

Hidden Universes of Information on the Internet – Part 2



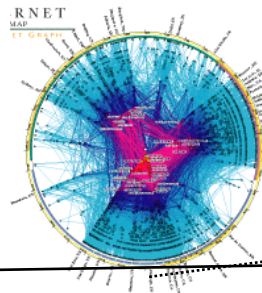
**SEARCH ENGINE
COLOSSUS**


abyznewslinks.com

INTERNATIONAL DIRECTORY OF SEARCH ENGINES




Yandex



 **RUSS HAYNAL**
Instructor & Speaker
<http://navigators.com>

Deep Web
OSINT

 Cyber Security
OPSEC

Ensure the Internet is an asset,
not a liability for your organization

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put "internet training" in subject of email

Rev. 08/2021

Note: If you send me an email, put "internet training" in the e-mail's subject

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Session Goal: country specific research

Course Outline:

- **Country-Specific Content**
 - **Internet Architecture Review**
 - **Country-Specific Infrastructure**
 - **Advanced Tools and Traceroute Details**

Online Web page= <http://navigators.com/opensource.html>
(Look under Hidden Universes-Part 2)

Many country resources are online

Assess popularity of resources using analytics
 (alexa.com/siteinfo , urlm.co , similarweb.com)

If necessary use site: and cached_text_only



Phone books



ABYZ News Links

[Home](#) > [Europe](#) > [Eastern Europe](#) > [Russia](#)

Media Type	Media Focus
BC-Broadcast	AG-Agriculture
IN-Internet	BU-Business
MG-Magazine	EN-Entertainment
NP-Newspaper	GI-General Interest
PA-Press Agency	SH-Shopper
	ML-Military
	RL-Religion
	SP-Sport

Address <http://www.radio-locator.com/cgi-bin/nabion?ccode=ruligo.x=99go.y=4>

formerly the MIT List of Radio Stations on the Internet

60 Radio Stations were found in Russia (displaying 1 - 20):

Info: Click on this icon to get more information about a station or to submit a ch
Bitcaster: Indicates that the station broadcasts its audio on the Internet.

Info	Call Sign	Frequency	City	Format
	AutoRadio	102.7 FM		Unknown Format
	Canal-Melodia	91.1 FM	St.Petersburg	Unknown Format
	Europa Plus	102.2 FM		Top-40
	Europaplus	100.5 FM	Saint Pitersburg	Unknown Format
	Hit FM	107 FM	Moscow	Unknown Format
	M	101.7 AM	Vladivostok	Unknown Format
	Maximum	103.7 FM	Moscow	Unknown Format
	Radio Hit	68.66/90.6 FM		Unknown Format

Found 60 matching stations (currently displaying 1 - 20)

Next 20 Stations (21 - 40) **Go to page: 1 2 3**

Most Countries Sell Their Domains

ALLDOMAINS
REGISTERING THE WORLD'S DOMAINS

SHOPPING CART

nukeplanner.com	1 yr.	\$24.95
nukeplanner.org	1 yr.	\$24.95
nukeplanner.info	1 yr.	\$7.95
nukeplanner.us	1 yr.	\$24.95
nukeplanner.name	1 yr.	\$24.95
nukeplanner.ca	1 yr.	\$20.00
nukeplanner.cc	1 yr.	\$59.95
nukeplanner.tv	1 yr.	\$50
nukeplanner.de	1 yr.	\$39.99
nukeplanner.md	1 yr.	\$129.95
nukeplanner.biz	1 yr.	\$24.95
nukeplanner.bz	1 yr.	\$50.00
nukeplanner.ws	2 yr.	\$70.00
nukeplanner.it	1 yr.	\$39.99
nukeplanner.nu	2 yr.	\$100.00
nukeplanner.nl	1 yr.	\$49.99
nukeplanner.dk	1 yr.	\$39.99
nukeplanner.fr	1 yr.	\$99.99
nukeplanner.ch	1 yr.	\$119.99
nukeplanner.be	1 yr.	\$39.99
nukeplanner.cn	1 yr.	\$35.00

REMOVE ALL ITEMS

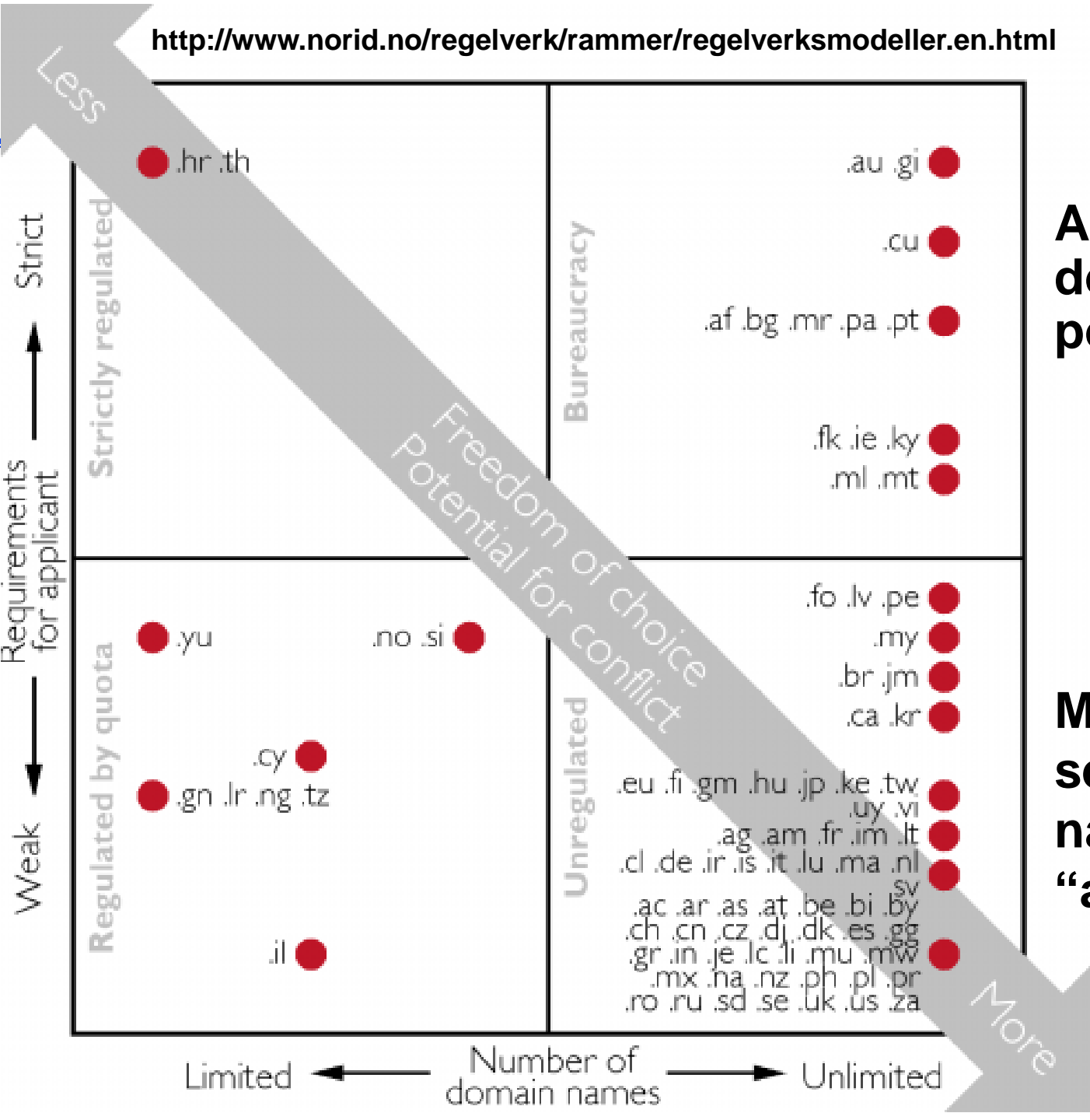
Total: \$1077.53



- These were just some of the country domains available for sale
- “All Domains” happens to be a licensed “registrar” for these countries
- Most countries who sell their domain names to “anyone”

