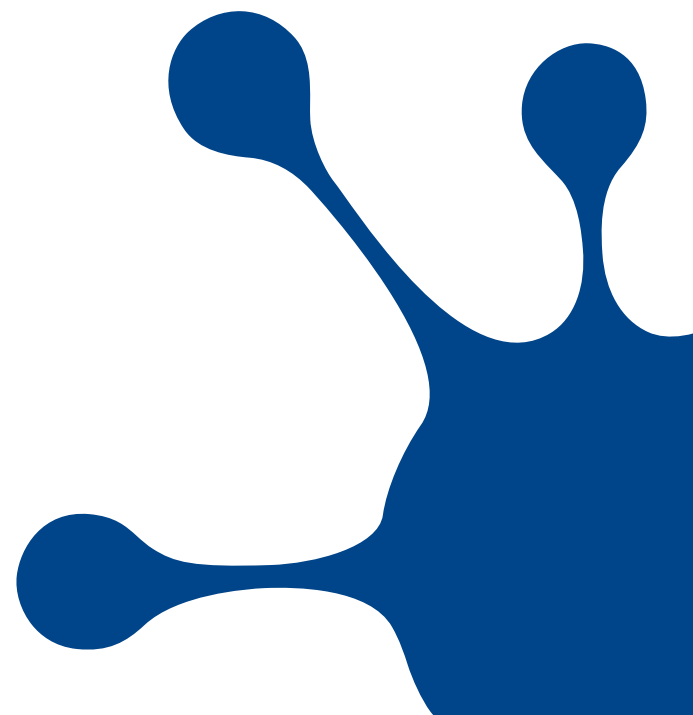


I.ROOT-SERVERS.NET

ANALYSIS OF QUERY SRC AND ANYCAST
LOCATIONS

2013 VERSION!

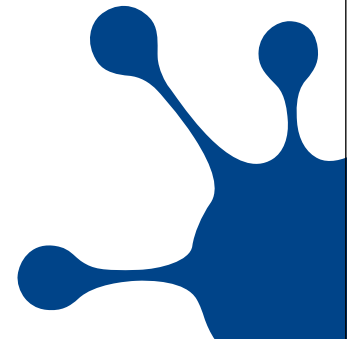


i.root-servers.net

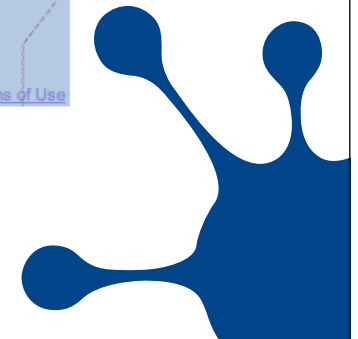
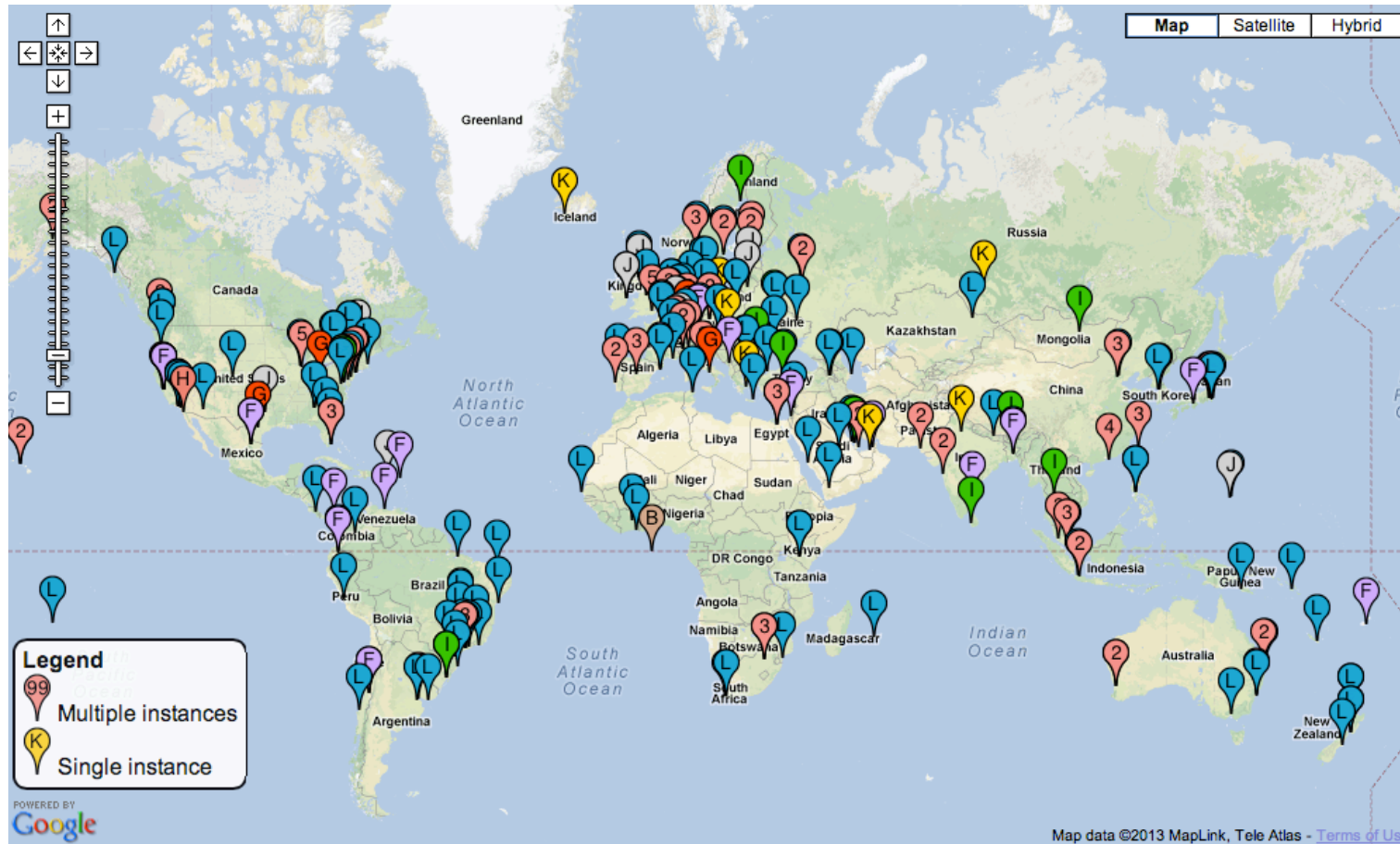
ONE OF THIRTEEN DNS ROOT-SERVERS

OPERATED BY NON-PROFIT NETNOD IN STOCKHOLM, SE (ALSO OPERATES THE INTERNET EXCHANGES)

ANYCAST AT +40 LOCATIONS AROUND THE WORLD



The root-servers



The root-servers

ALL HAVE DIFFERENT HARDWARE / SOFTWARE ARCHITECTURE, CHOICES ETC. DIVERSITY IS GOOD!

ALL HAVE DIFFERENT DEPLOYMENT STRATEGIES

- Some are unicast, some are anycast
- Some are anycast at IXPs some are inside carrier networks
- Some have few global nodes, and the rest are local nodes

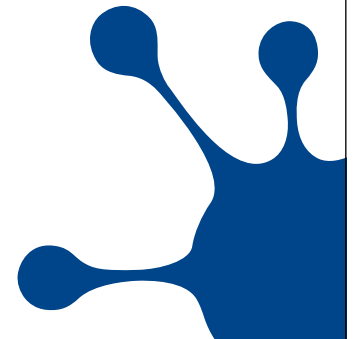


i.root deployments

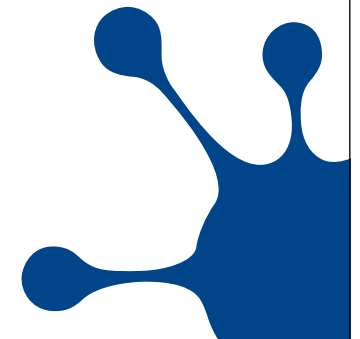
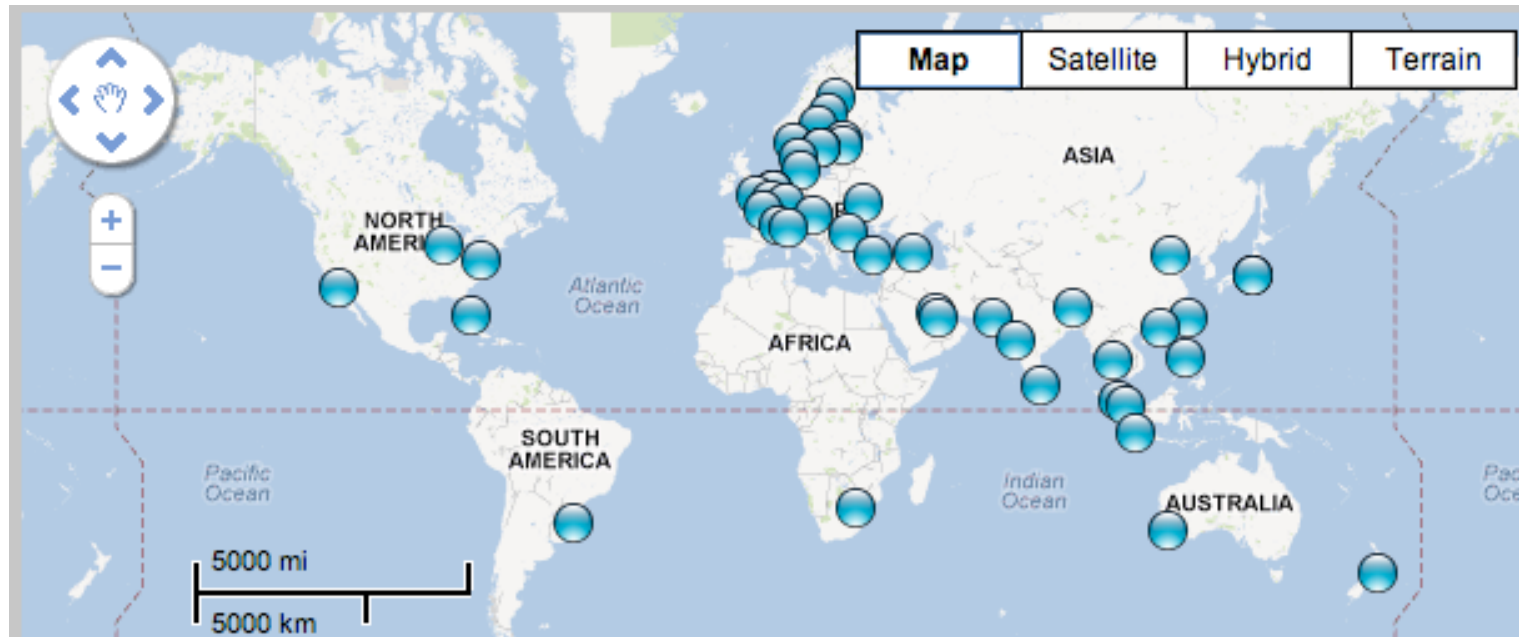
MOST LOCATIONS ARE AT IXPs, A FEW INSIDE TIER-1 NETWORKS, A FEW LOCATIONS ARE WHERE NO IXP EXISTS

GLOBAL / LOCAL DISTINCTION PER PEER (USING NO-EXPORT)

MOST PEERS ARE LOCAL



i.root-servers.net



Peerings

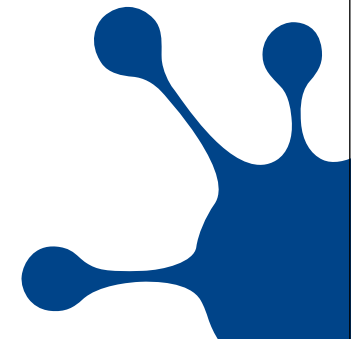
APPROX. +3000 PEERINGS WITH APPROX 650 ASNs

INCLUDES ROUTE-SERVERS AT SOME OF THE LARGER IXPs

WE ARE ALWAYS LOOKING FOR MORE PEERINGS!

peering@netnod.se

<http://as8674.peeringdb.com>



Analysis of query src

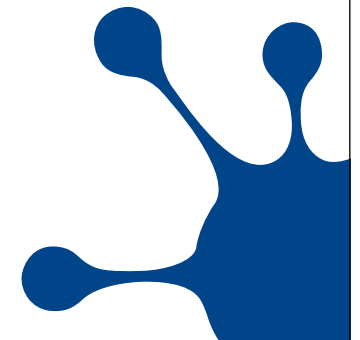
BASED ON SRC IPv4 / IPv6 ADDRESS

ECONOMY REPRESENTED BY CORRESPONDING RIR DATA FOR A PREFIX

BASED ON A 2H40M SNAPSHOT

NOT 100% REPRESENTATIVE, BUT GIVES AN INDICATION OF ROUTING AND ROUTING POLICIES

- **And the effects of routing policies**



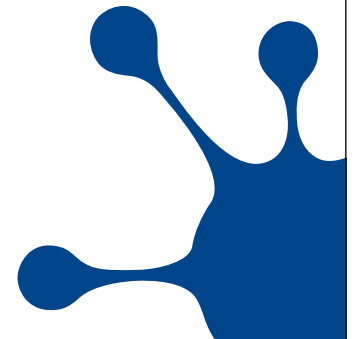
Goal of exercise

WHAT POLICIES ARE IN PLACE?

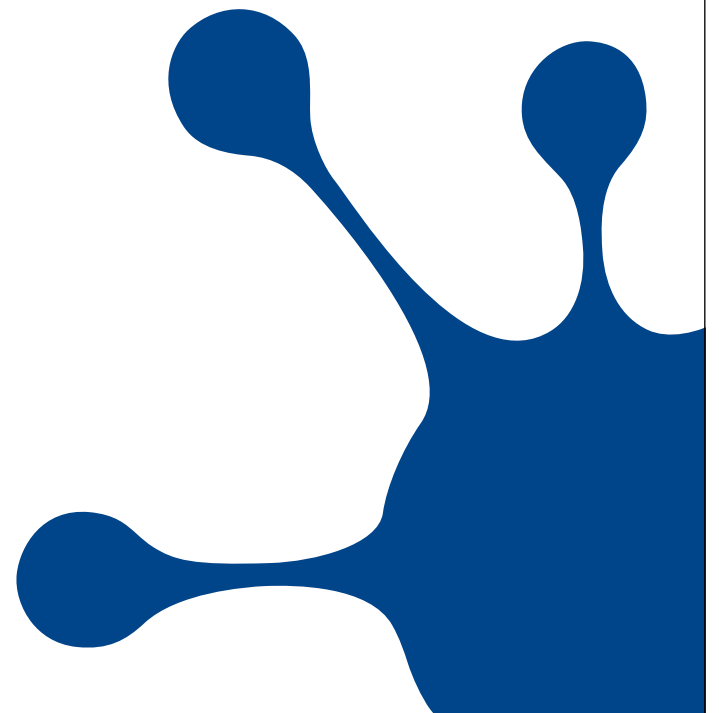
- Hot potato?
- Preference for customer over peer over transit?

WHAT EFFECTS DOES PEERING POLICIES HAVE ON REAL TRAFFIC?

HOW OPTIMAL IS DELIVERY OF TRAFFIC TO IT'S SOURCE?



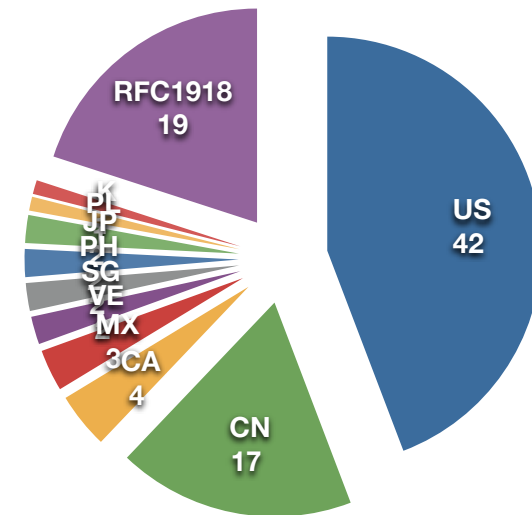
ASIA



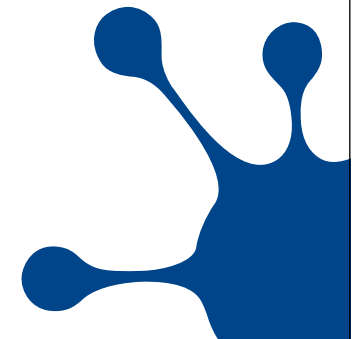
Beijing, CN

	NA		RFC1918
19			
10	7497	CN	CSTNET-AS-AP
6	15133	US	EDGECAST - EdgeCast Networks, Inc.
5	5769	CA	VIDEOTRON - Videotron Telecom Ltée
3	46606	US	UNIFIEDLAYER-AS-1 - Unified Layer
3	3549	US	GBLX Global Crossing Ltd.
3	32806	US	MARITIME-TELECOMMUNICATIONS-NETWORK - MARITIME TELECOMMUNICATIONS NETWORK, INC.
3	2828	US	XO-AS15 - XO Communications
2	7385	US	INTEGRATELECOM - Integra Telecom, Inc.
2	38345	CN	CNNIC-KNET-AP KNET Technology (BeiJing) Co.,Ltd.
2	22205	US	DATAPIPE-SEA - DataPipe, Inc.
2	13999	MX	Mega Cable, S.A. de C.V.
2	10026	JP	PACNET Pacnet Global Ltd
2	9497	PH	DIGITELONE Digital Telecommunications Philippines Inc.
1	714	US	APPLE Apple Inc
1	4812	CN	CHINANET-SH-AP China Telecom (Group)
1	23844	CN	BJ-GUANGHUAN-AP Beijing Guanghuan Xinwang Digital
1	22394	US	CELLCO - Cellco Partnership DBA Verizon Wireless
1	21826	VE	Corporación Telemic C.A.
1	19916	US	ASTRUM-0001 - OLM, LLC
1	14615	US	ROCK-HILL-TELEPHONE - Comporium Communications

% Queries per economy



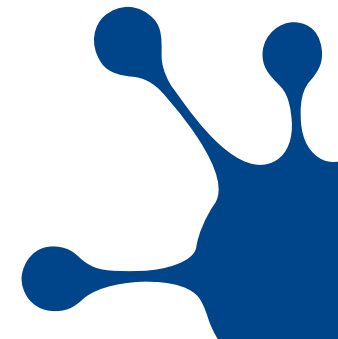
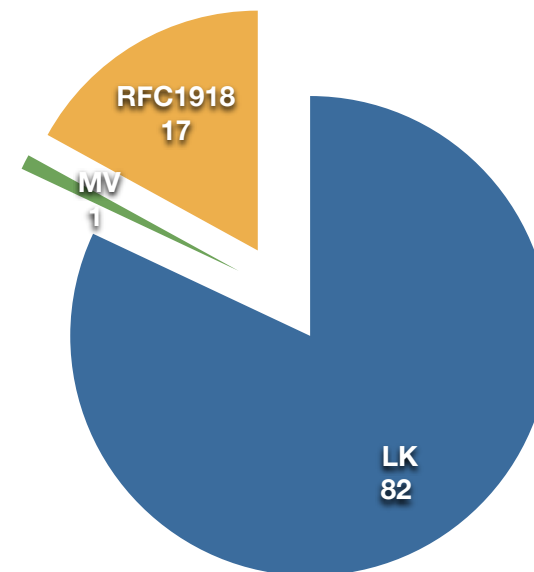
No1 SRC - RFC1918
 Top 2-9, US AND CA. WHY?
 NO REAL EXPLANATION



Colombo, LK

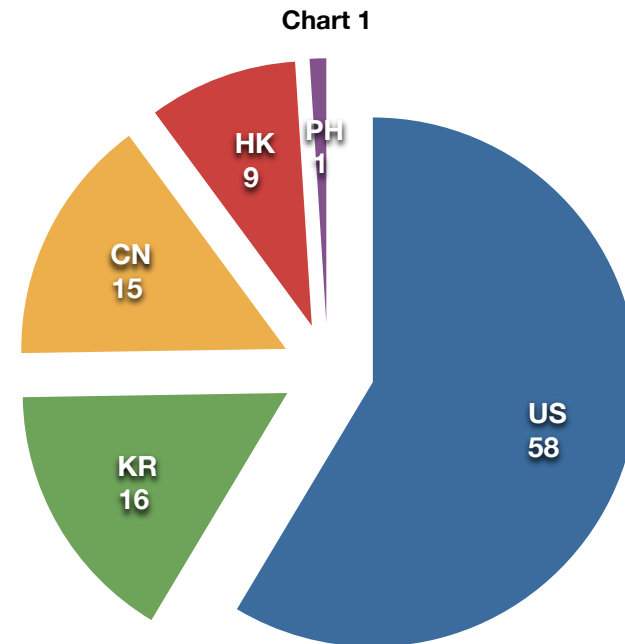
82	9329	LK	SLTINT-AS-AP Sri Lanka
17	NA		RFC1918
1	7642	MV	DHIRAAGU-MV-AP Dhiraagu Internet Services

