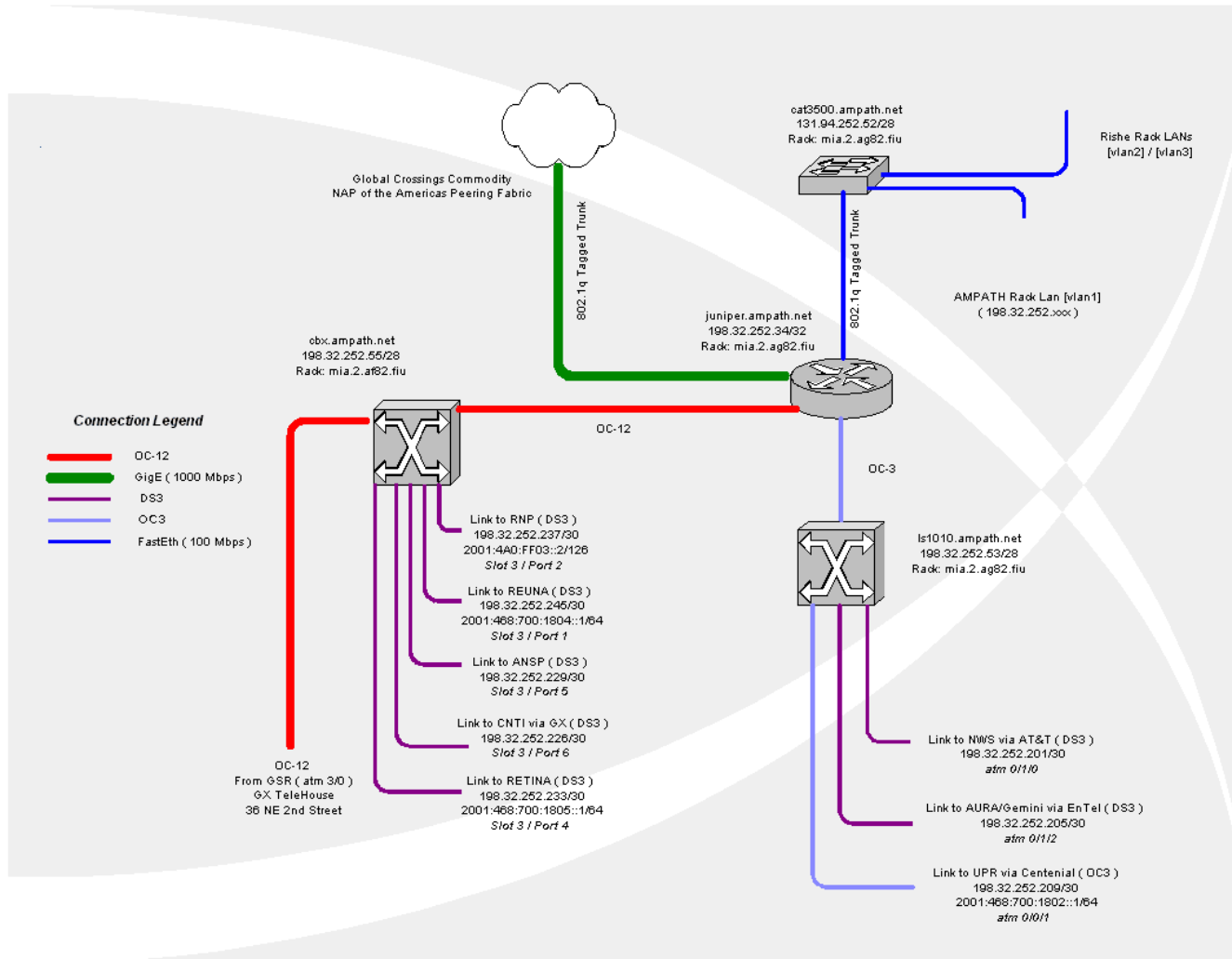
<i>150.163.3.208</i>	<i>1497</i>	<i>336892</i>	<i>8422</i>	<i>(Brazil) Instituto Nacional de Pesquisas Espaciais</i>
<i>200.20.67.25</i>	<i>320</i>	<i>311884</i>	<i>1023</i>	<i>(Brazil) Comite Gestor da Internet no Brasil</i>
<i>143.106.10.51</i>	<i>84</i>	<i>302146</i>	<i>206</i>	<i>(Brazil) Universidade Estadual de Campinas - UNICAMP</i>

Appendix D: Current Network Diagram



***Shows GSR 12012 – Main AMPATH Router connecting to StarLight via GigE Interface.*

An In-Depth Look At AMPATH StarLight Traffic Accounting and Participant Analysis



***Shows all Latin American NRENs connecting via AMPATH to US FedNets and Beyond (LS1010/CBX 500).*