Learn About the 2-letter code

- Visit your county's domain name registrar
 - iana.org/domains/root/db OR
 - – norid.no/en/om-domenenavn/domreg
- What is the policy for getting a domain name?
(citizenship, trademark, local presence, money)
 - What is the cost to register a domain name?
 - Are there any censorship clauses?
- Does the registrar require any proof of identity?
(drivers license, passport, business license)
- Is there a whois service? (make a bookmark)



An analysis of domain name policies

Most countries sell their domain names to “anybody”

Domain Names for Sale

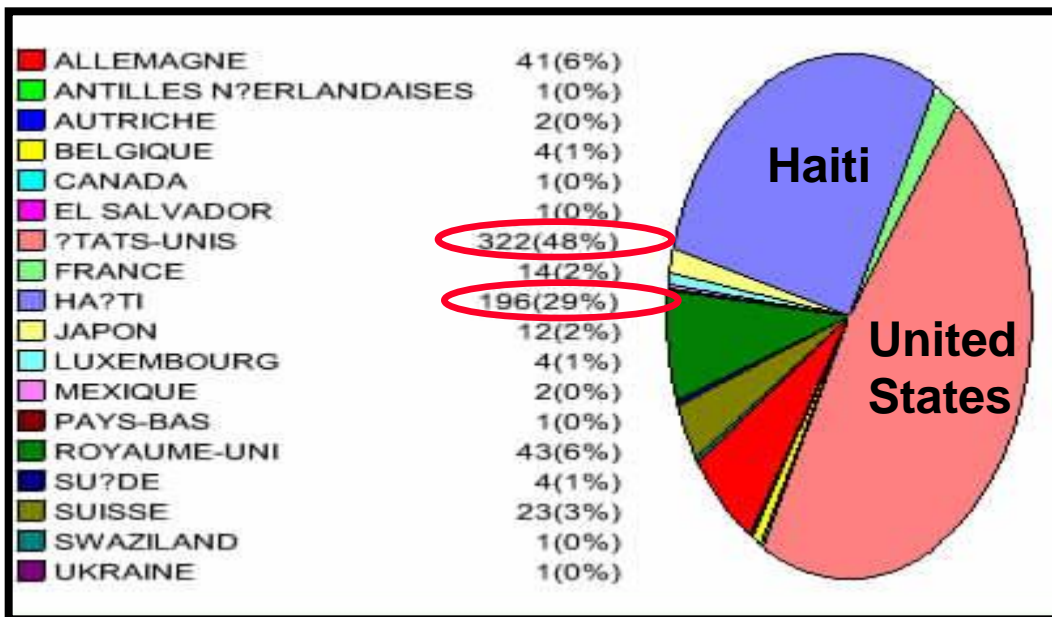
- Only 29% .HT domain names were registered to people with a Haitian address
- 48% of Haiti's Domain names were registered to U.S addresses
- When you see a .ht website... is it necessarily foreign?

1000+ new domains!



Domain	# registered
COM	115,260,124
NET	15,050,572
ORG	10,482,829
INFO	5,496,888
BIZ	2,399,522
US	1,771,180
MOBI	845,357
XYZ	726,850
ASIA	277,132
BERLIN	153,816
NAME	147,920
CLUB	142,281
TEL	133,434
PRO	110,096
XXX	104,044
REALTOR	88,065

Postal address for .HT Domain Owners

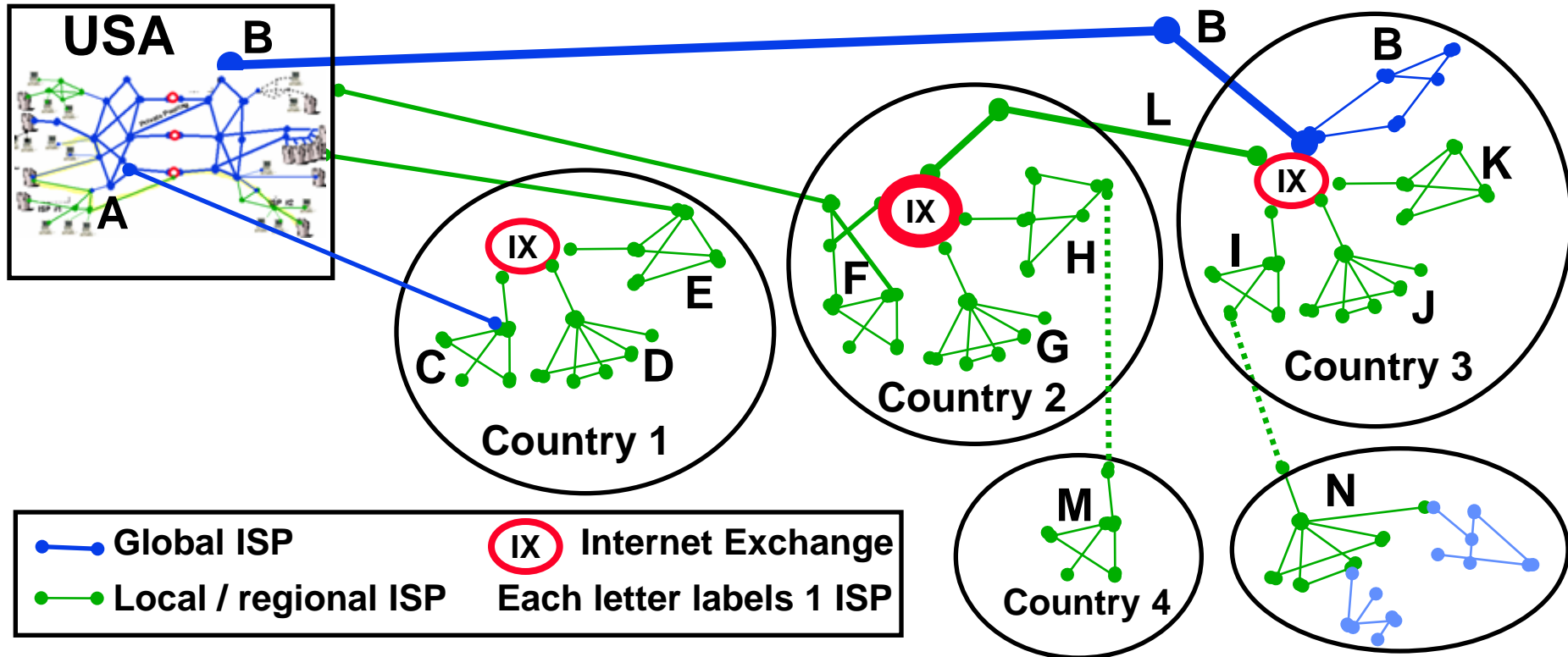


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Country-Specific Infrastructure