% Queries per economy

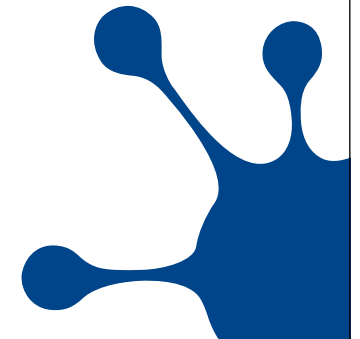


Hong Kong (HKIX),HK

56	15169	US	GOOGLE
15	9318	KR	HANARO-AS Hanaro Telecom Inc.
6	9808	CN	CMNET-GD Guangdong Mobile Communication Co.Ltd.
6	4760	HK	HKTIMS-AP PCCW Limited
2	56046	CN	CMNET-JIANGSU-AP China Mobile communications corporation
2	56041	CN	CMNET-ZHEJIANG-AP China Mobile communications corporation
2	56040	CN	CMNET-GUANGDONG-AP China Mobile communications corporation
1	6648	PH	BAYAN-TELECOMMUNICATIONS Bayan Telecommunications, Inc.
1	24445	CN	CMNET-V4HENAN-AS-AP Henan Mobile Communications Co.,Ltd
1	4515	HK	ERX-STAR PCCW IMSBiz

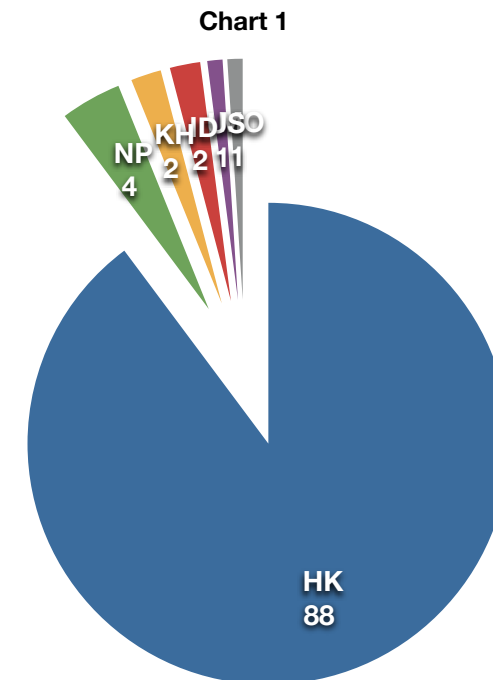


GOOGLE RESOLVERS ARE POPULAR
SITE CONNECTED TO LARGE MULTINATIONAL IX,
SO TRAFFIC SPREAD AS EXPECTED

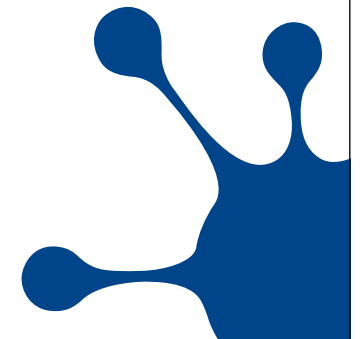


Hong Kong (HKIX),HK - IPv6

51	4515	HK	ERX-STAR PCCW IMSBiz
27	9381	HK	NEWTT-IP-AP Wharf T&T Ltd.
4	55726	NP	NDCL-AS-AP Nepal Doorsanchar Company Limited
4	3661	HK	ERX-CUHKNET The Chinese University of Hong Kong
2	4760	HK	HKTIMS-AP PCCW Limited
2	4058	HK	CPCNET-AS4058 CPCNet Hong Kong Limited
1	7582	MO	UMAC-AS-AP University of Macau
1	45287	ID	VARNION-AS-ID Varnion Technology Semesta, PT
1	24492	KH	WICAM-AS WiCAM ISP Cambodia Peering AS
1	10098	HK	HENDERSON-HK Henderson Data Centre Limited



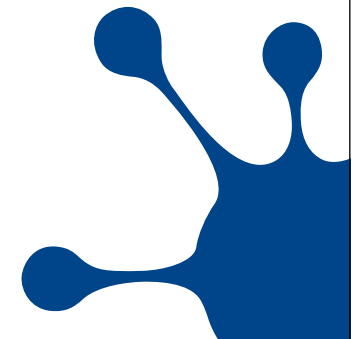
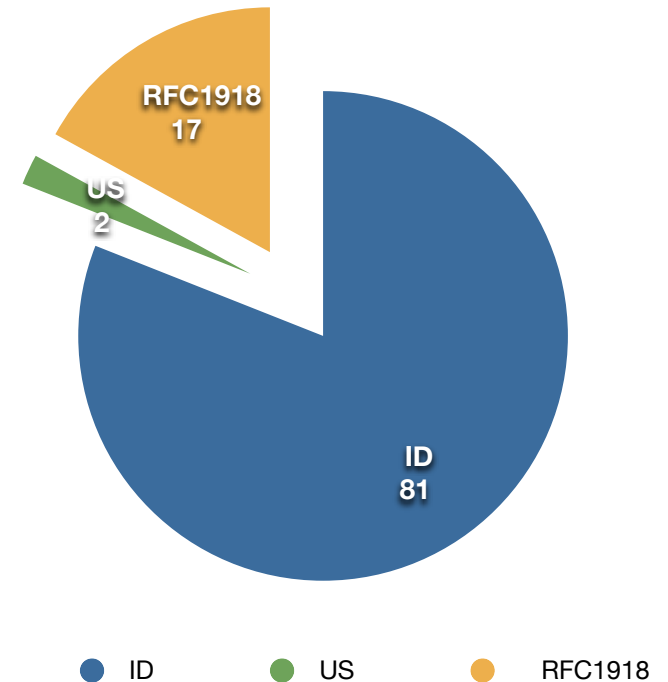
SITE CONNECTED TO LARGE MULTINATIONAL IX,
SO TRAFFIC SPREAD AS EXPECTED



Jakarta (IIX, MCIX), ID

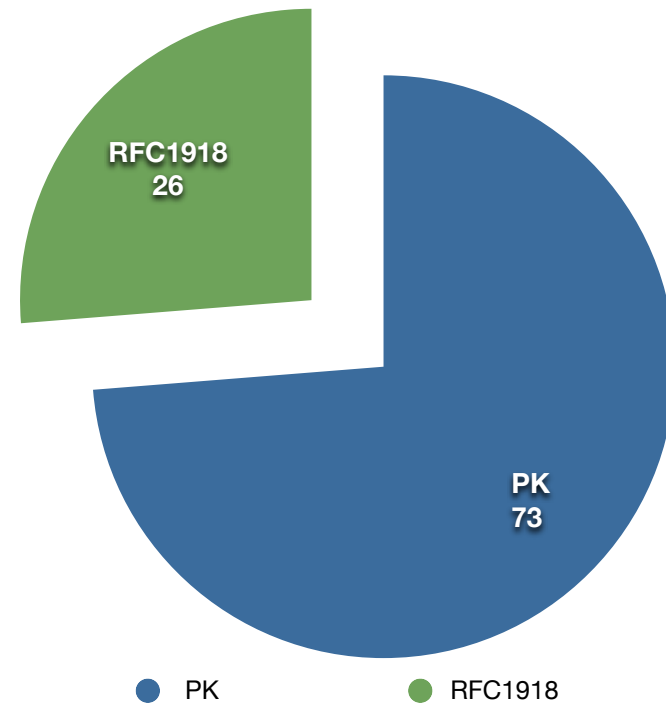
17	NA		RFC1918
16	17974	ID	TELKOMNET-AS2-AP
7	23693	ID	TELKOMSEL-ASN-ID PT. Telekomunikasi Selular
6	24518	ID	AXIS-AS-ID PT. Axis Telekom Indonesia
6	18103	ID	NEUVIZ-AS-ID-AP Neuviz Net
4	4787	ID	ASN-CBN Internet Service Provider
3	4855	ID	PI-ID-AS-AP Pacific Link Indonesia
3	4795	ID	INDOSATM2-ID INDOSATM2 ASN
3	38149	ID	RATELINDONET-AS-ID PT. Bakrie Telecom
3	23700	ID	BM-AS-ID PT. Broadband Multimedia, Tbk
2	55680	ID	KSI-UAJY-AS-ID Kantor Sistem Informasi Universitas Atma Jaya Yogyakarta
2	4800	ID	LINTASARTA-AS-AP Network Access Provider and Internet Service Provider
2	4761	ID	INDOSAT-INP-AP INDOSAT Internet Network Provider
2	38758	ID	HYPERNET-AS-ID PT. HIPERNET INDODATA
2	174	US	COGENT Cogent/PSI
2	18004	ID	WIRELESSNET-ID-AP WIRELESSNET AS
1	9326	ID	CENTRIN-AS-AP PT Centrin Utama

Chart 1



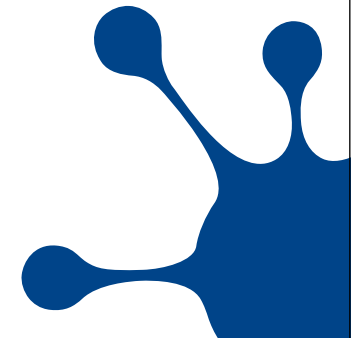
Karachi, PK

Chart 4



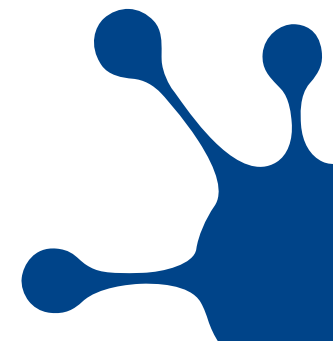
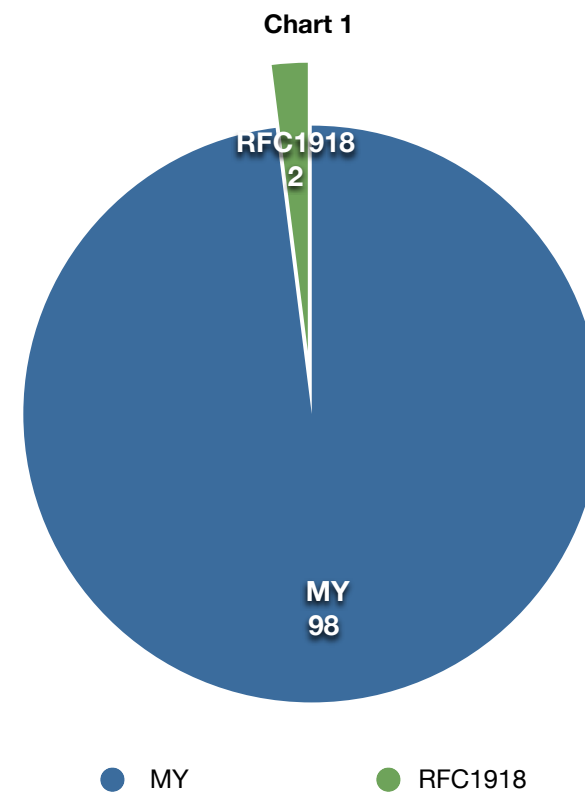
64	45595	PK	PKTELECOM-AS-PK Pakistan Telecom Company Limited
26	NA	RFC1918	
3	4661	PK	PTCLBB-PK PTCL MMBB DATA CENTRE
2	38710	PK	WORLDCALL-AS-LHR Worldcall Broadband Limited
2	17557	PK	PKTELECOM-AS-PK Pakistan Telecommunication Company Limited
1	9557	PK	PKTELECOM-AS-PK Paknet Limited Merged into PTCL
1	7590	PK	COMSATS Commission on Science and Technology for

VERY HIGH % OF RFC1918
OTHERWISE AS EXPECTED



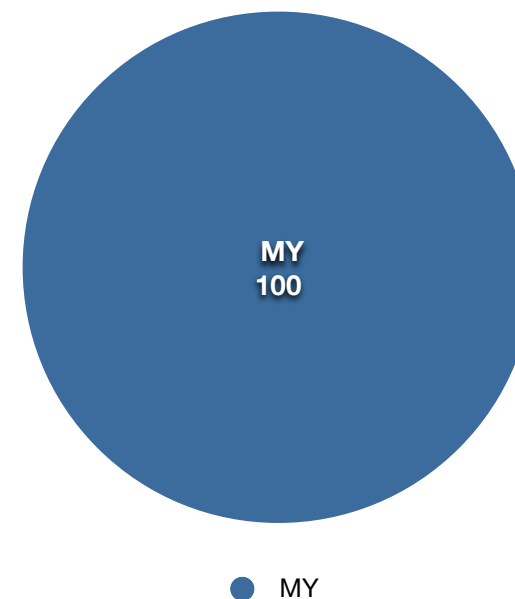
Kuala Lumpur (MyIX), MY

87	4788	MY	TM
2	NA		RFC1918
5	9534	MY	MAXIS-AS1-AP Binariang Berhad
1	9930	MY	TTNET-MY TIME dotCom Berhad
1	38044	MY	GITN-SCHOOLNET-AP Government Intergrated Telecommunication & Network (GITN) ,
1	17971	MY	TMVADS-AP TM-VADS DC Hosting

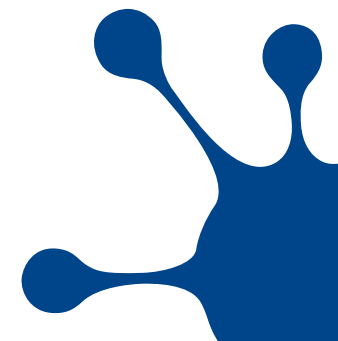


Kuala Lumpur (MyIX), MY - IPv6

% Queries per economy



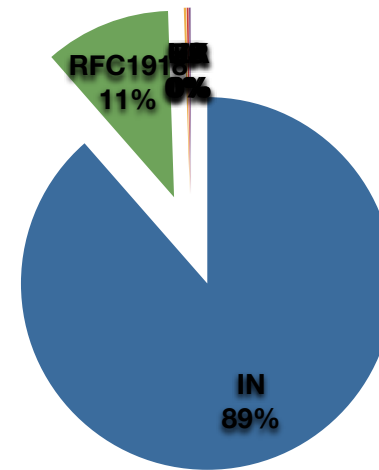
58	10204	MY	ARCNET-NTTMSC-MY Arcnet NTT MSC ISP
20	24218	MY	GTC-MY-PIP-AS Global Transit Communications - Malaysia
11	17564	MY	GITN-PCN-AS-AP GITN (M) Sdn. Bhd.
7	10030	MY	CELCOMNET-AP Celcom Internet Service Provider
3	4788	MY	TMNET-AS-AP TM Net, Internet Service Provider
1	9930	MY	TTNET-MY TIME dotCom Berhad



Mumbai (NIXI), IN

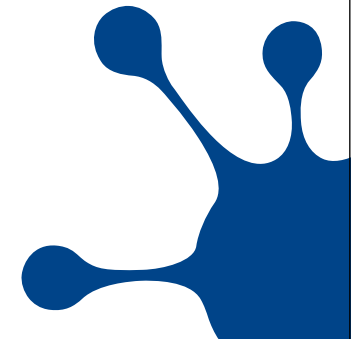
%	ASN	Economy	Network
31	131222	IN	MTS-INDIA-IN
15	131222	IN	MTS-INDIA-IN
9	9829	IN	BSNL-NIB
11			RFC1918
8	4755	IN	TATACOMM-AS
7	18101	IN	RELIANCE-COMMUNICATIONS-IN
2	38224	IN	REDIFF-AS
2	18209	IN	BEAMTELE-AS-AP
1	17813	IN	MTNL-AP
1	17488	IN	HATHWAY-NET-AP
1	17803	IN	BSES-AS-AP
1	24554	IN	FIVE-NET-AS-IN
1	23682	IN	PACENET-AS
1	17439	IN	NETMAGIC-AP

% Queries per Economy



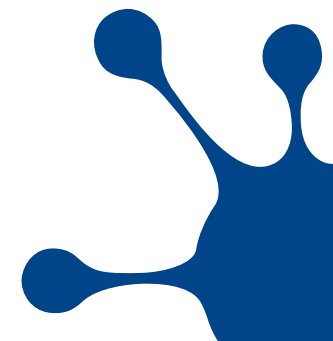
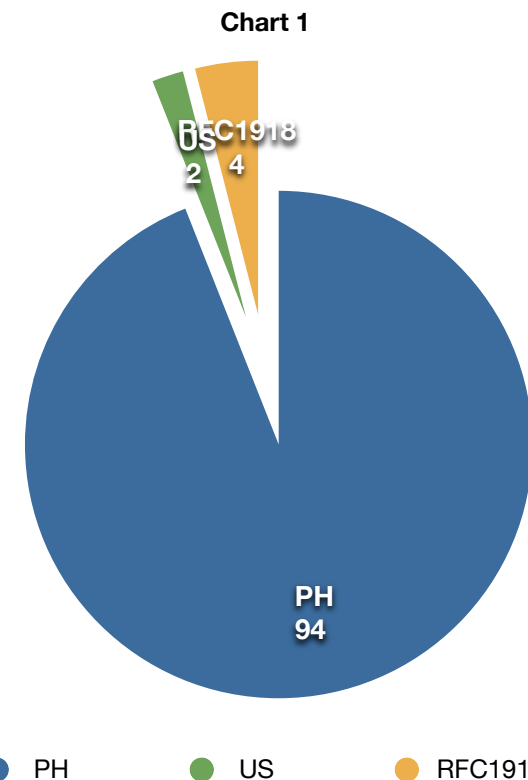
● IN
 ● RFC1918
 ● US
 ● HK
 ● JP
 ● ZA
 ● FR

MOSTLY AS EXPECTED
 QUITE HIGH % OF RFC1918
 REMEMBER THAT MTS IS TOP ASN



Manila (PHOpenIX), PH

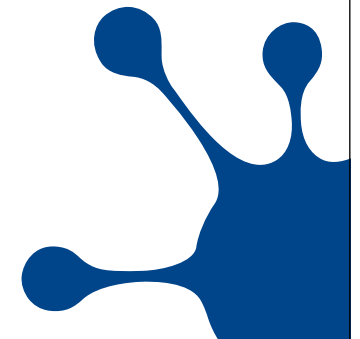
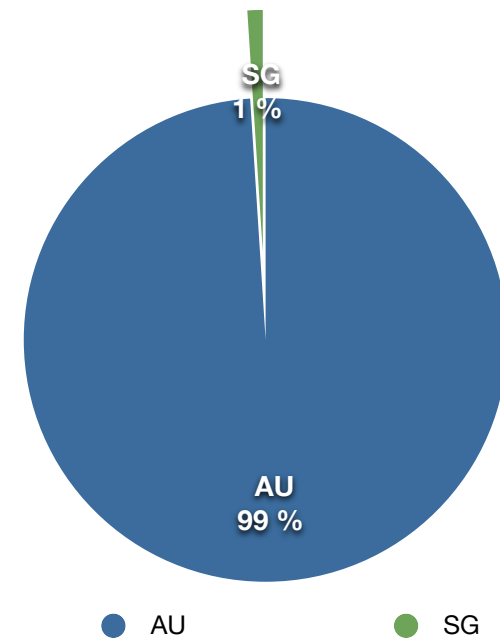
37	9658	PH	ETPI-IDS-AS-AP Eastern Telecoms Phils., Inc.
21	9927	PH	PHILCOMNET-PH A Multihomed ISP Company
15	23930	PH	IPVG-AS-AP IP-Converge Data Center, Inc.
13	45664	PH	LBNI Liberty Broadcasting Network Inc
4	NA		RFC1918
3	23606	PH	BELLTELECOM-PH-AS-PH Bell Telecommunication Philippines,
1	24081	PH	SPITECH-AS SPI Technologies Inc.
1	17970	PH	INTERISLAND-AS-AP TRI.ph AS Inter-Island Information Systems, Inc., AS Internet Service Provider and Internet Data Center, Manila PH



Perth (WAIX), AU

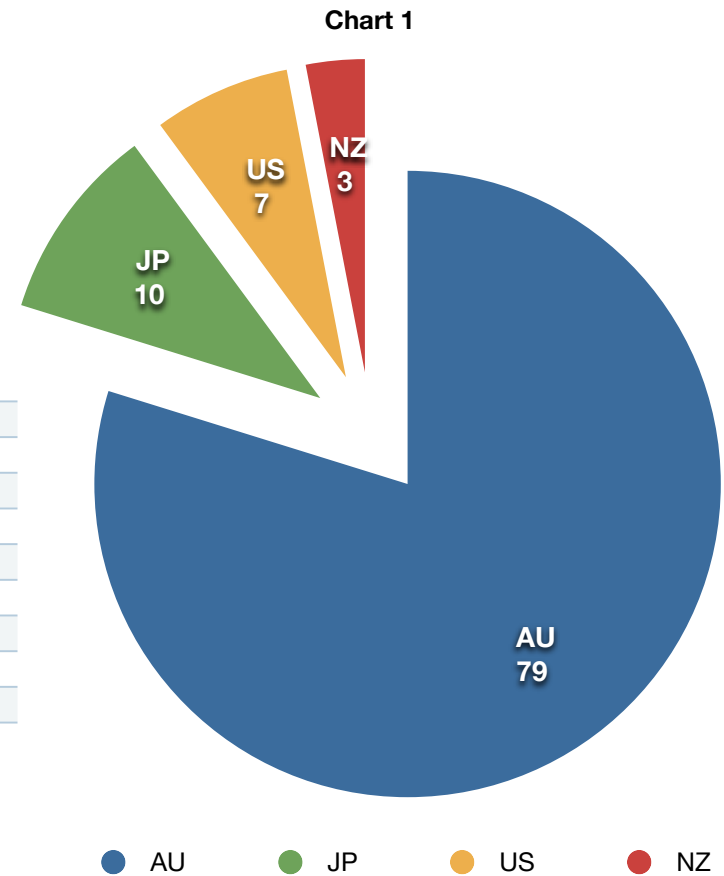
23	4802	AU	ASN-IINET iiNet Limited
22	7545	AU	TPG-INTERNET-AP TPG Internet Pty Ltd
9	2764	AU	AAPT AAPT Limited
8	4739	AU	INTERNODE-AS Internode Pty Ltd
5	9443	NZ	INTERNETPRIMUS-AS-AP Primus Telecommunications
5	38657	AU	WAWB-AS-AP WAWB Pty Ltd
3	9556	AU	ADAM-AS-AP Adam Internet Pty Ltd
3	17561	AU	SERVICENET-AP Internet service provision to Western
1	7604	AU	ZETTANET-AS ZettaNet
1	17819	SG	ASN-EQUINIX-AP Equinix Asia Pacific
1	17409	AU	EFTEL-AS-AP EFTel Pty Ltd

% Queries per economy

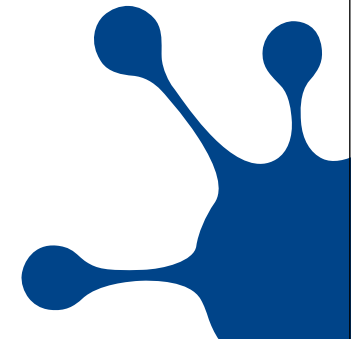


Perth (WAIX), AU - IPv6

39	4739	AU	INTERNODE-AS Internode Pty Ltd
23	9556	AU	ADAM-AS-AP Adam Internet Pty Ltd
7	36626	US	JGTLD - VeriSign Global Registry Services
5	9824	JP	ASN-ATHOMEJP
5	9617	JP	ZAQ KANSAI MULTIMEDIA SERVICE COMPANY
4	18371	AU	NCABLE-AP Neighbourhood Cable
3	7575	AU	AARNET-AS-AP Australian Academic and Research Network (AARNet)
2	7477	AU	TEREDONN-AS-AP SkyMesh Pty Ltd
1	45425	AU	DEDICATED-SERVERS-SYD-AS-AP Dedicated Servers - Sydney
1	24557	AU	UBERGLOBAL-AS-AP UberGlobal Pty Ltd
1	24130	AU	PIPETRANSIT-AS-AP PIPE Networks Pty Limited

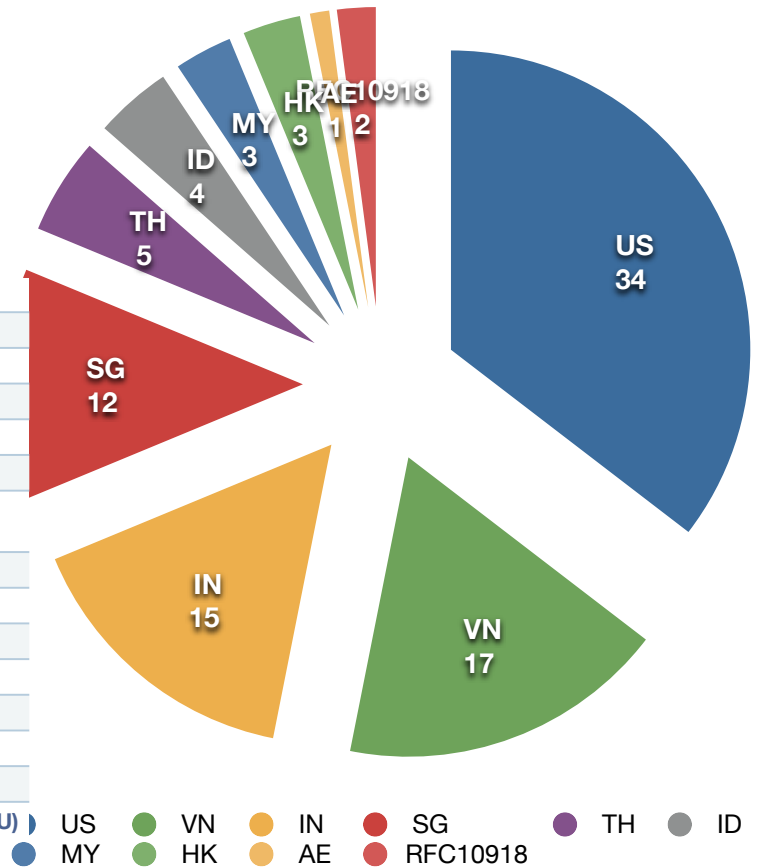


SOMEWHAT ODD TRAFFIC FROM VERSIGIN



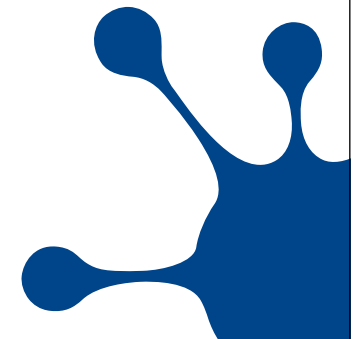
Singapore (Equinix), SG

Chart 1



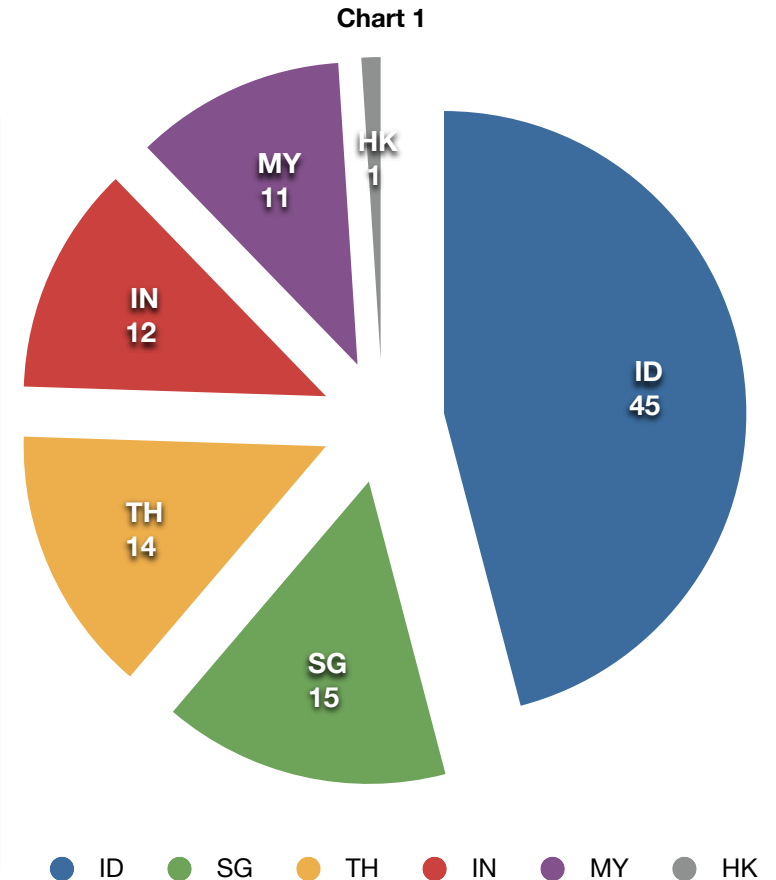
26	15169	US	GOOGLE - Google Inc.
9	7643	VN	VNPT-AS-VN Vietnam Posts and Telecommunications (VNPT)
6	7552	VN	VIETEL-AS-AP Vietel Corporation
5	9737	TH	TOTNET-TH-AS-AP TOT Public Com
5	38224	IN	REDIFF-AS Rediff.com India Limited,
4	9583	IN	SIFY-AS-IN Sify Limited
4	18101	IN	RELIANCE-COMMUNICATIONS-IN Reliance Communications Ltd.DAKC MUMBAI
4	10091	SG	SCV-AS-AP StarHub Cable Vision Ltd
3	38895	US	AMAZON-AS-AP Amazon.com Tech Telecom
3	13414	US	TWITTER-NETWORK - Twitter Inc.
2	NA		RFC1918
2	56173	SG	YAHOO-SG3 internet content provider
2	36692	US	OPENDNS - OpenDNS, LLC
1	9989	SG	EQUINIX-AP Equinix Singapore Pte Ltd
1	15802	AE	DU-AS1 Emirates Integrated Telecommunications Company PJSC (EITC-DU)

LAST RUN LARGEST SOURCES WHERE GOOGLE / OPENDNS.
SOMETHING CHANGED

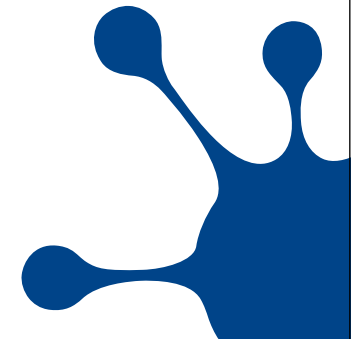


Singapore (Equinix), SG - IPv6

17	24203	ID	PT Excelcomindo Pratama (Network Access Provider)
10	4773	SG	MOBILEONELTD-AS-AP MobileOne Ltd. Mobile/Internet Service Provider Singapore
10	17974	ID	TELKOMNET-AS2-AP PT Telekomunikasi Indonesia
6	4750	TH	CSLOXINFO-AS-AP CS LOXINFO PUBLIC COMPANY LIMITED
5	4755	IN	TATACOMM-AS TATA Communications formerly VSNL is Leading ISP
5	38794	TH	BB-BROADBAND-TH-AS-AP BB-Broadband Co., Ltd. Transit AS
5	38322	MY	P1NETWORKS-MY-AP Packet One Networks Sdn Bhd, Internet Services Provider
4	2042	MY	ERX-JARING JARING Communications Sdn Bhd.
3	4800	ID	LINTASARTA-AS-AP Network Access Provider and Internet Service Provider
3	4795	ID	INDOSATM2-ID INDOSATM2 ASN
2	9892	SG	WEBVISIONS-AS-AP Webvisions Pte Ltd
2	9657	ID	MELSANET-ID-AP Melsa-i-net AS
2	17547	SG	QALA-SG-AP M1 CONNECT PTE. LTD.
2	10030	MY	CELCOMNET-AP Celcom Internet Service Provider
2	10029	IN	SPECTRANET FIRST FIBRE BROADBAND NETWORK IN NEW DELHI, INDIA
1	9829	IN	BSNL-NIB National Internet Backbone
1	4787	ID	ASN-CBN Internet Service Provider
1	45769	IN	DVOIS-IN D-Vois Broadband Pvt Ltd
1	23951	ID	CITRA-AS-ID PT JEMBATAN CITRA NUSANTARA
1	37992	TH	THAMMASAT-BORDER-AS Thammasat University in thailand
1	17671	ID	ASN-JETCOMS JETCOMS-ID Autonomous system

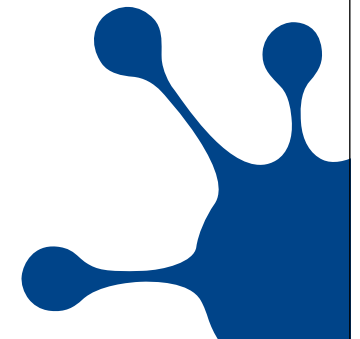
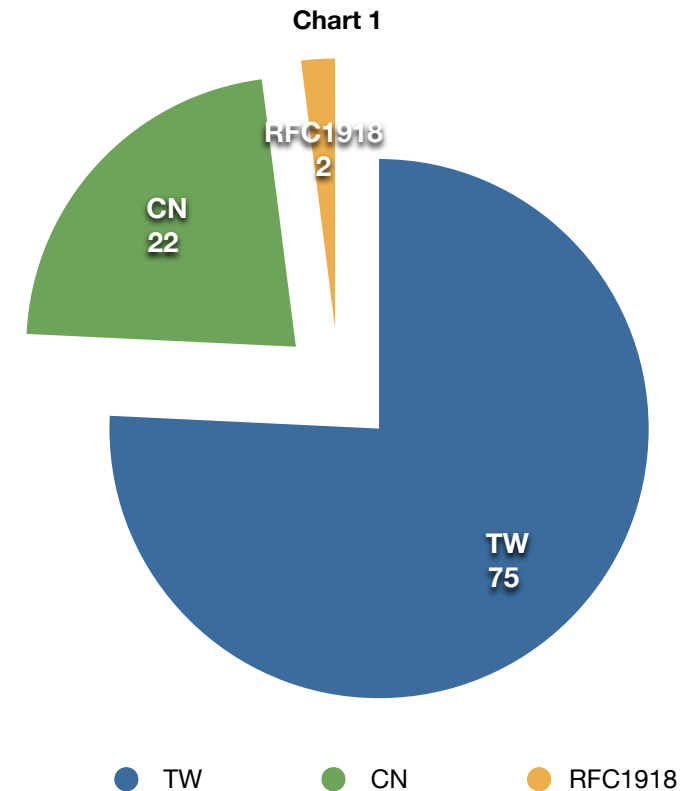


LAST RUN LARGEST SOURCES WHERE GOOGLE / OPENDNS.
SOMETHING CHANGED



Taipei, TW

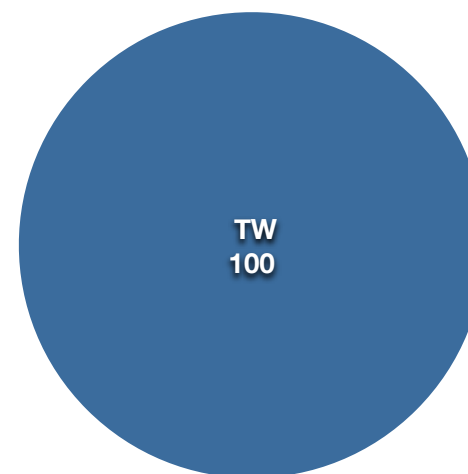
22	9394	CN	CRNET CHINA RAILWAY Internet(CRNET)
20	9416	TW	MULTIMEDIA-AS-AP Hoshin Multimedia Center Inc.
14	9924	TW	TFN-TW Taiwan Fixed Network, Telco and Network Service Provider.
11	4780	TW	SEEDNET Digital United Inc.
8	1659	TW	ERX-TANET-ASN1 Tiawan Academic Network (TANet) Information Center
6	9919	TW	NCIC-TW New
3	18182	TW	SONET-TW Sony Network Taiwan Limited
2	NA		RFC1918
2	9674	TW	FET-TW Far EastTone Telecommunication Co., Ltd.
2	17709	TW	EBT Eastern Broadband Telecom Co.,Ltd
1	17716	TW	NTU-TW National Taiwan University



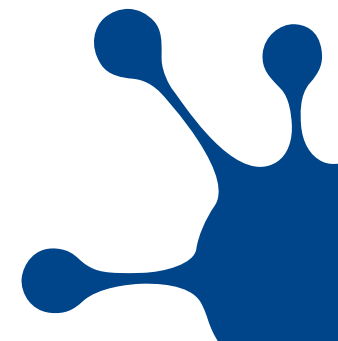
Taipei, TW - IPV6

Chart 1

52	1659	TW	ERX-TANET-ASN1 Tia
18	131148	TW	BOT-AS-TW Bank Of Taiwan
17	9264	TW	ASNET Academic Sinica Network
12	17419	TW	HINET-IPV6-TW HiNet IPv6 Service Network.,

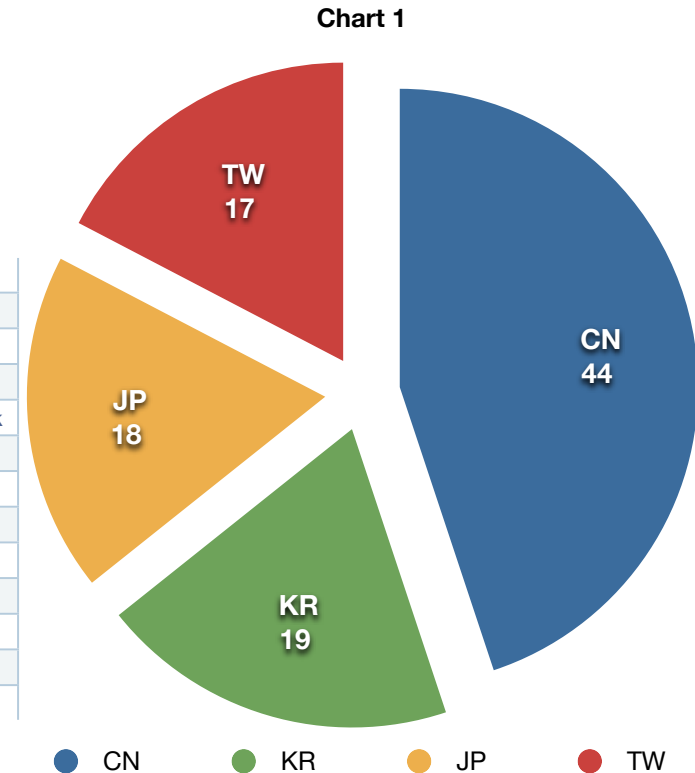


● TW



Tokyo (JPNAP), JP

17	4837	CN	CHINA169-BACKBON
17	4766	KR	KIXS-AS-KR Korea Telecom
17	3462	TW	HINET Data Communication Business Group
10	4134	CN	CHINANET-BACKBONE No.31,Jin-rong Street
8	4808	CN	CHINA169-BJ CNCGROUP IP network China169 Beijing Province Network
4	23637	JP	BI-CDN-IX Bit-isle Co.,Ltd.
3	4713	JP	OCN NTT Communications Corporation
2	4813	CN	BACKBONE-GUANGDONG-AP China Telecom(Group)
2	3786	KR	LGDACOM LG DACOM Corporation
2	17506	JP	UCOM UCOM Corp.
1	2527	JP	SO-NET So-net Entertainment Corporation
1	4847	CN	CNIX-AP China Networks Inter-Exchange
1	23724	CN	CHINANET-IDC-BJ-AP IDC, China Telecommunications Corporation

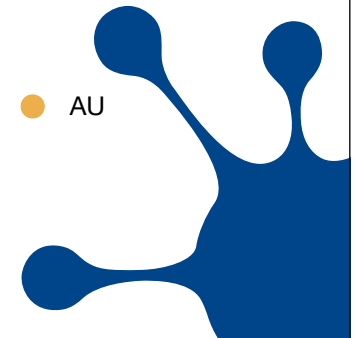
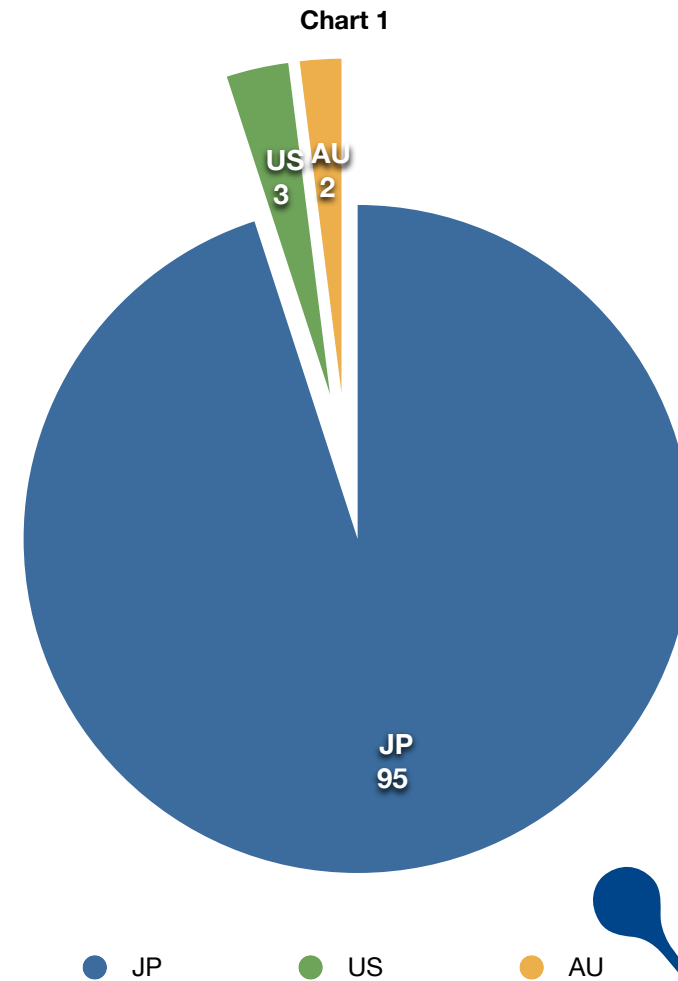


LARGE INTERNATIONAL IX, SO WIDE DISTRIBUTION OF SRC
 BUT WHY ARE TW AND CN THE LARGEST SRC ECONOMIES WHEN THERE
 ARE CLOSER INSTANCES?