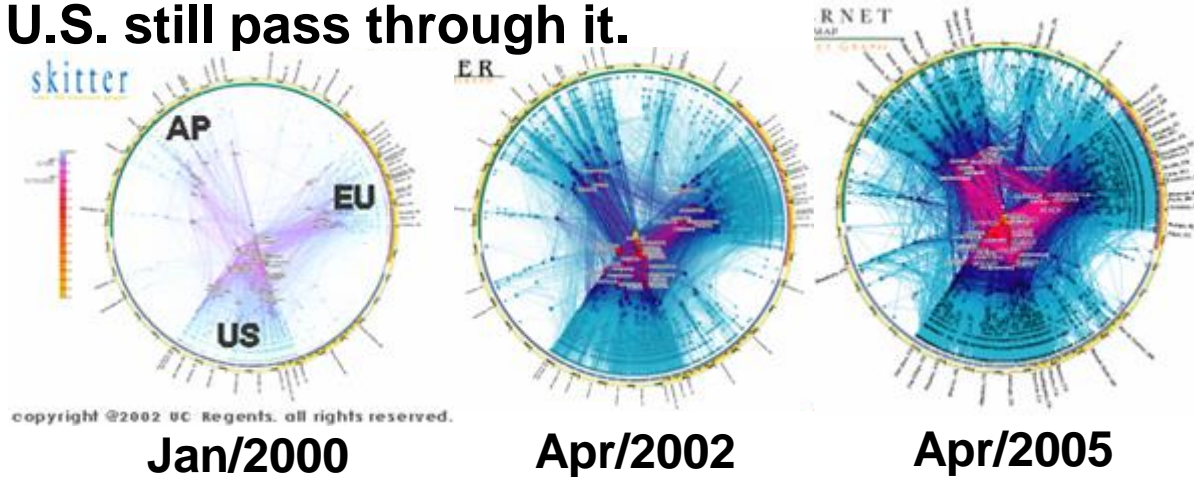
- There are many different scenarios for a country's connectivity
- A "clear picture" will emerge after many inter-country traceroutes
 - Initiate traceroutes in both directions (inbound & outbound)
- Routing rules can be determined by finance, politics, regulations, market pressures, personalities, and possibly technical efficiency

US-Centric Traceroutes

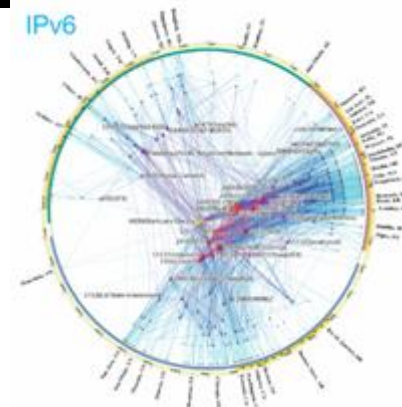
Example: South Africa to Russia via US

3 csir.uni.net.za
7 48NA209.sdn.net.za
8 wash-jhb.sdn.net.za
9 co-za-gw.digex.net
11 dca.atlas.digex.net
13 iad.atlas.digex.net
14 mae-e.icp.net
17 bb2-dc.icp.net
19 bb11-pen.icp.net
21 usnyk105.ebone.net
22 gblon504.ebone.net
24 bebru203.ebone.net
25 nlams303.ebone.net
26 dedus205.ebone.net
28 sesto501.ebone.net
30 195.158.226.54

- 2000 CAIDA Study: “Measurements of the Internet topology in the Asia-Pacific Region”
- The U.S. was the major Internet transit intermediary for the rest of the world: 71% of traces that neither start nor end in the U.S. still pass through it.

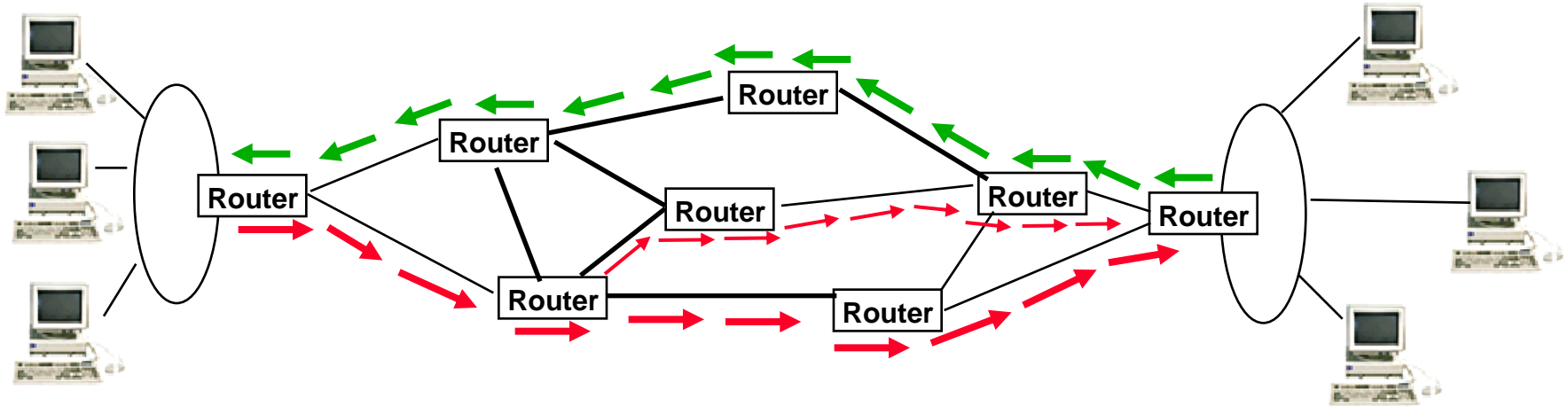


A mapping of IPV6 shows Europe as the new “center” (As of Aug 2010)



How Does it Work?

- Every Internet connection has a network address consisting of 4 numbers
- Each number has a range of 0-255 (e.g. 198.211.16.134)
- Internet Protocol (IP) numbers are allocated through a hierarchy
 - IANA → ARIN / RIPE / APNIC / LACNIC / AFRINIC → ISP/company/country
- Routers direct your packets of traffic along the “preferred” path



Note: The next version of IP address space (IPV6) is LARGE
3,911,873,538,269,506,102 IP #'s per square meter of the Earth's surface
4,500,000,000,000,000 IP #'s for every observable star in the universe

Asymmetric Routing

www.helios.de ← → registro.fapesp.br

Russ Haynal
Internet Instructor & Speaker
[http://navigators.com/
traceroute.html](http://navigators.com/traceroute.html)

Germany → Brasil

Via New York, Atlanta, Miami

- 1 cishelios2.helios.de (193.141.98.1) 3 ms
- 2 pop-hannover.de (193.98.1.212) 6 ms
- 3 pop2-hannover.de (193.98.1.213) 7 ms
- 4 ar3.haj.de.colt.net (213.61.144.17) 6 ms
- 5 213.61.232.45 (213.61.232.45) 6 ms
- 6 pos1.NYC.router.COLT.NET (212.74.74.169) 107 ms
- 7 so.nycmny1-hcr3.bbnplanet.net (4.25.133.37) 107 ms
- 8 xnycmny4-uunet.bbnplanet.net (4.0.2.42) 108 ms
- 9 so.XL2.NYC1.ALTER.NET (152.63.21.82) 108 ms
- 10 so.TL2.NYC8.ALTER.NET (152.63.0.185) 112 ms
- 11 so.TL2.ATL5.ALTER.NET (152.63.146.41) 126 ms
- 12 so.XL2.MIA4.ALTER.NET (152.63.86.193) 142 ms
- 13 POS7.MIA4.ALTER.NET (152.63.85.29) 142 ms
- 14 POS2.MIA4.ALTER.NET (65.208.80.142) 147 ms
- 15 MIAMI-STM1.metrored.net (200.49.77.14) 148 ms
- 16 BRASIL-STM1-.metrored.net (200.49.77.6) 259 ms
- 17 rjo.metrored.net.br (200.225.72.214) 261 ms
- 18 spo.metrored.net.br (200.225.76.221) 268 ms
- 19 .metrored.net.br (200.142.94.158) 267 ms
- 20 bb.registro.br (200.160.0.226) 268 ms
- 21 registro.br (200.160.2.3) 267 ms

Germany ← Brazil

Via Miami, Washington, London

- 1 bb (200.160.2.1) 0.254 ms
- 2 gw01 (200.160.0.228) 0.435 ms
- 3 200.142.94.157.metrored.net.br 3.991 ms
- 4 rbcor2-atm.rjo.metrored.net.br (200.225.76.222) 6ms
- 5 rbcor1-atm.rjo.metrored.net.br (200.225.72.213) 8ms
- 6 BRASIL-STM1-pm-pacor.metrored.net 118 ms
- 7 bar3-serial.Miami.cw.net (208.173.80.201) 118 ms
- 8 acr2-loopback.Miami.cw.net (208.172.98.62) 123 ms
- 9 -loopback.Washington.cw.net (206.24.226.103) 147 ms
- 10 dcr1-so.Washington.cw.net (206.24.238.57) 147 ms
- 11 bcr2.Thamesside.cw.net (166.63.210.62) 238 ms
- 12 zcr2-loopback.LondonInt.cw.net (166.63.210.19) 239 ms
- 13 oscar.LON.router.COLT.NET (212.74.64.217) 231 ms
- 14 ar3.haj.de.colt.net (213.61.232.42) 260 ms
- 15 213.61.144.18 (213.61.144.18) 261 ms
- 16 pop-hannover.de (193.98.1.212) 263 ms
- 17 cishelios2.helios.de (193.141.98.1) 268 ms
- 18 proxy.helios.de (193.141.98.37) 268 ms

You can try this with any two sites listed at traceroute.org

Some Definitions...

- **Telco - Company that owns networking infrastructure (fiber in the ground, switches, etc.)**
A Telco is often regulated by their country's government
- **“Real ISP” - ISP directly operates it's IP network (routers, data circuits) Data circuits may be obtained from the local telco (long term lease)**
- **“misc ISP” – ISP depends on the “real ISP's” for their existence. A “misc ISP” may be a very small localized ISP who depends on a “real ISP” for connectivity to the rest of the Internet. A “misc ISP” may also be a reseller of the “real ISP's” services**
- **Many “telco's” and “real ISP's” are now part of the same company. Referred to as a “facilities-based ISP”**

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"Country-Specific Infrastructure"

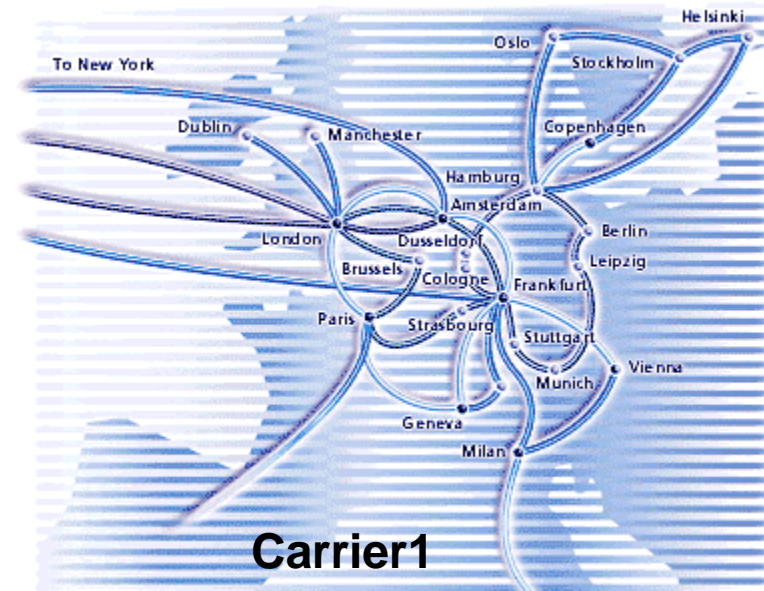
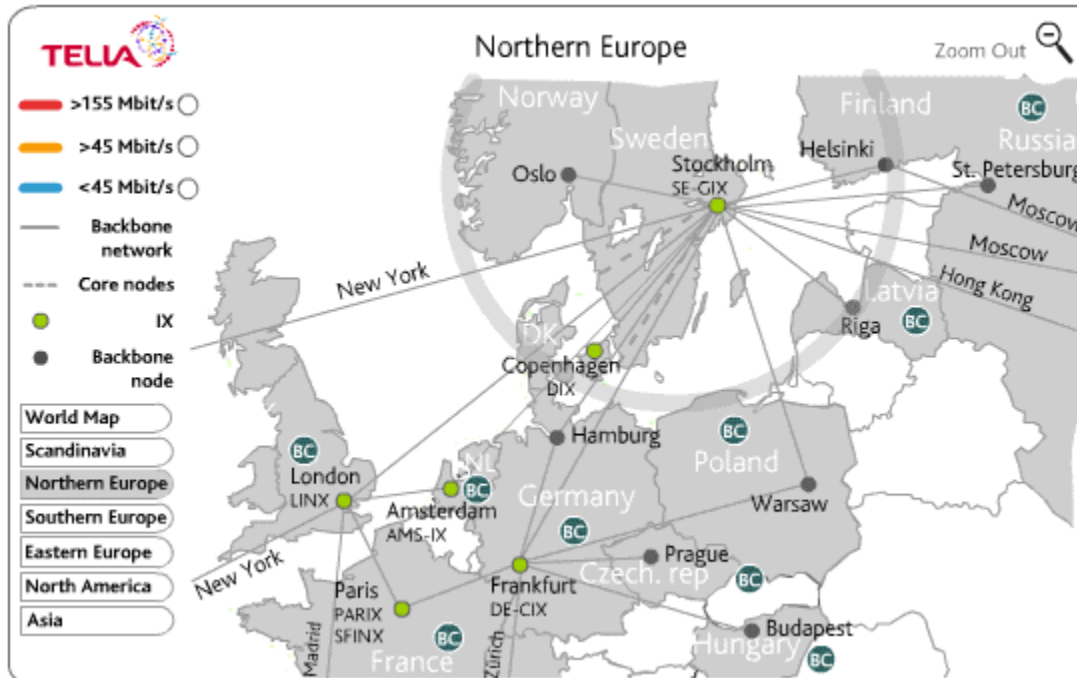
A top-down approach...

- Identify exchange points in a country or regional area
- Exchange points may list connected ISPs
- Exchange points may also mention telco providers, which provide infrastructure (fiber) to the ISPs
- Identify the ISPs which provide service in that country
- Examine the ISPs' backbone maps
- Watch for upstream providers, peering partners, and exchange points
- Initiate multiple traceroutes in/out of target country

Exchange Points

- **Research exchange points in your “area”**
- **Who operates the exchange point?**
- **Look for the address of the exchange point**
- **Look for telcos that provide circuits to the exchange point**
 - **May be described under FAQ’s or “how to connect”**
- **Look for membership list of ISPs that are connected**
 - **may also include content providers**
- **Do they provide a traceroute or a “looking glass” page?**
 - **Look under “tools” or “support”**