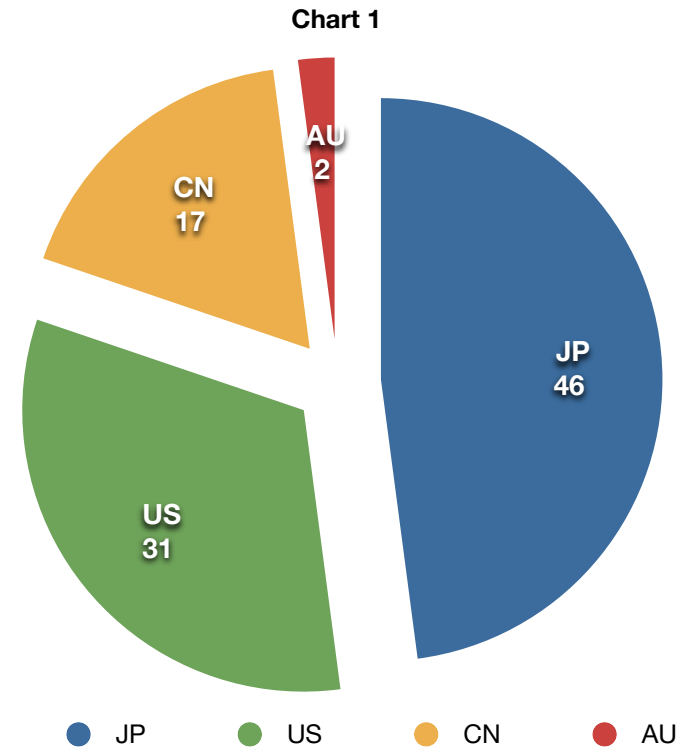


Tokyo (JPNAP), JP - IPv6

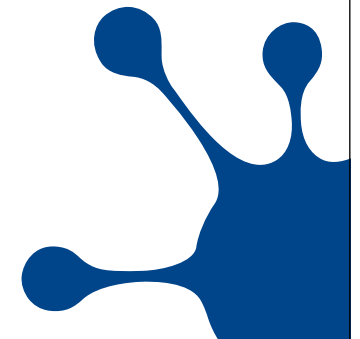
59	4713	JP	OCN NTT Communications Corporation
21	2518	JP	BIGL
3	9605	JP	MOPERA NTT DoCoMo, Inc.
3	2907	JP	SINET-AS Research Organization of Information and Systems, National Institute of Informatics
2	9600	JP	SONYTELECOM Sony Business Solutions Corporation
2	18268	JP	JANIS Naganoken Kyodou Densan Co.Ltd.
1	17676	JP	GIGAINFRA Softbank BB Corp.
1	15133	US	EDGECAST - EdgeCast Networks, Inc.
1	1221	AU	ASN-TELSTRA Telstra Pty Ltd



14	4134	CN	CHINANET-BACKBONE No.31,Jin-rong Street
14	14618	US	AMAZON-AES - Amazon.com, Inc.
6	9370	JP	SAKURA-B SAKURA Internet Inc.
6	2516	JP	KDDI KDDI CORPORATION
4	17676	JP	GIGAINFRA Softbank BB Corp.
3	2497	JP	IJ Internet Initiative Japan Inc.
2	4725	JP	ODN SOFTBANK TELECOM Corp.
2	4716	JP	POWEREDCOM KDDI CORPORATION
2	2510	JP	INFOWEB FUJITSU LIMITED
2	16509	US	AMAZON-02 - Amazon.com, Inc.
1	9824	JP	ASN-ATHOMEJP
1	4812	CN	CHINANET-SH-AP China Telecom (Grou1
1	2519	JP	VECTANT VECTANT Ltd.
1	2514	JP	INFOSPHERE NTT PC Communications, Inc.
1	17511	JP	K-OPTICOM K-Opticom Corporation
1	701	US	UUNET - MCI Communications Services, Inc. d/b/a Verizon Business
1	1221	AU	ASN-TELSTRA Telstra Pty Ltd

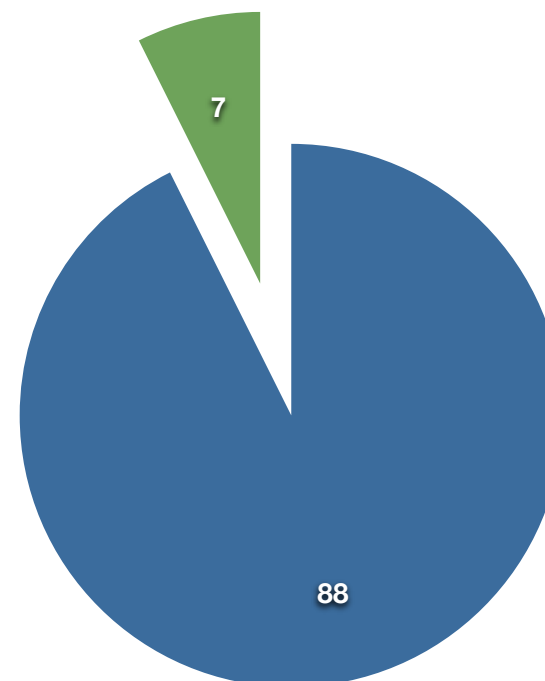


IMPROVEMENT!



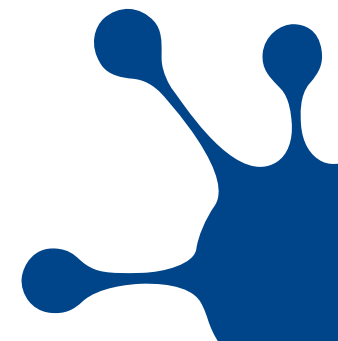
19	9371	JP	SAKURA-C SAKURA Internet Inc.
16	9824	JP	ASN-ATHOMEJP
16	2516	JP	KDDI KDDI CORPORATION
8	2514	JP	INFOSPHERE NTT PC Communications, Inc.
6	4721	JP	JCN Japan Cablenet Limited
4	9365	JP	ITSCOM its communications Inc.
4	9354	JP	TDNC Community Network Center Inc.
4	7684	JP	SAKURA-A SAKURA Internet Inc.
3	2497	JP	IIJ Internet Initiative Japan Inc.
3	18126	JP	CTCX Chubu Telecommunications Company, Inc.
2	6621	US	HNS-DIRECPC - Hughes Network Systems
2	17511	JP	K-OPTICOM K-Opticom Corporation

Chart 1



● JP

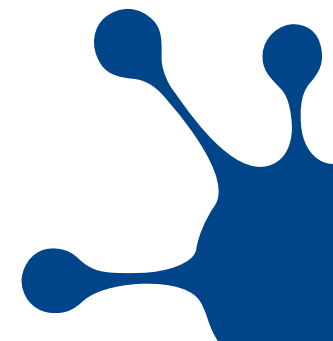
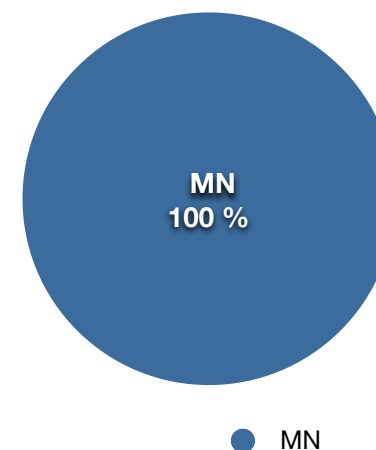
● US



Ulan Bataar, MN

20	45204	MN	GEMNET-MN GEMNET LLC
16	17882	MN	ASN-MCS-AP
10	38805	MN	CITINET-AS-MN-AP STXCitinet, Leading Internet & VOIP Service Provider, Ulaanbaatar, Mongolia
9	45237	MN	GLOBAL-MG-AS-AP Bodicom ISP Ulaanbaatar
9	38818	MN	YOKOUNANET-MN-AS-AP YOKOZUNANET LLC
6	10219	MN	SKYCC-AS-MAIN SKY C&C LLC
5	56293	MN	KEWIKONET-AS-AP Kewiko LLC
3	9934	MN	MICOM-MN-AS Mongolia Telecom
3	4850	MN	DIGICOM-AS-AP Digicom LLC
3	38038	MN	SANSAR-INTERNET-AS Sansar-Internet Co.,Ltd. Internet Service
3	38008	MN	HANS-AS-MN Hancomm Co.,Ltd. HFC Network and ISP Ulaanbaatar
3	24559	MN	WIRELESSCOM-MN WirelessCom LLC, Wireless Broadband Service
2	56194	MN	TELEMAX_COMMUNICATION-MN 3rd Floor Azmon Building
2	10109	MN	TOPNET-AS-MN-AP Topica LLC, Internet Service Provider,Ulaanbaatar, Mongolia
1	58598	MN	COMTEL-NET-AS Mongolia
1	38042	MN	INCOMNET-MONGOLIA-AS-AP Incomnet LLC, Mongolia, VSAT and Wireless service

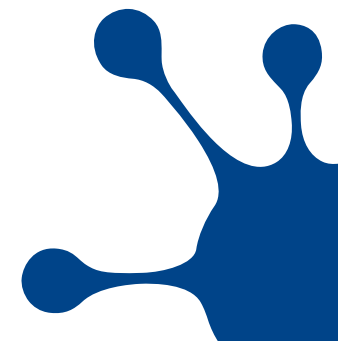
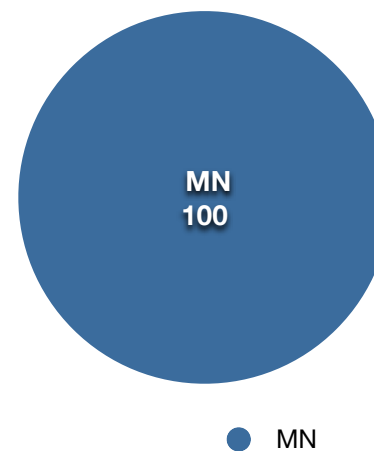
Chart 1



Ulan Bataar, MN - IPv6

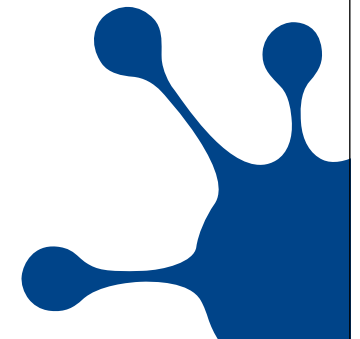
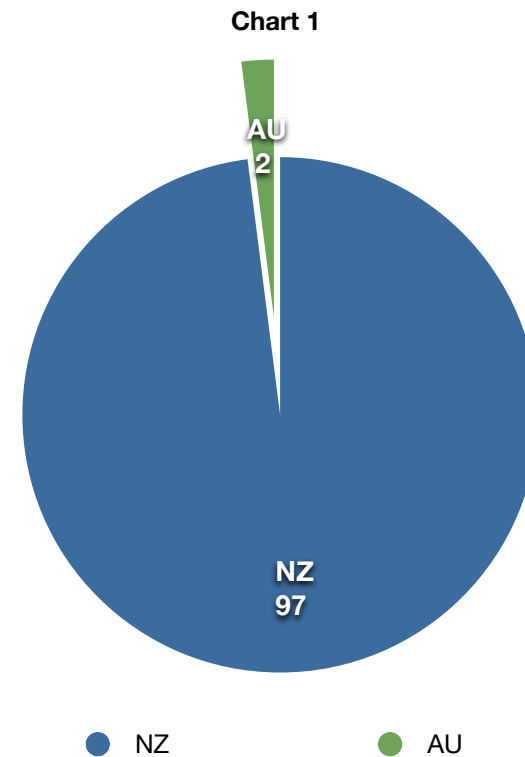
59	58598	MN	COMTEL-NET-AS Mongolia
40	45204	MN	GEMNET-MN GEMNET LLC

Chart 1

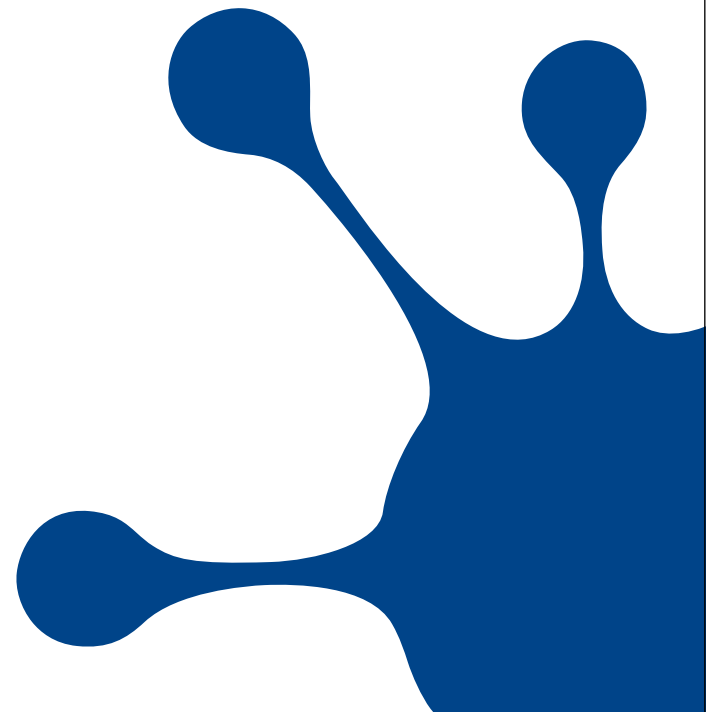


Wellington (WIX-NZ), NZ

41	4768	NZ	TelstraClear Ltd
11	17746	NZ	ORCONINTERNET-NZ-AP Orcon Internet
9	7657	NZ	VODAFONE-NZ-NGN-AS Vodafone NZ Ltd.
4	23655	NZ	SNAP-NZ-AS Snap Internet Limited
3	9889	AU	MAXNET-NZ-AP Auckland
3	24183	NZ	DTS-ISP-CORE1-AP DTS LTD
3	4770	NZ	ICONZ-AS ICONZ Ltd
2	9872	NZ	ITNET-NZ-AS-AP ITNet Ltd
2	9503	NZ	FX-PRIMARY-AS FX Networks Limited
2	132040	NZ	CITYLINK-CT-AP Citylink Ltd
1	55853	NZ	MEGATEL-AS-AP Megatel
1	45459	NZ	WEB-DRIVE-NZ-AS-AP Web Drive Limited
1	23735	NZ	EOL-AS-AP Enternet Online Ltd
1	17649	NZ	DMZGLOBAL-AP DMZGlobal Ltd



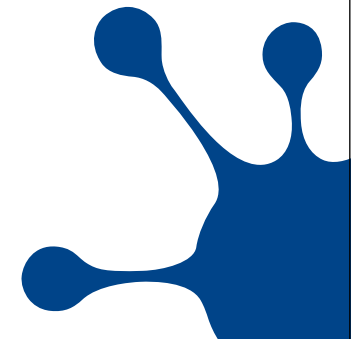
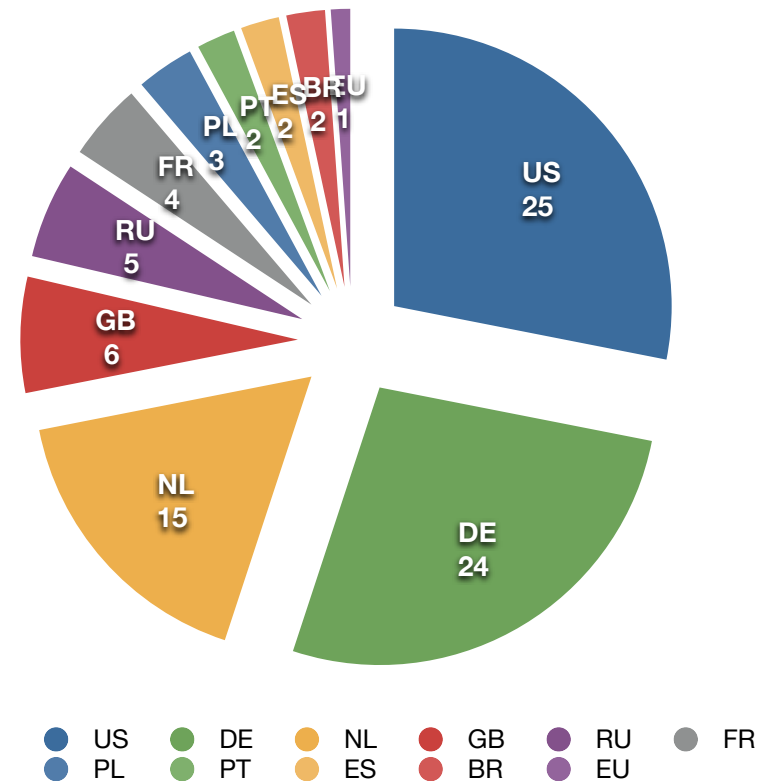
EUROPE



Amsterdam (AMS-IX), NL

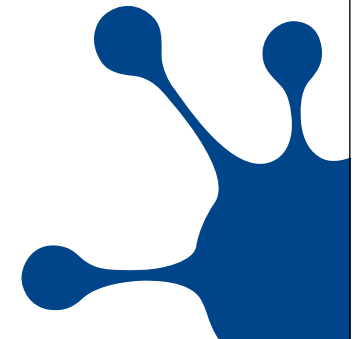
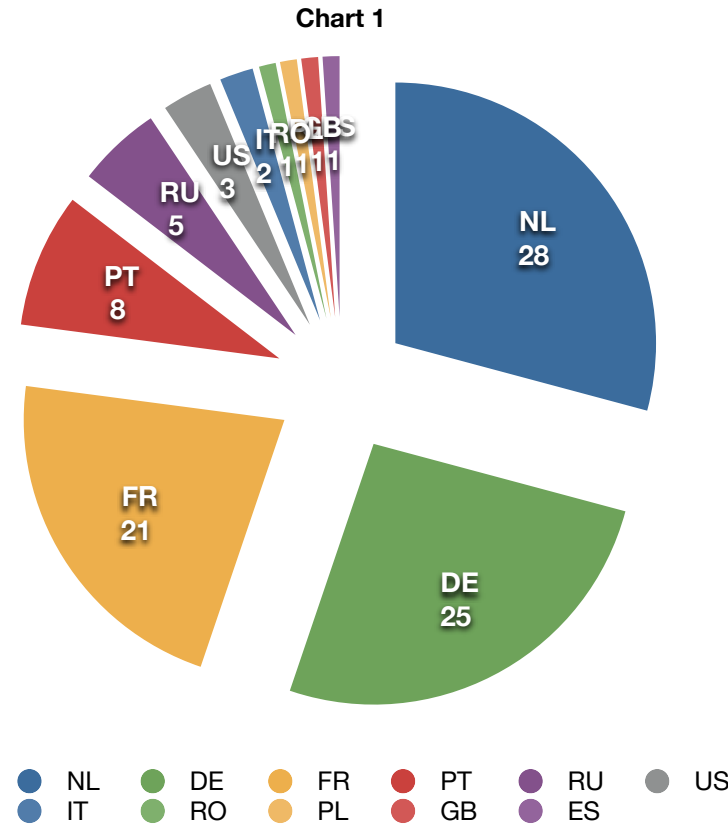
17	3320	DE	DTAG Deutsche Telekom AG
4	5607	GB	BSKYB-BROADBAND-AS British Sky Broadcasting Limited
4	22773	US	ASN-CXA-ALL-CCI-22773-RDC - Cox Communications Inc.
3	36692	US	OPENDNS - OpenDNS, LLC
3	12322	FR	PROXAD Free SAS
2	9143	NL	ZIGGO Ziggo B.V.
2	7132	US	SBIS-AS AS for SBIS-AS
2	3209	DE	VODANET Vodafone D2 GmbH
2	26496	US	AS-26496-GO-DADDY-COM-LLC - GoDaddy.com, LLC
2	197902	NL	HOSTNET Hostnet B.V.
1	7018	US	ATT-INTERNET4 - AT&T Services, Inc.
1	6389	US	BELLSOUTH-NET-BLK - BellSouth.net Inc.
1	3265	NL	XS4ALL-NL XS4ALL Internet BV
1	15830	EU	TELECITY-LON TELECITYGROUP INTERNATIONAL LIMITED
1	13238	RU	YANDEX Yandex LLC
1	12542	PT	TVCABO-AS TVCABO Autonomous System