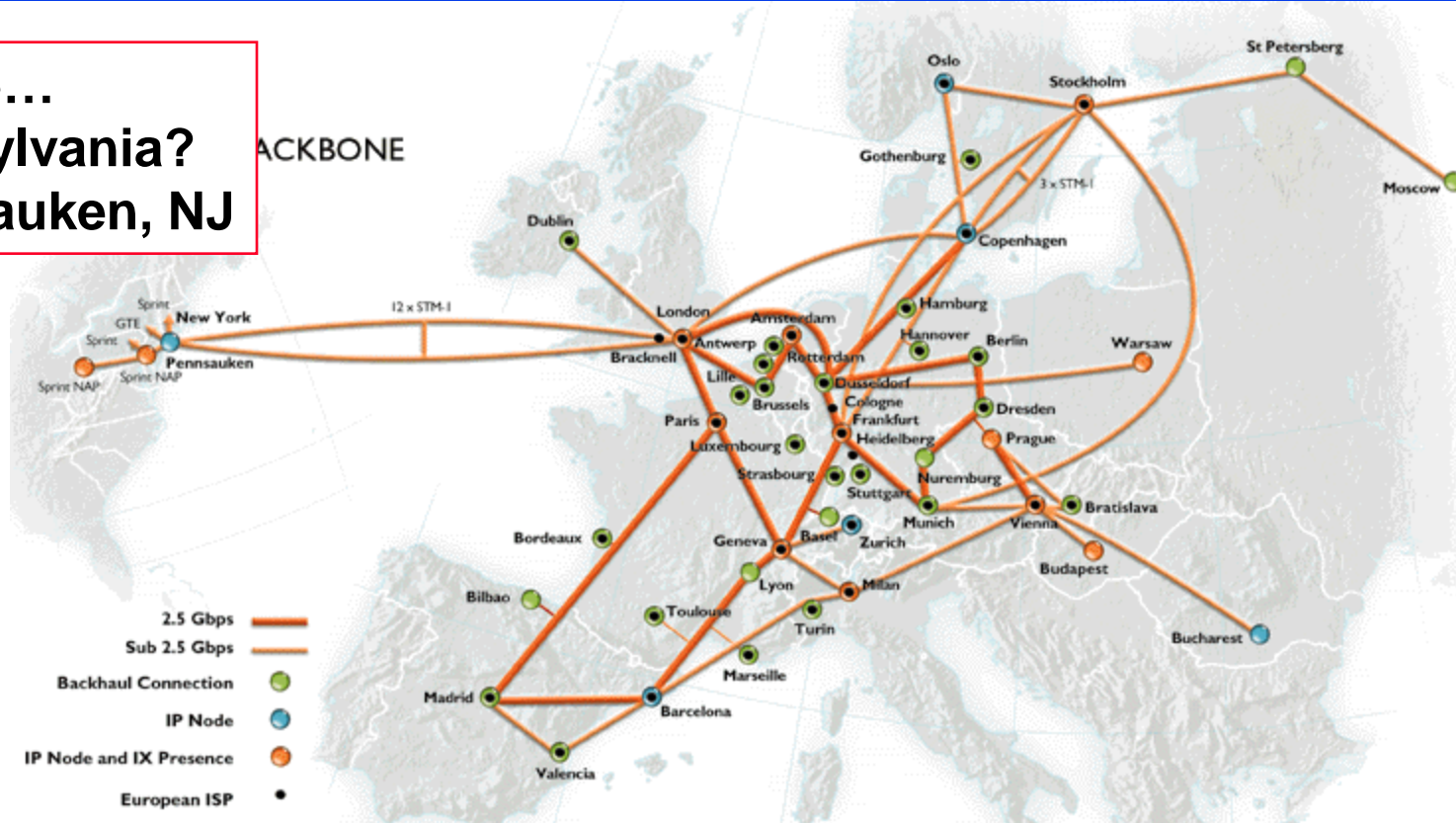
Regional ISPs



- Notice how these regional ISP's inter-connect with many Exchange Points
- You would expect intra-country traffic to not criss-cross the Atlantic through the U.S.

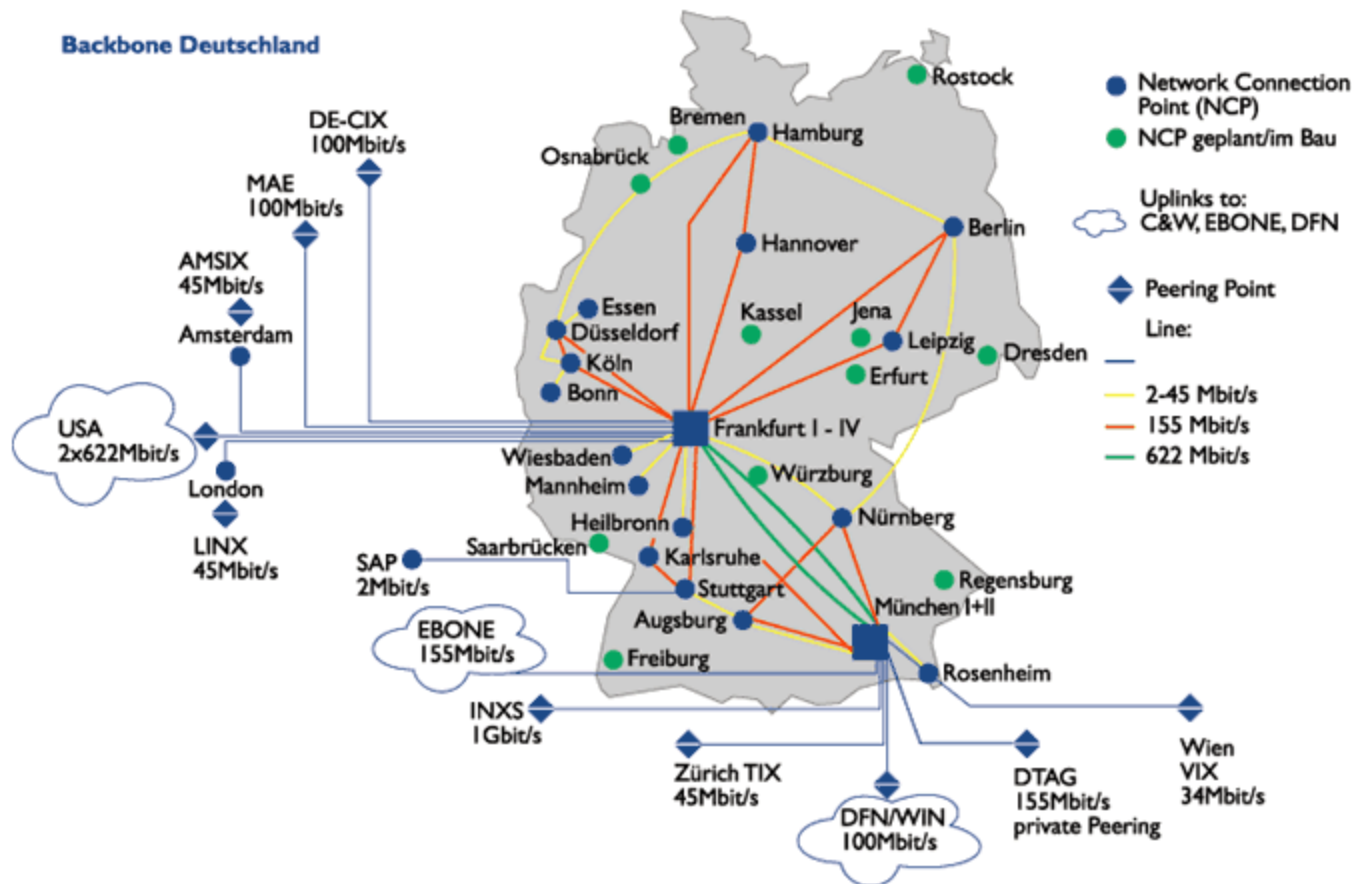
European Backbone

In a traceroute...
Penn = Pennsylvania?
Penn = Pennsauken, NJ



- This regional backbone extends across to the U.S.
- Ebone shows that they have U.S Connections at the Sprint NAP, and also with GTE, Sprint