Chart 1



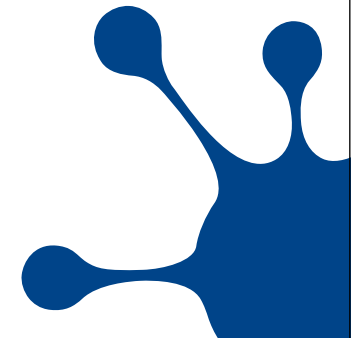
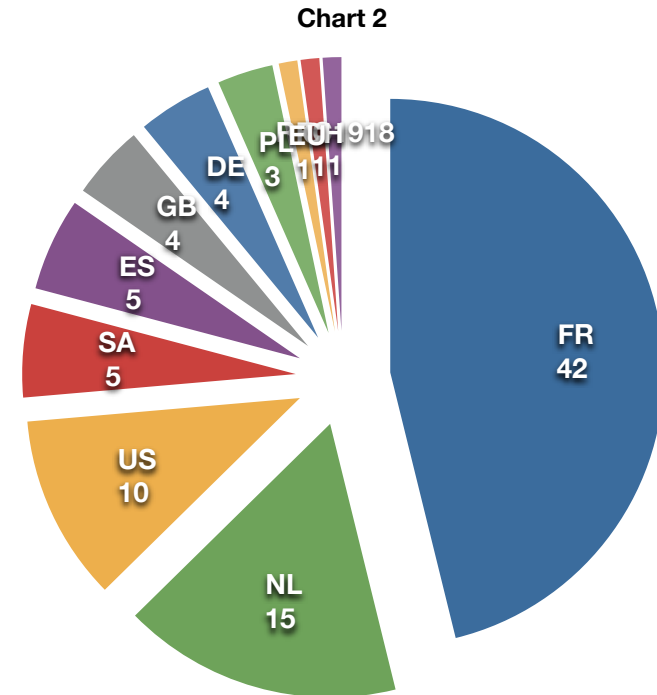
Amsterdam (AMS-IX), NL - IPv6

20	12322	FR	PROXAD Free SAS
11	8422	DE	NETCOLOGNE NetCologne GmbH
7	20825	DE	UNITYMEDIA Unitymedia NRW GmbH
6	3265	NL	XS4ALL-NL XS4ALL Internet BV
6	3243	PT	TELEPAC PT Comunicacoes S.A.
2	49562	NL	XMS KPN ITNS Services B.V.
2	39120	IT	CONVERGENZE-AS Convergenze S.p.A.
2	36351	NL	SOFTLAYER - SoftLayer Technologies Inc.
2	28685	NL	ASN-ROUTIT Routit BV
2	12871	NL	NL-CONCEPTS Concepts ICT Autonomous System
2	12695	RU	DINET-AS Digital Networks CJSC
2	12353	PT	VODAFONE-PT Vodafone Portugal
2	1103	US	SURFNET-NL SURFnet, The Netherlands
1	6939	US	HURRICANE Hurricane Electric, Inc.
1	4589	GB	EASYNET Easynet Global Services
1	13127	NL	VERSATEL Tele 2 Nederland B.V.
1	12414	NL	NL-SOLCON SOLCON
1	12355	DE	HAMCOM-DE HeLi NET Telekommunikation GmbH & Co. KG
1	12310	RO	INES iNES Group SRL



Amsterdam, NL

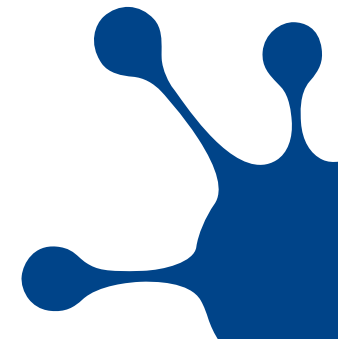
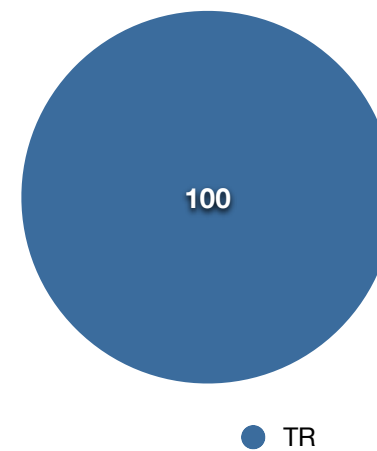
34	3215	FR	AS3215 France Telecom S.A.
13	8737	NL	PT Koninkli
6	702	DE	AS702 Verizon Business EMEA - Commercial IP service provider in Europe
5	12479	ES	UNI2-AS France Telecom Espana SA
4	35819	SA	MOBILY-AS Etihad Etisalat Company (Mobily)
2	8362	FR	NordNet
2	8220	IT	COLT COLT Technology Services Group Limited
2	5617	PL	TPNET Telekomunikacja Polska S.A.
1	701	US	UUNET - MCI Communications Services, Inc. d/b/a Verizon Business
1	5511	FR	OPENTRANSIT France Telecom S.A.
1	19262	US	VZGNI-TRANSIT - Verizon Online LLC
1	12576	GB	ORANGE-PCS Orange Personal Communications Services



Ankara, TR

96	8517	TR	ULAKNET
3	24922	TR	HACETTEPE Hacettepe University, located in Ankara, Turkey,
1	15390	TR	SELCUK-NET-AS Selcuk Universitesi

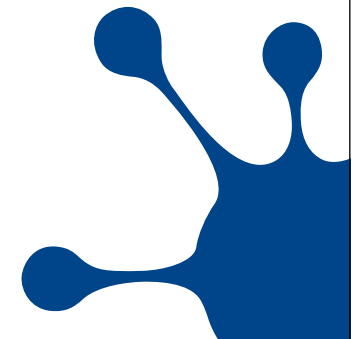
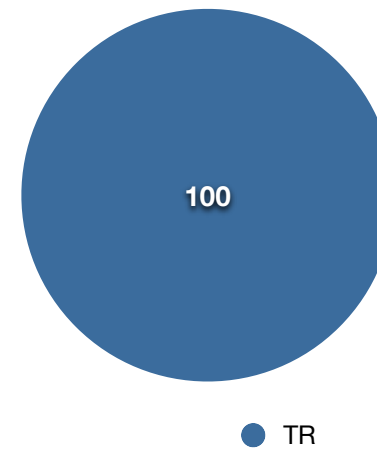
Chart 2



Ankara, TR - IPV6

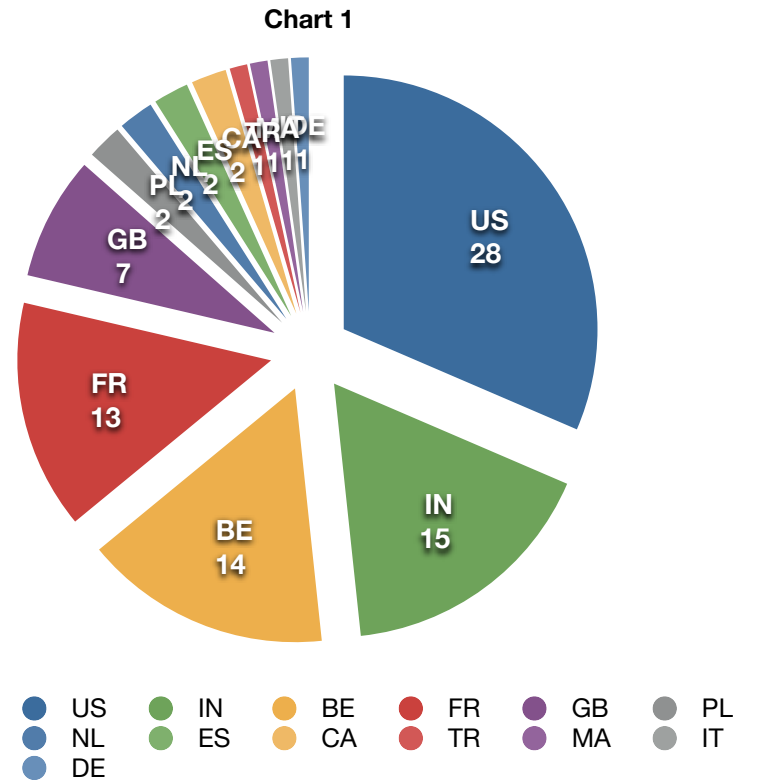
91	8517	TR	ULAKNET ULAKNET-ASN
9	1967	TR	TR-NET Middle East Technical University

Chart 2

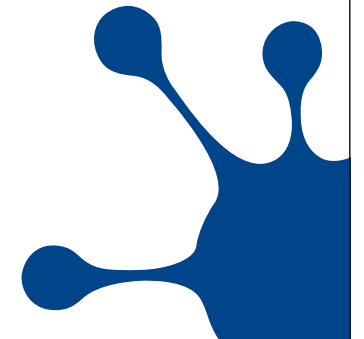


Brussels (BIX), BE

15	131222	IN	MTS-INDIA-IN 334,Udyog Vihar
9	5432	BE	BELGACOM-SKYNET-AS Belgacom regional ASN
9	16276	FR	OVH OVH Systems
5	3356	US	LEVEL3 Level 3 Communications
3	11427	US	SCRR-11427 - Road Runner HoldCo LLC
1	2611	BE	BELNET BELNET
1	174	US	COGENT Cogent/PSI
1	13037	GB	ZEN-AS Zen Internet Ltd

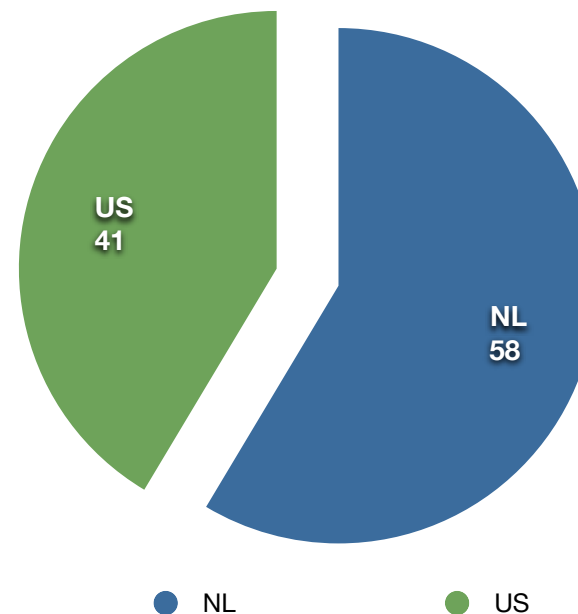


WHY IS LEVEL3 SENDING ALL THEIR TRAFFIC TO BRUSSELS?



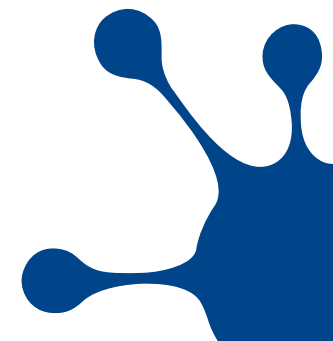
Brussels (BIX), BE - IPv6

Chart 1



45	25525	NL	REASONNET-AS Reasonnet IP Networks B.V.
39	30058	US	FDCSERVERS - FDCservers.net
7	57866	NL	FUSIX-AS N.M. Raijer trading as _Fusix Networks V.o.F._
3	5580	NL	ATRATO Atrato IP Networks
2	46844	US	ST-BGP - Sharktech

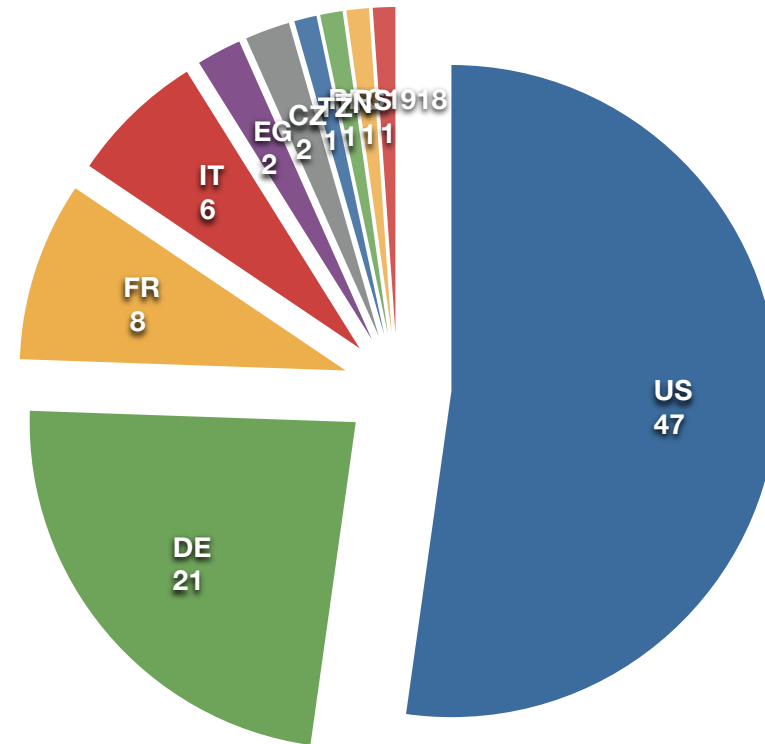
HAVE GONE FROM BEING 100% FROM THE UK



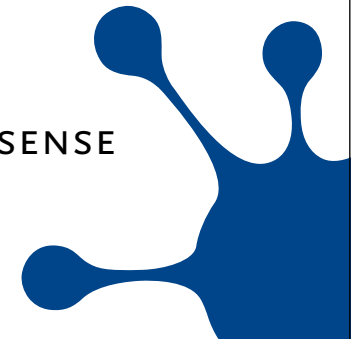
Frankfurt (DE-CIX), DE

Chart 1

45	15169	US	GOOGLE
7	15557	FR	LDCOMNET Societe Francaise du Radiotelephone S.A
4	3209	DE	VODANET Vodafone D2 GmbH
4	24940	DE	HETZNER-AS Hetzner Online AG
2	8452	EG	TE-AS TE-AS
2	3269	IT	ASN-IBSNAZ Telecom Italia S.p.a.
2	13184	DE	HANSENET Telefonica Germany GmbH & Co.OHG
1	NA		RFC1918
1	8881	DE	VERSATEL Versatel Deutschland GmbH
1	8560	DE	ONEANDONE-AS
1	36930	TZ	Zantel-AS
1	36692	US	OPENDNS - OpenDNS, LLC
1	2609	TN	TN-BB-AS Tunisia BackBone AS
1	20746	IT	ASN-IDC Telecomitalia s.p.a.



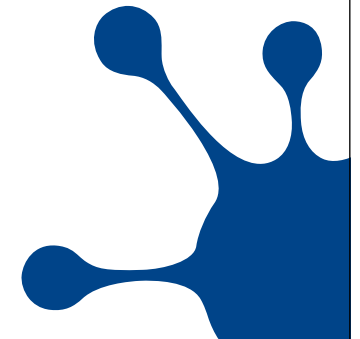
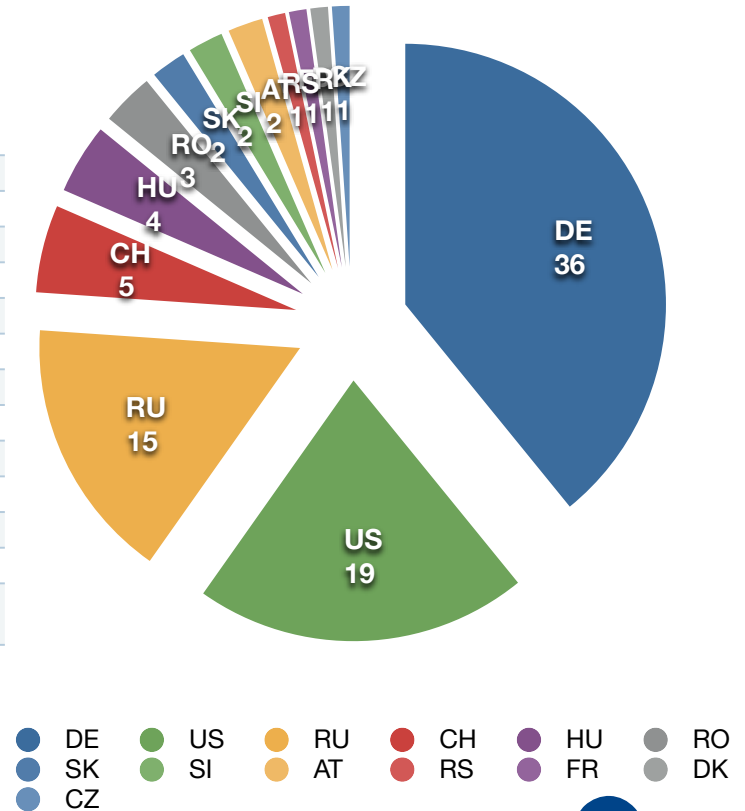
LARGE INTERNATIONAL IX, MAKE SENSE
GOOGLE AGAIN....