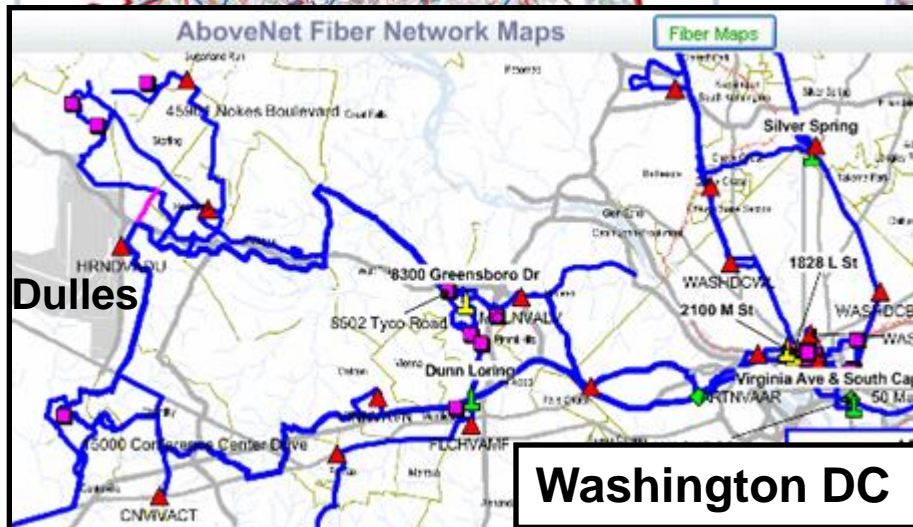
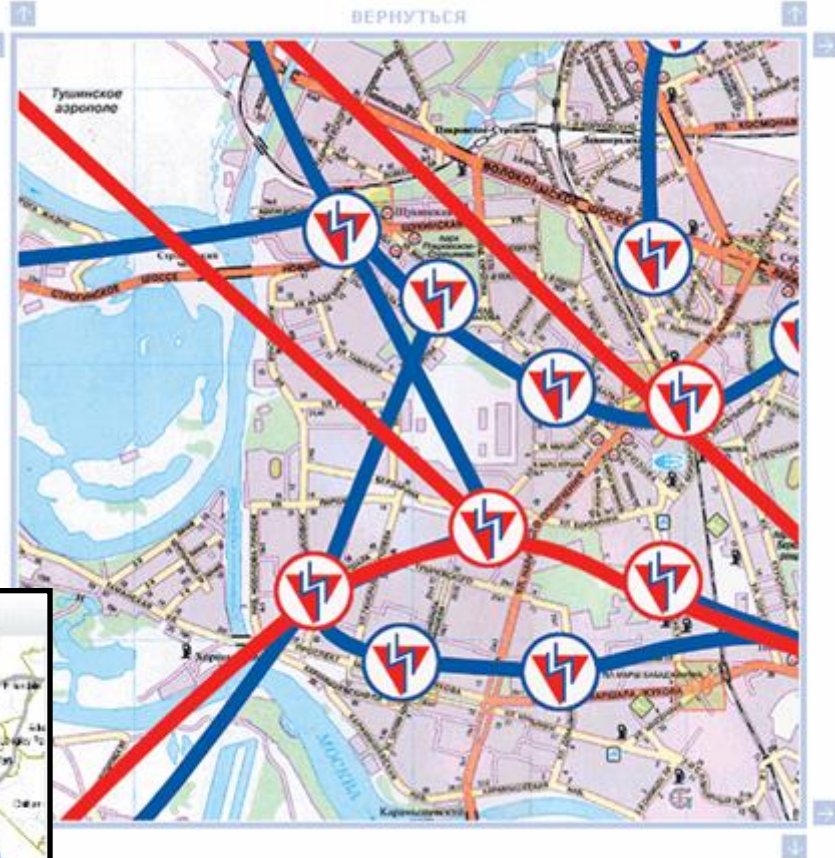
Country-Specific Backbone



- Shows the ISP's network within one country
- Note the links outward to numerous peering points
- Note the “uplinks” outward to C&W, Ebone, DFN

City-Specific Infrastructure

- City-wide Map of Fiber Network in Moscow → close-ups reveal access points



Vendors Reveal Details...

A telco's press announcements may tell you which vendors helped build their infrastructure

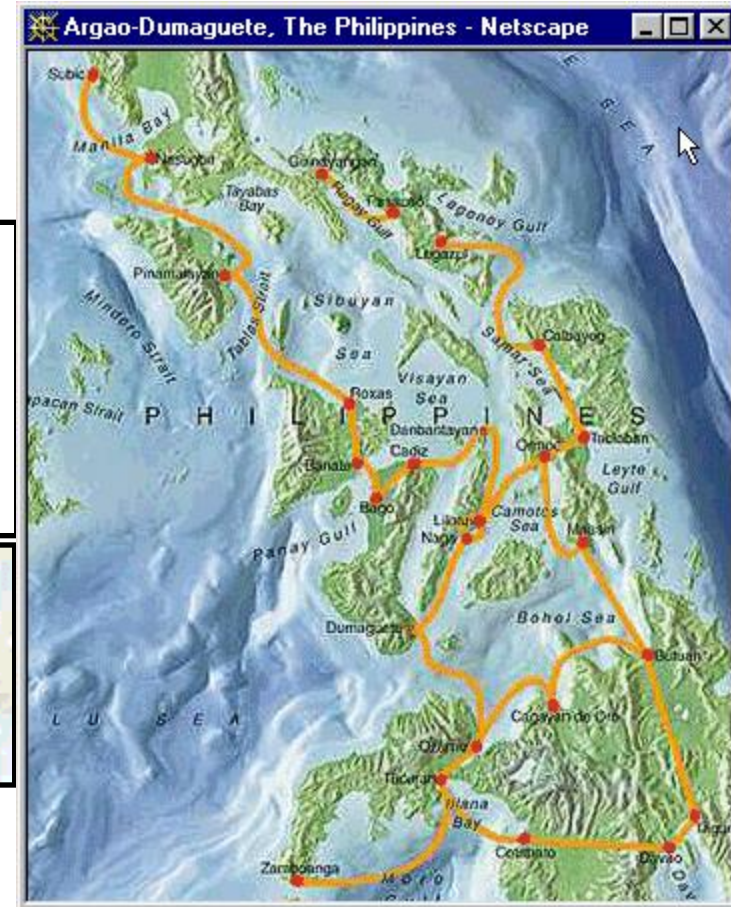
Submarine Cable Systems

The mission of the Submarine Cable System group of **NSW** is to be the most innovative and competitive player in the field of

Non-repeated
Submarine Cable Systems
Worldwide

Argao-Dumaguete, The Philippines

The Philippines world's first MINISUB cable with a diameter of 8 mm containing 6 fibres was installed over a span length of 100 km without first and final splices.



ALCATEL References LFON (Libyan Fibre Optic Network)

Family :	Unrepeated
Bit rate/fibre pairs :	2500/6
Length (km) :	80 / 54 / 146 / 104 / 198 / 236 / 125 / 213 / 138 / 186 / 161

Still looking for ISPs?

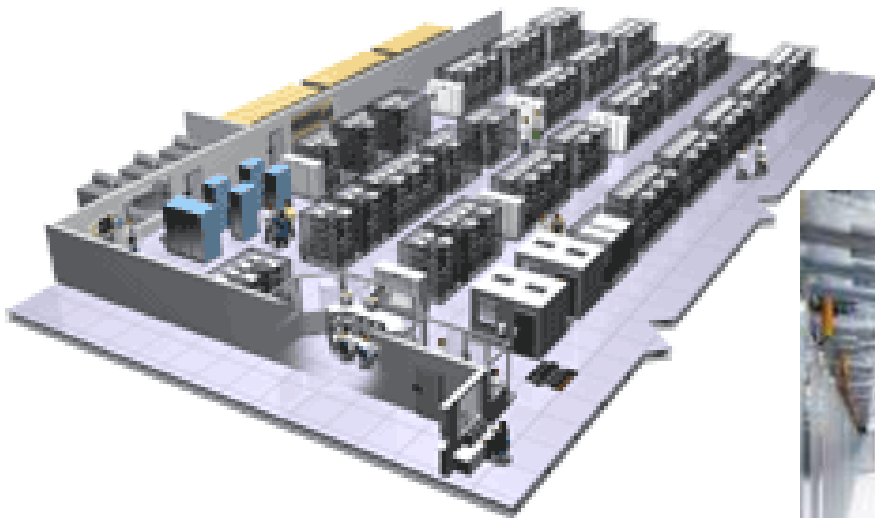
- **Use a county-specific search tool**
 - www.iranyellowpages.net
- **Traceroute towards websites hosted within the country**
 - Sites within country = homepages of universities, governments, Exchange Points, traceroute servers at traceroute.org
- **Surf Upstream from several country ISPs**

Course Exercise - “Real” ISP’s

- Visit the web site for each ISP connected to the exchange points in your area.
- Look for backbone map (look under: “about company”, “our services”, “our network”, investors, Google: `site:ispname.com network map`)
- Do they also provide webhosting?
(Where is their web hosting data center)
- Do they have a traceroute page
 - Look under technical support, network status
- Make bookmarks for any major ISPs

Web Hosting Datacenters

- Hosting environment that is secure, server-friendly and well-connected
- Can provide complete services including content development, server management
- Others offer “rack-space” and utilities for co-location of user-supplied equipment



see: datacentermap.com




Third-party Sites Filled with Resources

UplinkStation



The Worldwide Satellite Uplink Service

UplinkStation Turkey


Satcom Companies:		Satellite Operators:	
ATV Satcom Services		 Türksat	
BBA		Internet Providers:	
CHA Cihan Haber Ajansi		 Barracuda Speedware (DEXAR)	
Dalman Productions		Teleports/ES:	
EKSEN Broadcasting Company		BBA Teleport	
 e-SAT Satellite Communications	Samanyolu TV Uplink Station		
IHA Ihlas Haber Ajansi		SATKO Teleport Istanbul	
SVS Telekom			

LyngSat - Lyngemark Satellite Chart



Lyngemark Satellite Chart Türksat 1B at 31.3°E

Türksat 1B © Lyngemark Satellite, last updated 2001-09-12 - <http://www.lyngsat.com/turk1b.shtml>

Freq. Tp	Provider Name Channel Name	Video Encryption	SR - FEC SID - VPID	NID - TID Audio	Beam	Source Updated
11567 V tp 2L	 @ Barracuda Internet Service	 MPEG-2	20000 - 3/4 0-1088	0-1088	Turkey	Olgun 010807



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Use a Swiss Army Knife...

- There are many websites that enable you to do traceroute, whois, DNS look-up, etc.
- Some website will limit how many queries you can do (from a single IP address)



robtex.com



Looking in the neighborhood

- Reverse DNS lookup - - Enter IP #, and it identifies associated domain name (if defined)
- Some tools will do this for a series of IP numbers
- example search for neighbors of **www.gov.ru**

194.226.80.66 ipaccess.gov.ru

194.226.80.77 ns.gov.ru

194.226.80.78 www.council.gov.ru

194.226.80.88 apparat.gov.ru

194.226.80.129 apollo.gov.ru

194.226.80.145 ns.vpk.gov.ru

194.226.80.146 ts.vpk.gov.ru

194.226.80.147 ia.vpk.gov.ru

194.226.80.159 president.kremlin.ru

194.226.80.160 **www.gov.ru**

194.226.80.162 council.gov.ru

194.226.80.163 award.adm.gov.ru

194.226.80.164 kazak.adm.gov.ru

194.226.80.165 lib.adm.gov.ru

194.226.80.166 orgdiv.adm.gov.ru

194.226.80.167 protocol.adm.gov.ru

194.226.80.168 udprf.gov.ru

194.226.80.169 Msu.gov.ru

194.226.80.170 www.government.ru

194.226.80.171 www.youth.gov.ru

194.226.80.172 www2.scrf.gov.ru

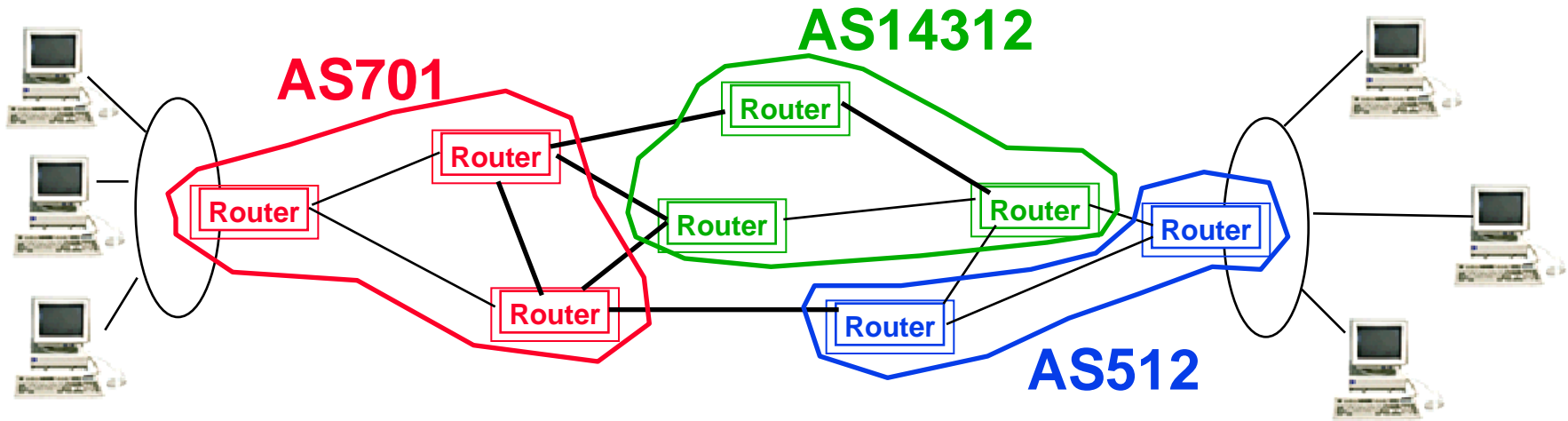
194.226.80.173 www.vneshpol.gov.ru

194.226.80.177 time.gov.ru

194.226.80.187 mylex.gov.ru

Autonomous System Numbers (ASNs)

- Most Internet providers have an Autonomous System Number
- ASN's are part of the announcement of "routing policies" between ISP's. BGP= Border Gateway Protocol
- Global internet routing tables contain "all" such announcements.