Frankfurt (DE-CIX), DE - IPv6

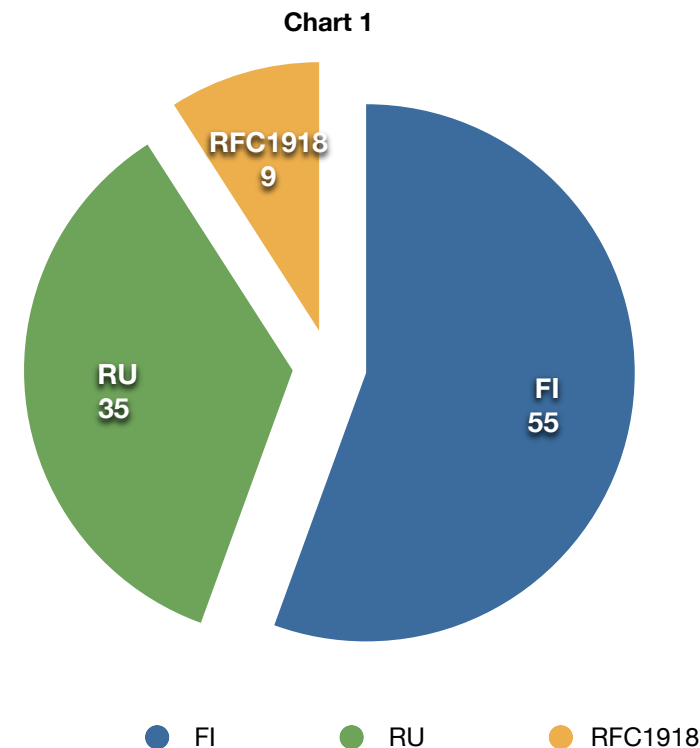
17	15133	US	EDGECAST - EdgeCast Networks, Inc.
8	13238	US	YANDEX Yandex LLC
6	29562	DE	KABELBW-ASN Kabel BW GmbH
6	24940	DE	HETZNER-AS Hetzner Online AG
4	5483	HU	HTC-AS Magyar Telekom plc.
2	5603	SI	SIOL-NET Telekom Slovenije d.d.
2	5541	RO	ADNET-TELECOM AdNet Telecom
2	13045	DE	HTP-AS htp GmbH
1	8447	AT	TELEKOM-AT A1 Telekom Austria AG
1	8371	RU	VIMPELCOM-NN OJSC _Vimpelcom_
1	8365	DE	MANDA Man-da.de GmbH
1	6939	US	HURRICANE - Hurricane Electric, Inc.
1	34878	DE	KIT Karlsruhe Institute of Technology (KIT)
1	31042	RS	SERBIA-BROADBAND-AS Serbia BroadBand-Srpske Kablovske mreze d.o.o.
1	12668	RU	MIRALOGIC-AS LLC _KomTehCentr_

Chart 1

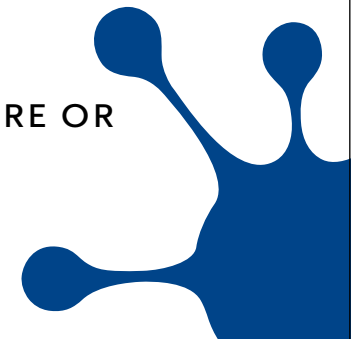


Helsinki (FICIX), FI

14	1759	FI	TSF-IP-CORE TeliaSonera Finland IP Network
9	NA		RFC1918
7	719	FI	ELISA-AS Elisa Oyj
5	8359	RU	MTS MTS OJSC
5	3336	FI	ELISA-AS Elisa Oyj
5	1741		FUNET autonomous system
5	16086	FI	DNA DNA Oy
3	29422	FI	NBLNETWORKS-AS Nebula Oy
3	29209	RU	SPBMTS-AS MTS OJSC
3	25513	RU	ASN-MGTS-USPD OJS Moscow city telephone network
3	25086	RU	URALTC-AS CJSC _COMSTAR-regions_
2	6767	RU	RU-CTSRND-AS InterCommunications Ltd
1	790	FI	EUNETFI Elisa Oyj
1	15527	FI	ANVIA Anvia Oyj
1	15496	FI	Aalto University
1	13174	RU	MTSNET MTS OJSC

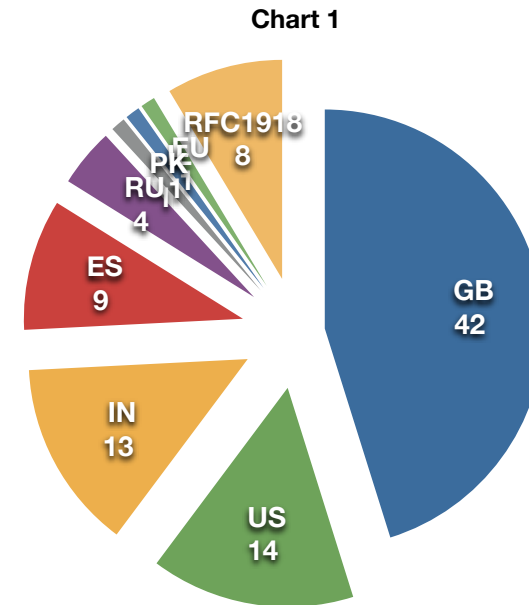


FINLAND AND RUSSIA, MORE OR LESS AS EXPECTED

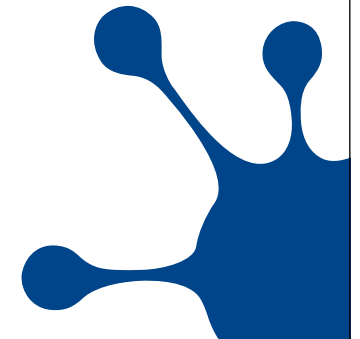


London (Linx), UK

9	131222	IN	MTS-INDIA-IN 334,Udyog Vihar
8	NA		RFC1918
8	3352	ES	TELEFONICA-DATA-ESPANA TELEFONICA DE ESPANA
8	2856	GB	BT-UK-AS BTnet UK Regional network
7	25605	GB	SCANSAFE Cisco
4	5089	GB	NTL Virgin Media Limited
2	7018	US	ATT-INTERNET4 - AT&T Services, Inc.
2	36692	US	OPENDNS - OpenDNS, LLC
2	24560	IN	AIRTELBROADBAND-AS-AP Bharti Airtel Ltd., Telemedia Services
2	22458	US	NETSOURCE - NetSource Communications, Inc.
2	15830	GB	TELECITY-LON TELECITYGROUP INTERNATIONAL LIMITED
1	9498	IN	BBIL-AP BHARTI Airtel Ltd.
1	9105	GB	TISCALI-UK Tiscali UK
1	35228	GB	BEUNLIMITED Telefonica UK Limited
1	25135	GB	VODAFONE_UK_ASN Vodafone Limited
1	13672	US	FAIRPO-3 - FAIRPOINT COMMUNICATIONS, INC.
1	1273	EU	CW Cable and Wireless Worldwide plc

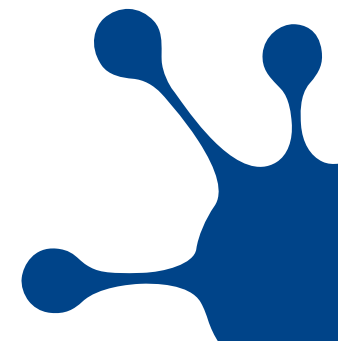
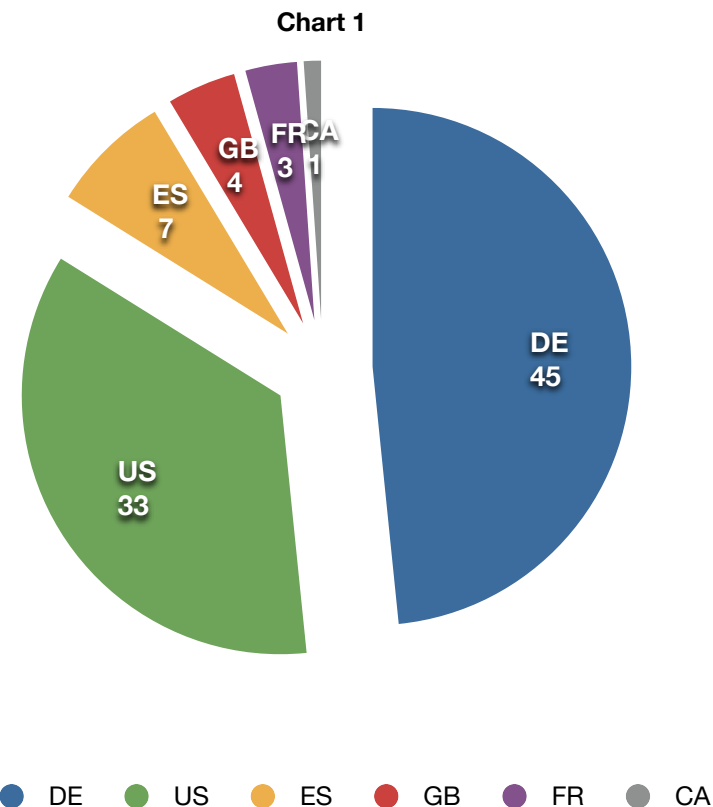


REMEMBER THAT MTS WAS THE LARGEST SRC OF TRAFFIC TO MUMBAI?



London (Linx), UK - IPv6

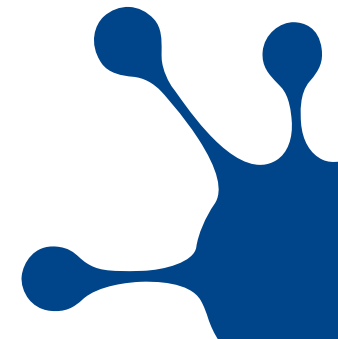
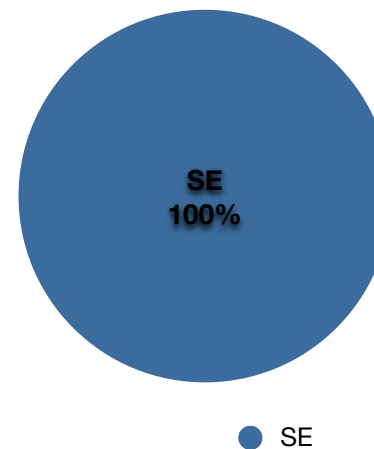
44	3320	DE	DTAG Deutsche Telekom
18	22773	US	ASN-CXA-ALL-CCI-22773-RDC - Cox Communications Inc.
7	3352	ES	TELEFONICA-DATA-ESPANA TELEFONICA DE ESPANA
2	7018	US	ATT-INTERNET4 - AT&T Services, Inc.
2	5410	FR	ASN-BOUYGTEL-ISP Bouygues Telecom S.A.
1	33070	US	RMH-14 - Rackspace Hosting
1	22394	US	CELLCO - Cellco Partnership DBA Verizon Wireless



Luleå (Netnod), SE

49	2831	SE	LTUNET Lulea Tekniska Universitet
22	8473	SE	BAHNHOF Bahnhof Internet AB
13	6782	SE	BDNET AS for the county net in Norrbotten Sweden
6	44581	SE	SE-ALLTELE AllTele Allmanna Svenska Telefonaktiebolaget
4	1653	SE	SUNET SUNET Swedish University Network
3	31331	SE	LINNEA Logica Norr AB
2	29518	SE	BREDBAND2 Bredband2 AB

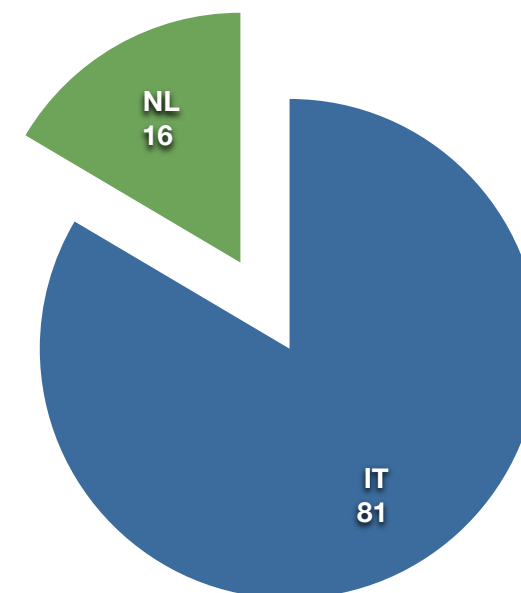
% Queries per Economy



Milano (MIX), IT

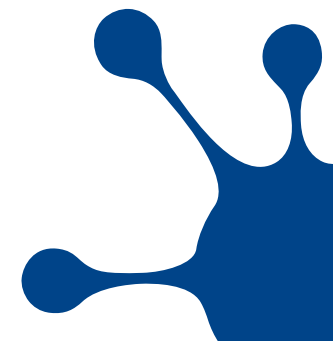
21	3313	IT	INET-AS BT Italia S.p.A.
16	16265		LeaseWeb
10	24608	IT	H3G-AS H3G S.p.A.
6	39729	IT	REGISTER-AS Register.IT S.p.A.
5	3302	IT	INFRACOM-NETWORK-APPLICATION-AS Infracom Italia S.p.A.
4	5602	IT	KPNQwest Italia S.p.a
4	5396	IT	MC-LINK MC-link Spa
3	31034	IT	ARUBA-ASN Aruba S.p.A.
2	35612	IT	NGI-AS NGI Spa
2	15589	IT	ASN-EUTELIA Clouditalia Communications S.p.A.
2	20811	IT	BRENNERCOM-AS
1	21309	IT	CASAWEB-AS ACANTHO SPA

Chart 1



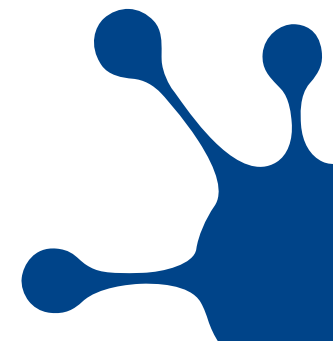
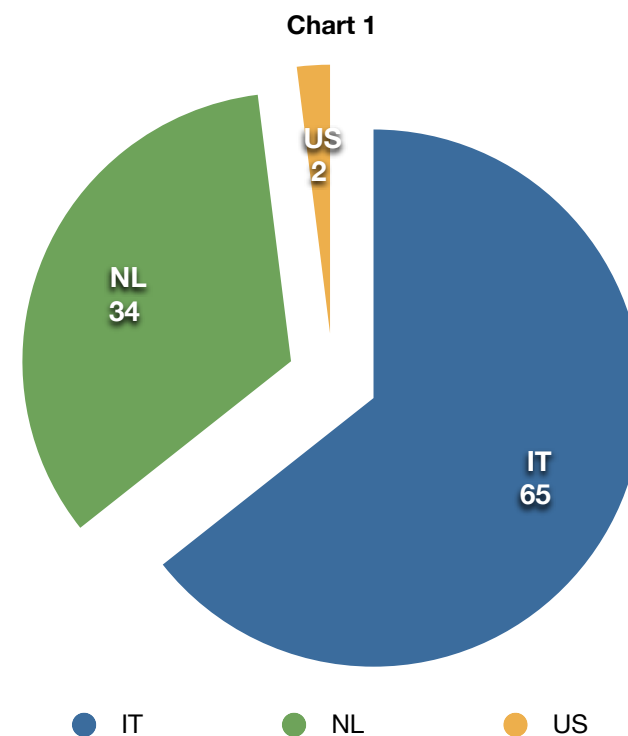
● IT

● NL



Milano (MIX), IT - IPv6

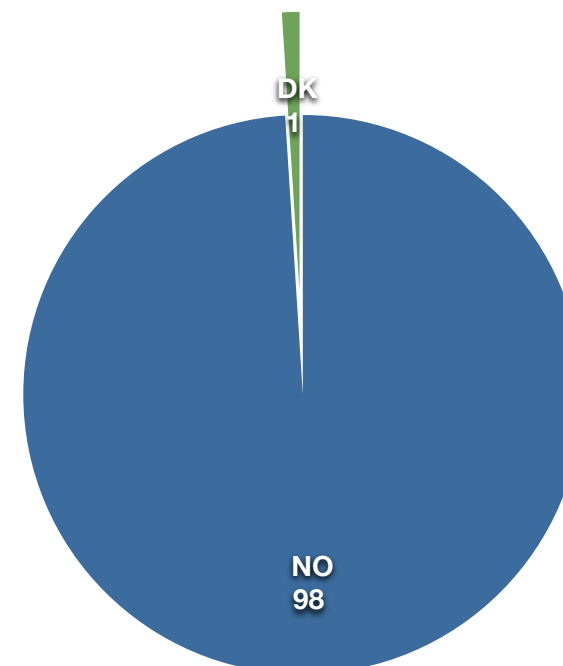
34	16265	NL	LEASEWEB LeaseWeb B.V.
11	15589	IT	ASN-EUTELIA Clouditalia Communications S.p.A.
9	12850	IT	ASN-ENTER Enter S.r.l. http://www.enter.it
7	34695	IT	E4A-AS E4A s.r.l.
7	12637	IT	SEEWEB Seeweb s.r.l.
6	12779	IT	ITGATE IT.Gate S.p.A.
4	29449	IT	TPN-AS TopneT Telecomunicazioni S.r.L.
3	6734	IT	ASN-SPIN Spin s.r.l.
2	8265	IT	FASTNET-BKB-ASN FASTnet s.p.a.
2	43989	IT	EHWEB Ehinet Srl
2	20912	IT	ASN-PANSERVICE Panservice
2	15605	IT	ICTVALLEUMBRA-AS ICT Valle Umbra s.r.l.
2	1103	US	SURFNET-NL SURFnet, The Netherlands
1	9026	IT	ULI-MAIN Utility Line Italia S.r.l.
1	57426	IT	PLANETACOM-AS Antecom S.r.l.
1	44160	IT	INTERNETONE Internet ONE SRL
1	35130	IT	SFERANET-AS Sfera Networks s.r.l. - Treviolo
1	197075	IT	ACTIVENETWORK-AS Active Network S.p.A.



Oslo (NIX), NO

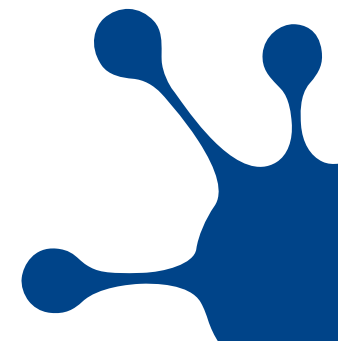
21	2116	NO	ASN-CATCHCOM Broadnet AS
14	224	NO	UNINETT UNINETT, The Norwegian University & Research Network
12	41572	NO	Hafslund Telekom Nettjenester AS
11	34087	NO	NTE-BREDBAND NTE Bredband, Norway
10	5381	NO	POWTECH-AS PowerTech Information Systems AS
8	29695	NO	LYSE-AS Altibox AS
7	29492	NO	EIDSIVA-ASN Eidsiva bredband AS
4	5619	NO	ERGO EVRY AS
3	16175	NO	SIGNAL Signal Bredband AS
1	49455	NO	LOQAL-AS Loqal AS
1	41483	NO	NWN-AS Network Norway Autonomous System
1	39832	NO	NO-OPERA Opera Software ASA
1	35132	NO	ENIVEST-AS Eninvest AS
1	1835	DK	FSKNET-DK Forskningsnettet - Danish network for Research and Education

Chart 1



● NO

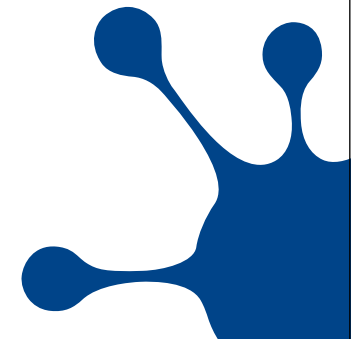
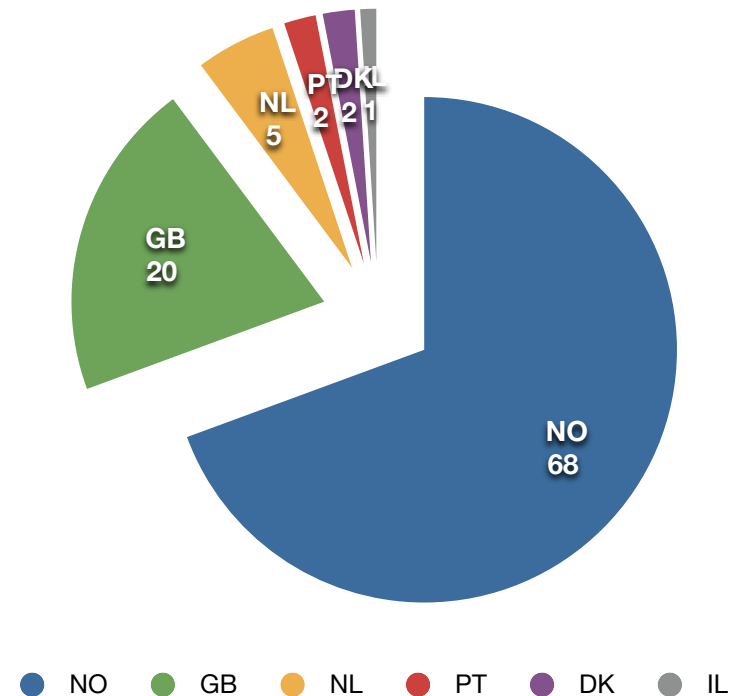
● DK



Oslo (NIX), NO - IPv6

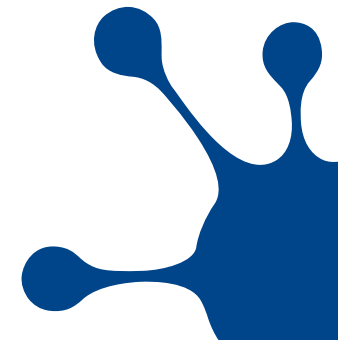
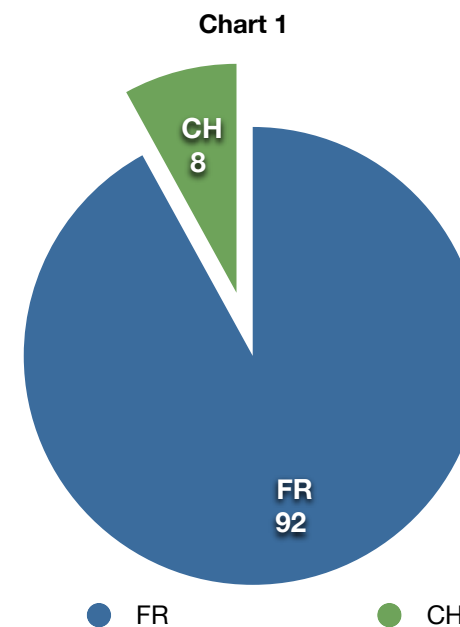
Chart 1

36	2119	NO	Telenor Norge AS
18	786	GB	JANET The JNT Association
6	224	NO	UNINETT UNINETT, The Norwegian University & Research Network
6	29695	NO	LYSE-AS Altibox AS
4	15659	NO	NEXTGENTEL NEXTGENTEL Autonomous System
3	5381	NO	POWTECH-AS PowerTech Information Systems AS
3	1103	NL	SURFNET-NL SURFnet, The Netherlands
2	41741	NO	BBS-AS BBS AS
2	41572	NO	HAFSLUND Hafslund Telekom Nettjenester AS
2	1930	PT	RCCN Rede Ciencia Tecnologia e Sociedade (RCTS)
2	1835	DK	FSKNET-DK Forskningsnettet - Danish network for Research and Education
1	8896	NO	NetPower Int AS
1	8542	NO	BKKB BKK Fiber AS
1	198864	GB	QMW-AC-UK Queen Mary and Westfield College, University of London



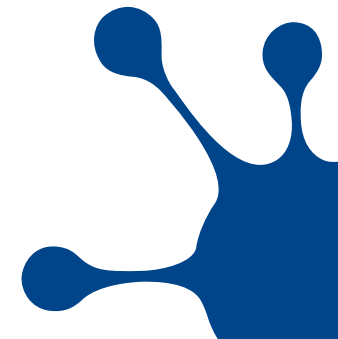
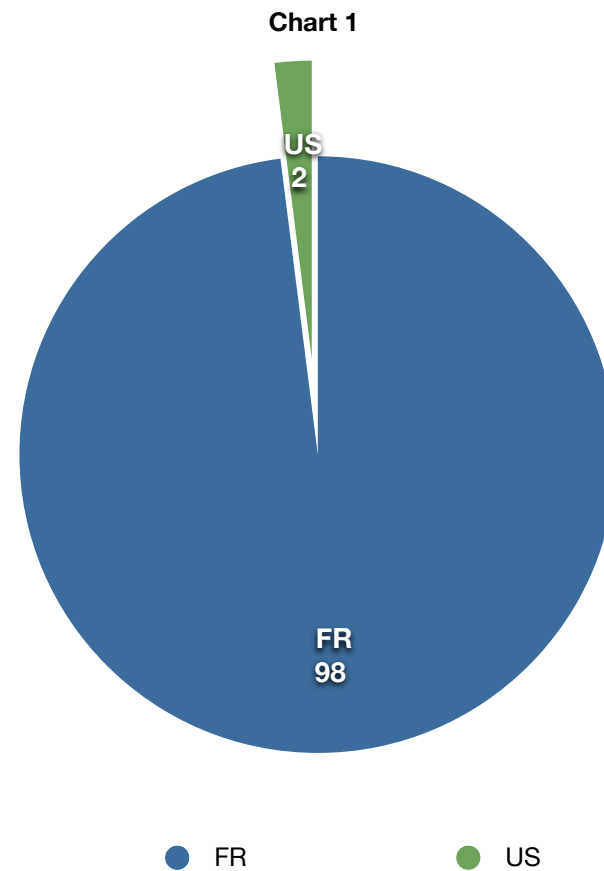
Paris (Sfinx), FR

68	2200	FR	FR-RENATER Reseau National de telecommunications pour la Technologie
6	6730	CH	SUNRISE Sunrise Communications AG
2	4589	FR	EASYNET Easynet Global Services
2	1948	FR	FR-RENATER-SAPHIR Education and research network of the Saclay plateau
2	1942	FR	FR-TIGRE Toile Informatique GREnobloise
2	1307	FR	FR-U-JUSSIEU-PARIS
1	789	FR	IN2P3 IN2P3 Autonomous System
1	25187	FR	FCV FRANCE CITEVISION SAS
1	2422	FR	FR-RENATER-RAP Metropolitan Paris Academic Network
1	2269	FR	FR-U-PARISSUD-ORSAY FR
1	2202	FR	FR-RENATER-REAUMUR Reseau Regional REAUMUR
1	2060	FR	FR-RENATER RENATER_ASNBLOCK1



Paris (Sfinx), FR - IPv6

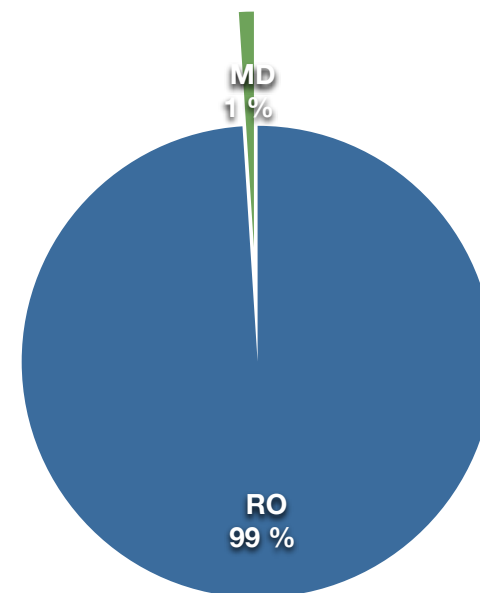
96	29169	FR	GANDI-AS Gandi SAS
3	34752	FR	DOCTISSIMO MEDCOST
2	25358	FR	NOVSO Novso SARL



Bucharest (RoNIX), RO

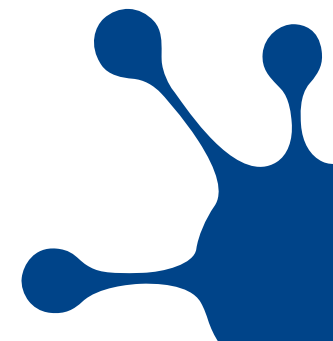
40	8708	RO	RCS-RDS
31	9050	RO	RTD ROMTELECOM S.A
7	12310	RO	INES iNES Group SRL
3	48161	RO	NG-AS SC NextGen Communications SRL
2	35002	RO	NEWCOM-ASN SC NextGen Communications SRL

Chart 1



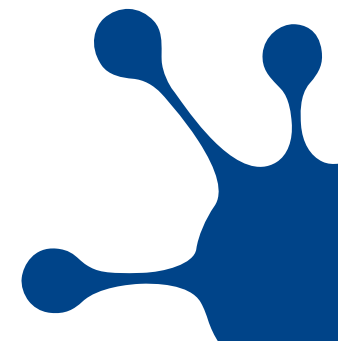
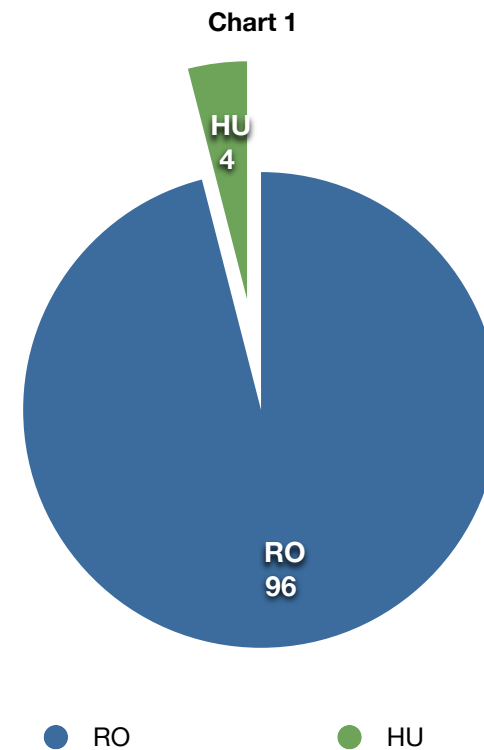
● RO

● MD



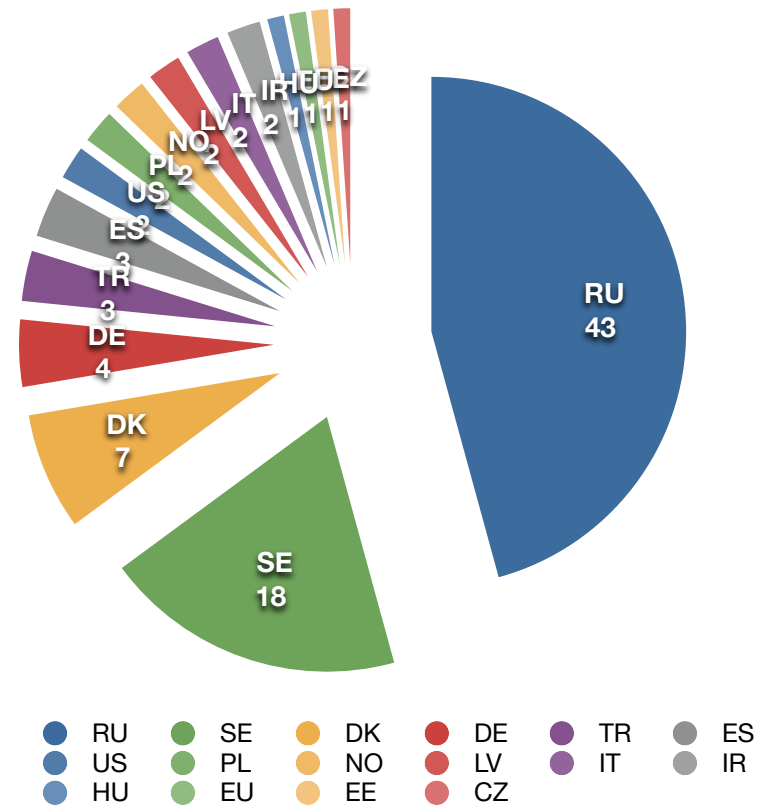
Bucharest (RoNIX), RO - IPv6

96	8708	RO	RCS & RDS SA
4	20845	HU	DIGICABLE DIGI Ltd.



5	3292	DK	TDC TDC Data Networks
3	680	DE	DFN Verein zur Foerderung eines Deutschen Forschungsnetzes e.V.
3	3301	SE	TELIANET-SWEDEN TeliaSonera AB
3	1257	SE	TELE2
2	9121	TR	TTNET Turk Telekomunikasyon Anonim Sirketi
2	34137	RU	RUAMUR-AS OJSC Rostelecom
2	137	IT	ASGARR GARR Italian academic and research network
1	8239	ES	Arrakis, Servicios y comunicaciones, S.L.
1	5650	US	FRONTIER-FRTR - Frontier Communications of America, Inc.
1	2119	SE	TELENOR-NEXTEL Telenor Norge AS
1	15582	RU	AKADO-STOLITSA-AS _AKADO-Stolitsa_ JSC

Chart 1

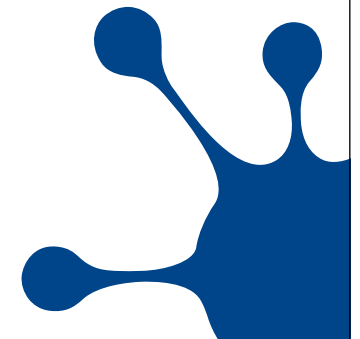
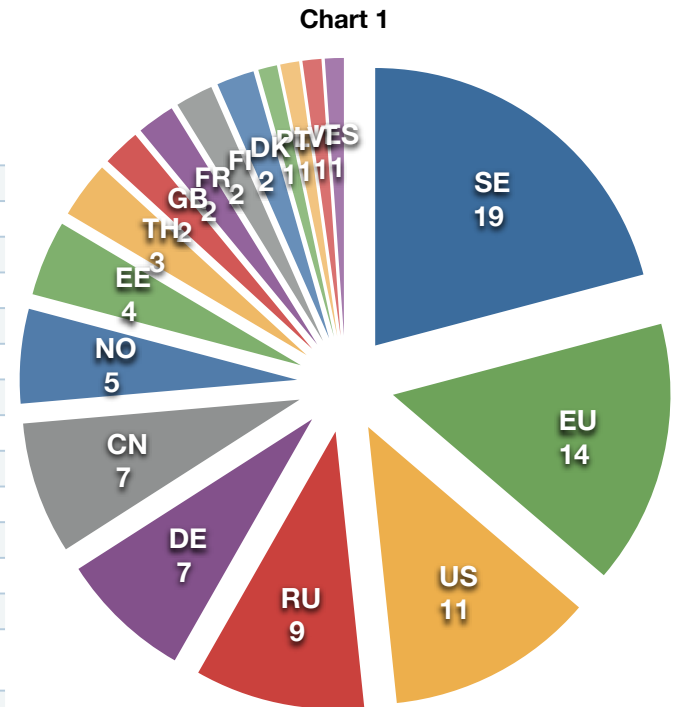


LARGE INTERNATIONAL IX, SO WIDE SPREAD OF SRCS



Stockholm (Netnod), SE - IPv6

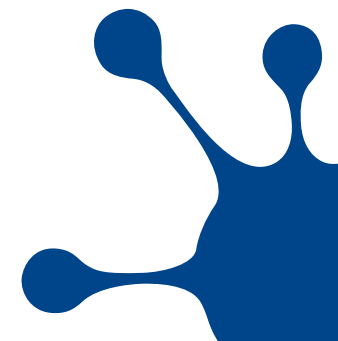
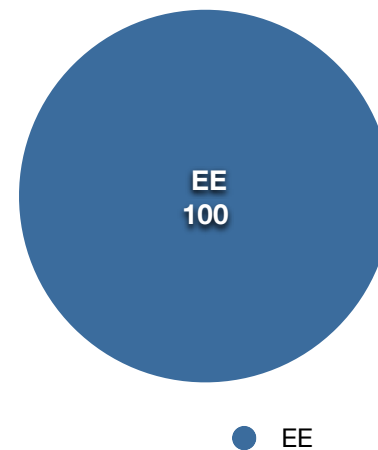
11	3301	EU	TELIANET-SWEDEN TeliaSonera AB
5	1257	SE	TELE2
4	41164	NO	GET-NO GET Norway
4	38345	CN	CNNIC-KNET-AP KNET Techonlogy (BeiJing) Co.,Ltd.
4	174	DE	COGENT Cogent/PSI
4	1103	US	SURFNET-NL SURFnet, The Netherlands
3	4621	TH	UNSPECIFIED UNINET-TH
3	3292	SE	TDC TDC Data Networks
3	3249	EE	ESTPAK Elion Enterprises Ltd.
3	24961	DE	FIBREONE-AS myLoc managed IT AG
2	8359	RU	MTS MTS OJSC
2	44034	SE	HI3G Hi3G Access AB
2	33885	SE	OWNIT Ownit Broadband AB
2	22394	US	CELLCO - Cellco Partnership DBA Verizon Wireless
2	2200	FR	FR-RENATER Reseau National de telecommunications pour la Technologie
2	1759	EU	TSF-IP-CORE TeliaSonera Finland IP Network
2	16657	US	FIBERTECH-NETWORKS-AS-ROC-NY-US - Fibertech Networks, LLC
2	1653	SE	SUNET SUNET Swedish University Network
1	378	IL	MACHBA-AS
1	786	GB	JANET The JNT Association
1	680	DE	DFN Verein zur Foerderung eines Deutschen Forschungsnetzes e.V.
1	5538	LV	SIGMANET-NIC Institute of Mathematics and Computer Science of University of Latvia
1	23910	CN	CNGI-CERNET2-AS-AP China Next Generation Internet CERNET2
1	21195	SE	DGCSYSTEMS DGC Access AB
1	1930	PT	RCCN Rede Ciencia Tecnologia e Sociedade (RCTS)
1	137	IT	ASGARR GARR Italian academic and research network



Tallin (RTIX), EE

64	3221	EE	EENet
15	2586	EE	UNINET-AS Elisa Eesti AS
14	8240	EE	ASO Autonomous System
6	39301	EE	TELEVORK-AS Televorgu AS

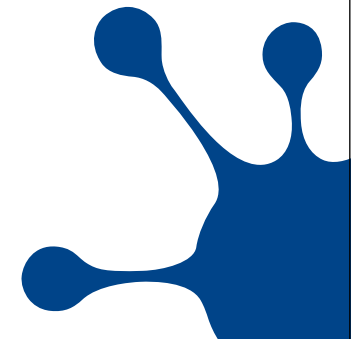
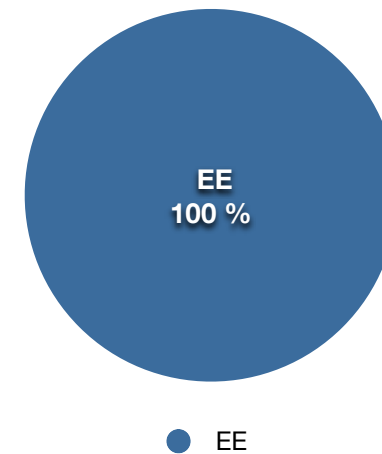
Chart 1



Tallin (RTIX), EE - IPV6

64	3221	EE	EENet
15	2586	EE	UNINET-AS Elisa Eesti AS
14	8240	EE	ASO Autonomous System
6	39301	EE	TELEVORK-AS Televorgu AS

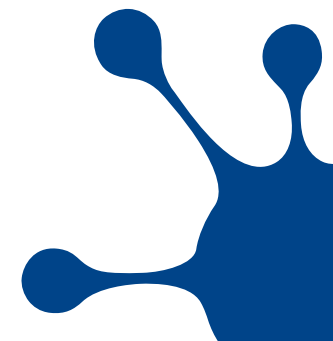
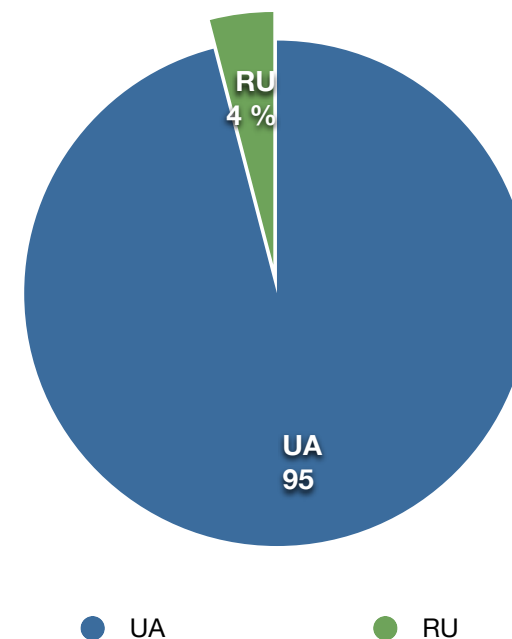
Chart 2



Kiev (UA-IX), UA

7	35297	UA	DATALINE-AS Dataline LLC
5	15895	UA	KSNET-AS Kyivstar GSM
3	6703	UA	ALKAR-AS PRIVATE JOINT-STOCK COMPANY _FARLEP-INVEST_
2	25229	UA	VOLIA-AS Kyivski Telekomunikatsiyi Merezhi LLC
2	21219	UA	DATAGROUP PRIVATE JOINT STOCK COMPANY _DATAGROUP_
2	12530	UA	GOLDENTELECOM-UKRAINE Golden Telec
1	43802	UA	TERRASEV TOV _TERRA-FINANCE_
1	42396	UA	PPLNETUA-AS PJSC Telesystems of Ukraine
1	31272	UA	WILDPARK-AS ISP WildPark, Ukraine, Nikolaev
1	28858	UA	LECOS Lecos Online Ltd.
1	25386	UA	INTERTELECOM-AS Inter-Telecom CJSC
1	13188	UA	BANKINFORM-AS TOV _Bank-Inform_
1	16066	UA	TEST-UA _T.E.S.T._ Ltd

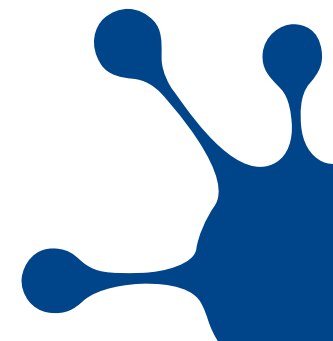
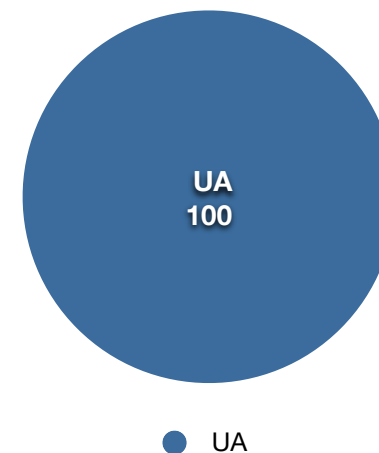
Chart 1



Kiev (UA-IX), UA - IPv6

66	3255	UA	UARNET-AS State Enterprise Scientific and Telecommunication Centre _Ukrainian Academic and Research Network_ of the Institute for Condensed Matter Physics of the National Academy of
9	13307	UA	SKIF-AS SKIF ISP Ltd
5	21219	UA	DATAGROUP PRIVATE JOINT STOCK COMPANY _DATAGROUP_
4	39399	UA	FENIXVT-AS Private Enterprise Firma Fenix VT
3	34700	UA	CITYNET-AS Maxnet Autonomous System
2	8359	UA	MTS MTS OJSC
2	41165	UA	Ukrainian Newest Telecommunications Ltd.
2	39608	UA	LANETUA-AS Lanet Network Ltd.
1	29632	UA	NASSIST-AS The NetAssist autonomous system