Traceroute = a path at individual router level
AS Mapping = paths at ISP level of detail

Final exercise; traceroute.org

- **Initiate traceroutes towards websites hosted within your country (target pages= ISP's, Exchange Point, Country Registrar, Other Traceroute Servers, etc.)**
- **Initiate traceroutes from diverse geographic starting points**
- **If possible, Initiate traceroutes from within the country, heading outward (try traceroute.org)**
- **Are there key ISP's / exchange points that appear in most of these traceroutes?**
- **Enter only the "name" of the server:**
www.target.com NOT http://www.target.com/folder

Try different starting points for Traceroutes

Starting from Arizona University

1 128.196.128.253 0 ms
2 192.80.43.25 0 ms
3 192.80.43.58 1 ms
4 207.250.65.133 5 ms
5 core-02-ge.phnx.twtelecom.net 5 ms
6 core-02-so.chcg.twtelecom.net **46 ms**
7 peer-01-ge.chcg.twtelecom.net 46 ms
8 aads.verio.net 47 ms
9 chcgil01.us.bb.verio.net 47 ms
10 chcgil06.us.bb.verio.net 47 ms
11 dllstx01.us.bb.verio.net 47 ms
13 stngva01.us.bb.verio.net 82 ms
17 navigators.com **82 ms**

Times are real-time round trip measurements from step 1 to step #__

Starting From University of Maryland

1 Vlan5.css-core-r1.net.umd.edu 0.53 ms
2 128.8.1.222 0.43 ms
3 qwest-bdr.net.umd.edu 1.49 ms
4 63-237-64-1.cust.qwest.net 1.38 ms
6 dca-brdr.inet.qwest.net 1.48 ms
7 qwest.stngva01.us.bb.verio.net 2.45 ms
9 ge.stngva01.us.verio.net 3.09 ms
10 stngva01.us.verio.net 2.75 ms
11 navigators.com **2.48 ms**

The speed of light can serve as a yardstick in traceroutes

Speed of light:

186,000 miles/sec (in vacuum)
120,000 miles/sec (in glass fiber)
= 120 miles/ms (in glass fiber)

Navigators.com “must” be near University of Maryland’s server
 $2.48 \times 120 / 2 = \sim 150$ miles

Note: Each hop via geostationary satellite must take at least 240 ms
Low-earth satellites have low latencies that compete with fiber cables

Study the traceroutes, line by line

10 so.IR2.DCA4.Alter.Net (146.188.13.46) 1 ms
11 so.TR1.STK2.Alter.Net (146.188.7.30) 116 ms
12 so.XR1.OSL2.Alter.Net (146.188.15.62) 128 ms
13 POS.GW2.OSL1.Alter.Net (146.188.12.42) 211 ms
14 Taide-gw.customer.ALTER.NET (146.188.32.26) 117 ms
15 NO-NIT-TN.taide.net (193.219.193.134) 125 ms
16 taide-gw.sovam.net.ua (212.82.192.114) 390 ms
17 taide-lgw.sovam.net.ua (212.82.192.113) 395 ms
18 web01.sputnikmedia.net (212.82.212.197) 390 ms

Notice the time difference:
390-125 = 275 ms
(could be satellite)

Be persistent to understand each line of the traceroute

- **Lines 10-14... visit www.alter.net = UUNET/Verizon (look at their map)**
- **Line 15... visit www.taide.net – They indicate a teleport in Oslo, Norway**
- **Line 16...www.sovam.net.ua – Their website includes an icon for a satellite**



Our Teleport and Internet eXchange at Nittedal outside of Oslo, Norway.



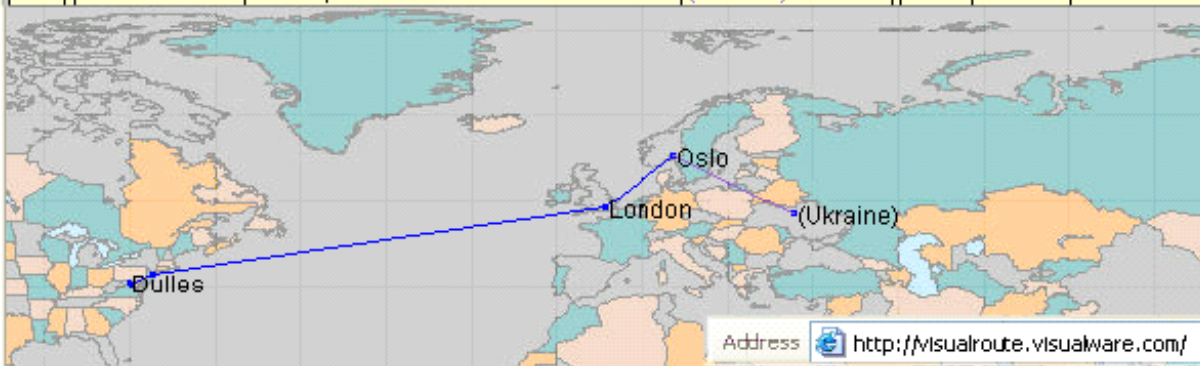
Traceroutes on a Map?

- Software attempts to associate latitude/longitude locations with router
- Such associations may not be accurate
- Limited ability to control your starting point
- With practice, you can more accurately interpret most traceroutes

Enter Host/URL: Show Details

Analysis: 'www.sputnikmedia.net' [db2.sputnikmedia.net] was found in 19 hops (TTL=47). It is a HTTP server Apache/1.3.26 (Unix) mod_gzip/1.3.19.1 a PHP/4.2.3).

Hop	IP Address	Node Name	Location	ms	Graph	Network
0	161.58.180.11	win10115.iad.dn.net	Dulles, VA, USA			Verio, Inc. V
1	161.58.176.12	-	...	0		Verio, Inc. V
2	161.58.156.14	-	...	0		Verio, Inc. V
3	129.250.27.21	ge-1-3-0.r02.stngva01.us.bb.verio.net	Sterling, VA, USA	0		Verio, Inc. V
4	129.250.5.14	p16-0-0-0.r00.stngva01.us.bb.verio.net	Sterling, VA, USA	0		Verio, Inc. V
5	129.250.2.75	p16-0-1-0.r20.asbnva01.us.bb.verio.net	Ashburn, VA, USA	0		Verio, Inc. V
6	129.250.2.35	p64-0-0-0.r21.asbnva01.us.bb.verio.net	Ashburn, VA, USA	0		Verio, Inc. V
7	129.250.5.98	p16-0-1-1.r21.nycmny01.us.bb.verio.net	New York, NY, US/	0		Verio, Inc. V
8	129.250.2.171	p16-3-0-0.r80.nycmny01.us.bb.verio.net	New York, NY, US/	0		Verio, Inc. V
9	129.250.4.182	p4-0-0-0.r01.londen02.uk.bb.verio.net	London, UK	69		Verio, Inc. V
10	213.248.74.20	ldn-b2-pos0-1.telia.net	London, UK	70		Telia Internat
11	213.248.74.1	ldn-bb1-pos1-2-0.telia.net	London, UK	79		Telia Internat
12	213.248.64.33	kbn-bb1-pos2-1-0.telia.net	-	95		Telia Internat
13	213.248.66.26	s-bb1-pos4-0-0.telia.net	-	113		Telia Internat
14	213.248.66.90	oso-okr-i1-pos3-0.telia.net	-	126		Telia Internat
15	213.248.78.50	taide-01270-oso-okr-i1.c.telia.net	Oslo, Norway	109		Telia Internat
16	193.219.193.1	NO-NIT-TN-4.taide.net	---	109		For address
17	212.82.192.11	taide-gw.sovam.net.ua	(Ukraine)	393		Golden Tele
18	212.82.192.11	taide-lgw.sovam.net.ua	(Ukraine)	391		Golden Tele
19	212.82.212.20	www.sputnikmedia.net	(Ukraine)	391	This Is a Sv	



Whois IP Numbers?



Internet Assigned Numbers Authority

- Every IP# originates from IANA
- IANA allocations are made to five regional registrars
- Further allocations are then made to ISP's and other companies.



- You can “WHOIS” an IP # at the regional registrars
 - You have to “guess” which registrar to use
 - The address shown is probably for the headquarters of the company, NOT the location of that single router
- Shows the allocation heritage of that IP number
- Shows how large a block of numbers was allocated
- The ISP may own other IP blocks as well

Summary

- Internet's information space continues to grow in value
- Specialized search tools can sometimes help locate and identify sources of information.
- “Go native”; learn local search tools, domain name policies, infrastructure providers.
- Over time, you will become familiar with these resources

**The Future is Clear...
Master the Information Superhighway
or
Become Roadkill**