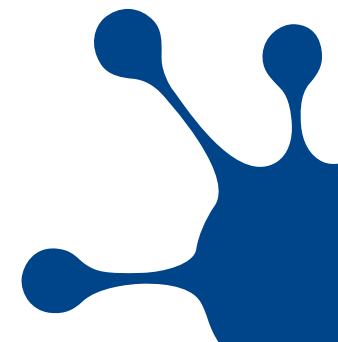
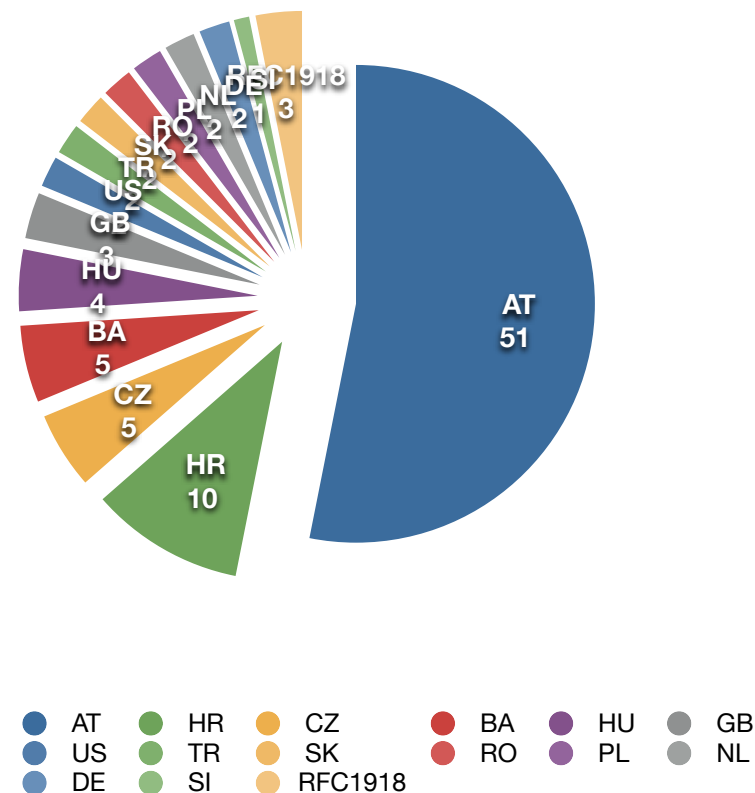
Chart 1



Vienna (VIX), AT

10	6830	NL	LGI-UPC Liberty Global Operations B.V.
7	5391	HR	T-HT Hrvatski Telekom d.d.
5	8412	AT	TMA T-Mobile Austria GmbH
4	8447	AT	TELEKOM-AT A1 Telekom Austria AG
4	42473	AT	ANEXIA-AS ANEXIA Internetdienstleistungs GmbH
4	1853	AT	ACONET ACONet Backbone
3	NA		RFC1918
3	8928	GB	INTERROUTE Interoute Communications Limited
3	16305	AT	mobilkom austria AG
2	9146	BA	BIHNET BH Telecom d.d. Sarajevo
2	8685	TR	DORUKNET Doruk Iletisim ve Otomasyon Sanayi ve Ticaret A.S.
2	8437	AT	UTA-AS Tele2 Telecommunication GmbH
2	2819	CZ	GTSCZ GTS Czech s.r.o.
2	25144	BA	TELEKOM-SRPSKE-AS Telekom Srpske
2	15133	US	EDGECAST
1	8339	AT	KABSI-AS Kabelsignal AG
1	760	AT	University of Vienna, Austria
1	6714	PL	ATOMNET GTS Poland Sp. z o.o.
1	29198	AT	SCHENKER-AS Schenker und Co. AG

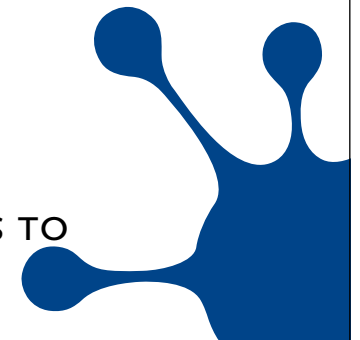
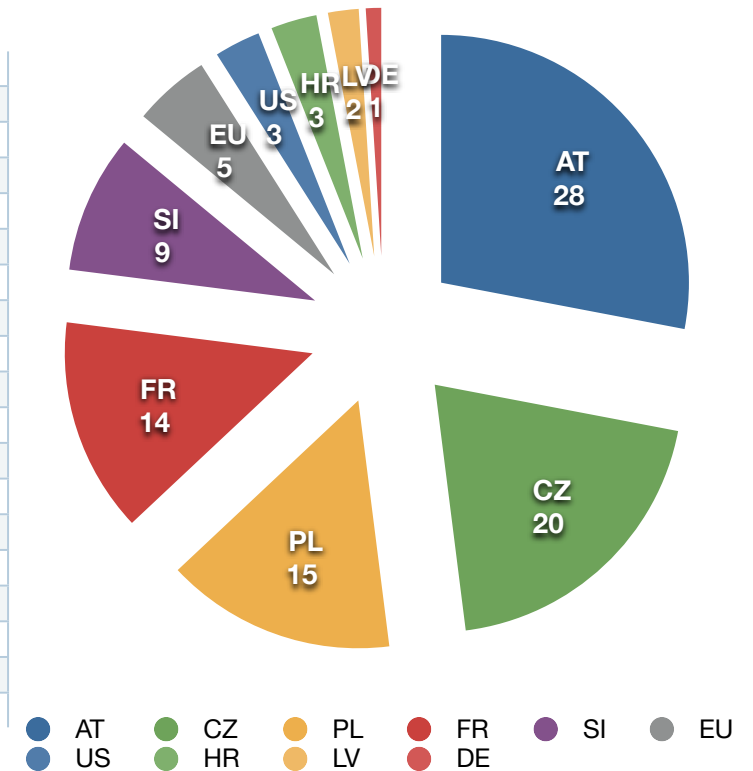
Chart 1



Vienna (VIX), AT - IPv6

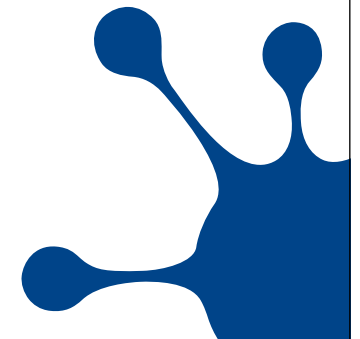
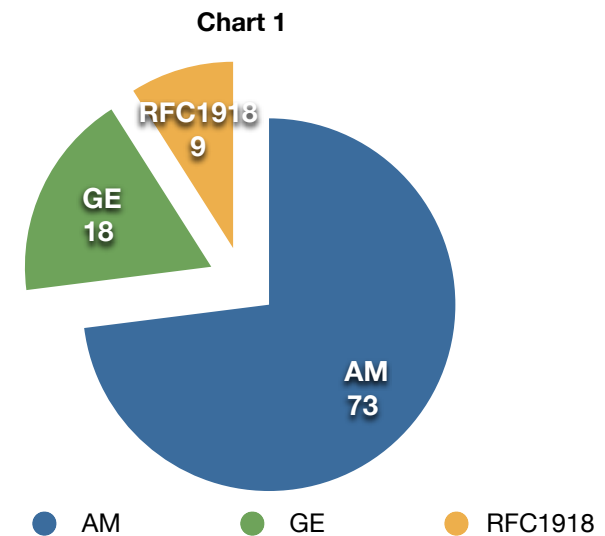
14	8437	AT	UTA-AS Tele2 Telecommunication GmbH
14	16276	FR	OVH OVH Systems
9	9119	SI	SOFTNET-AS Softnet d.o.o.
6	1853	AT	ACONET AConet Backbone
5	702	EU	AS702 Verizon Business EMEA - Commercial IP service provider in Europe
3	34594	HR	OT - Optima Telekom d.d.
3	39912	AT	I3B-AS i3B - Internetbreitband GmbH
2	8246	PL	GTS-POLSKA-AS GTS Poland Sp. z o.o.
2	31080	PL	O2-AS o2 Sp. Z.o.o.
2	2852	CZ	CESNET2 CESNET
2	12578	LV	APOLLO-AS LATTELEKOM-APOLLO
2	1103	US	SURFNET-NL SURFnet, The Netherlands
1	31543	AT	MYNET-AS myNET Internet Solutions
1	29113	CZ	SLOANE-AS UPC Ceska Republica, s.r.o.
1	28725	CZ	CZ-EUROTTEL-AS AS of Eurotel Praha
1	24971	CZ	MASTER-AS Master Internet s.r.o / Czech Republic / www.master.cz
1	20960	PL	TKTELEKOM-AS TK Telekom sp. z o.o.
1	16019	CZ	VODAFONE-CZ-AS Vodafone Czech Republic a.s.
1	12605	AT	LIWEST-AT LIWEST Kabelmedien GmbH

Chart 1



Yerevan, AM

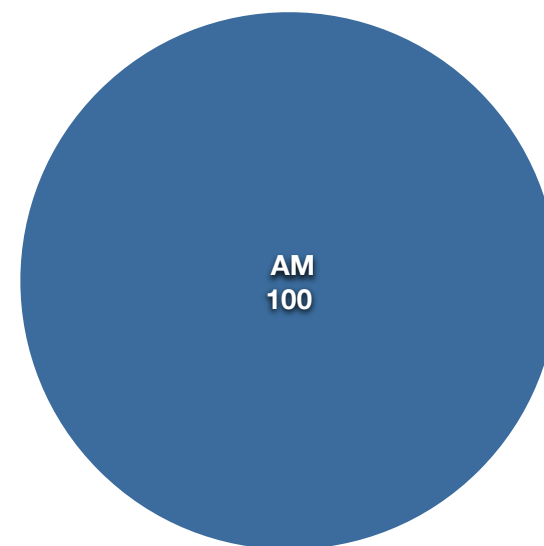
17	44395	AM	ORG-UL31-RIPE UCOM LLC
11	49363	AM	OAR-DC _Orange Armenia_ CJSC
9	NA		RFC1918
7	43733	AM	K-TELECOM K-Telecom CJSC
6	49800	AM	GNC-ALFA GNC-ALFA CJSC
5	42109	AM	ADC-AS ADC - Armenian Datacom Company
4	8932	AM	ICONCOM iCON Communications CJSC
3	47623	AM	IIAP-ASNET-AS Institute for Informatics and Automation Problems of National Academy of Sciences of the Republic of Armenia
3	39863	AM	CROSSNET Crossnet LLC
3	24997	GE	GE-CDN-AS AS for CDN
3	20771	GE	CAUCASUS-CABLE-SYSTEM CCS Autonomous System
3	16010	GE	RUSTAVI2ONLINEAS Caucasus Online LLC
2	8226	AM	AM-NIC-AS Armenia Network Information Center (AMNIC)
2	57473	GE	EMIS-AS Educational and Scientific Infrastructure Development Agency
2	51835	AM	MYLAN MyLAN LLC
2	42991	AM	BIONET-AS BioNET LLC
2	198561	GE	FAS Legal Entity of Public Law Financial Analytical Service
1	41965	AM	FIBERNET FiberNet Communication LLC
1	20545	GE	GRENA-AS GRENA Autonomous System
1	16190	AM	AS16190 AS for AM.WEB LIR,



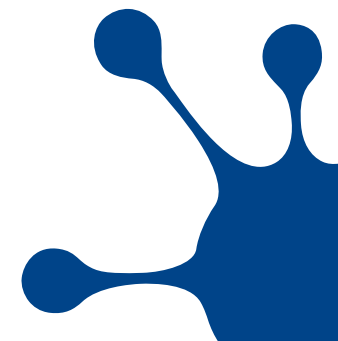
Yerevan, AM - IPv6

80	49363	AM	OAR-DC _Orange Armenia_ CJSC
10	8226	AM	AM-NIC-AS Armenia Network Information Center (AMNIC)
9	41965	AM	FIBERNET FiberNet Communication LLC

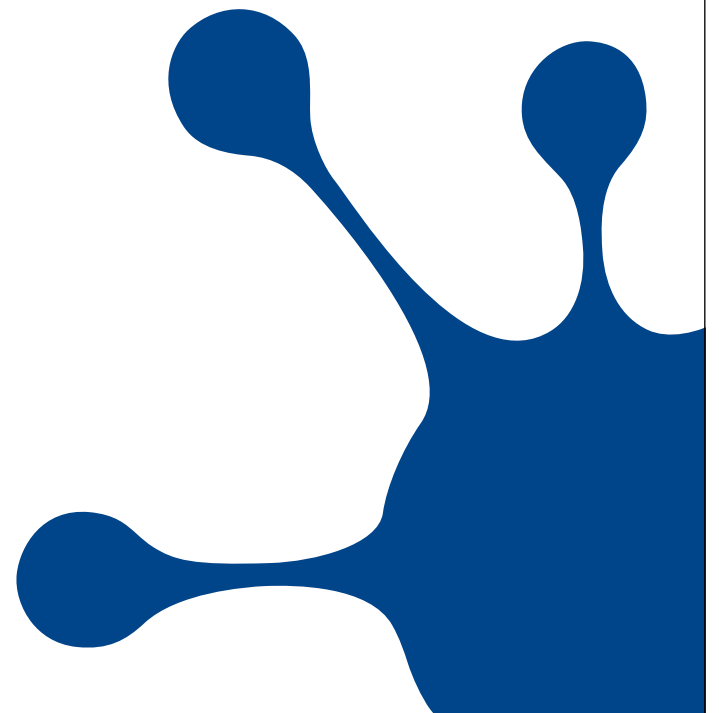
Chart 2



● AM



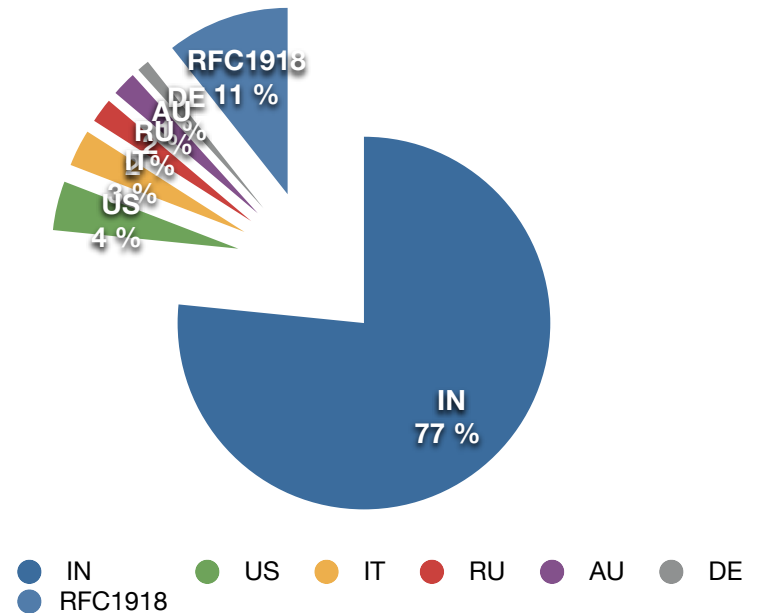
MIDDLE EAST



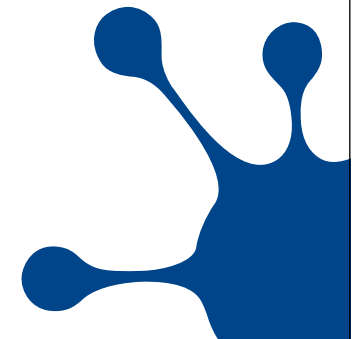
Manama, BH

60	131222	IN	MTS-INDIA-IN 334,Udyog Vihar
9	NA		RFC1918
4	9829	IN	BSNL-NIB National Internet Backbone
4	4755	IN	TATACOMM-AS TATA Communications formerly VSNL is Leading ISP
3	21788	US	NOC - Network Operations Center Inc.
2	12874	IT	FASTWEB Fastweb SpA

Chart 2



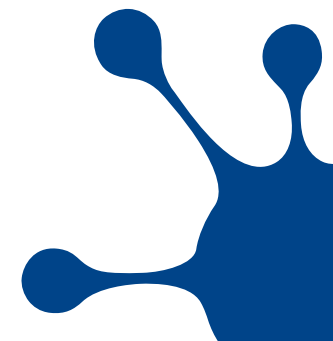
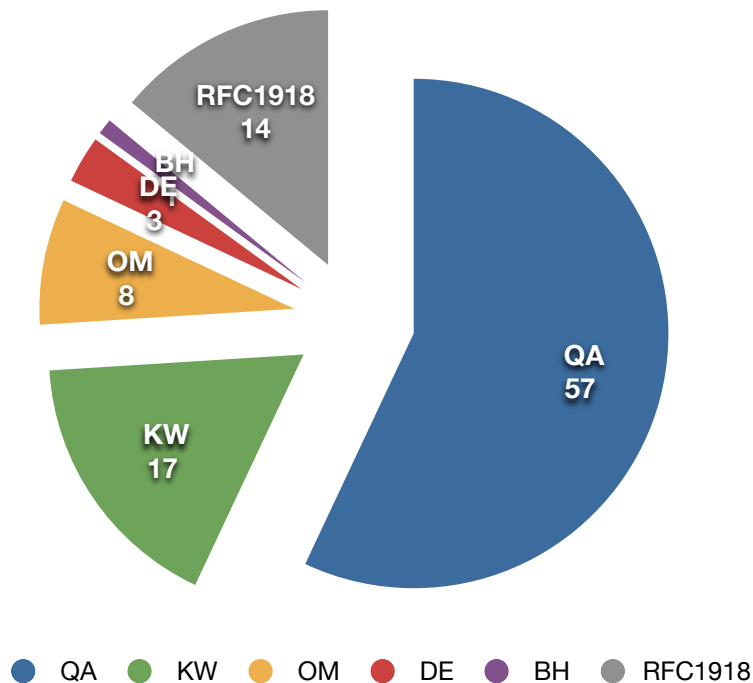
LAST TIME WAS ONLY BH TRAFFIC
NOW GOT TRANSIT



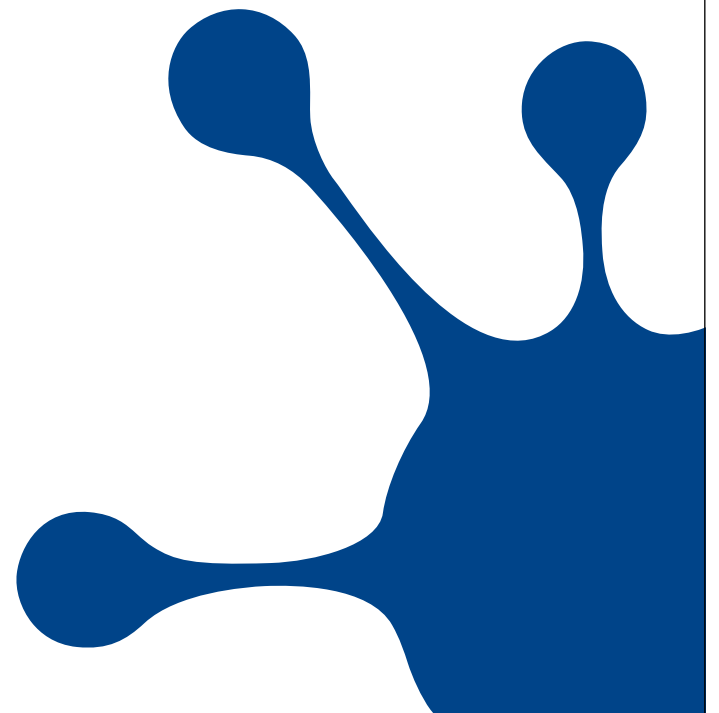
Qatar, QA

53	8781	QA	QA-ISP Qatar Telecom (Qtel) Q.S.C.
17	NA		RFC1918
8	28885	OM	OMANTEL-NAP-AS OmanTel NAP
6	6412	KW	KW KEMS
4	42298	QA	GCC-MPLS-PEERING Qatar Telecom
4	21050	KW	FAST-TELCO Fast Telecommunications Company W.L.L.
2	9155	KW	QNET QualityNet General Trading & Contracting Co.
2	3225	KW	GULFNET-KUWAIT Gulfnet Kuwait
1	5416	BH	Batelco

Chart 1

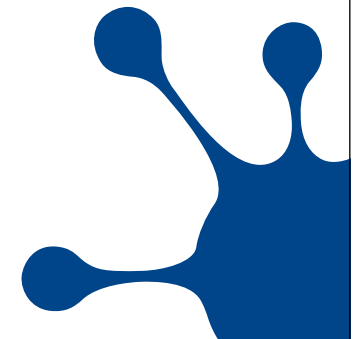
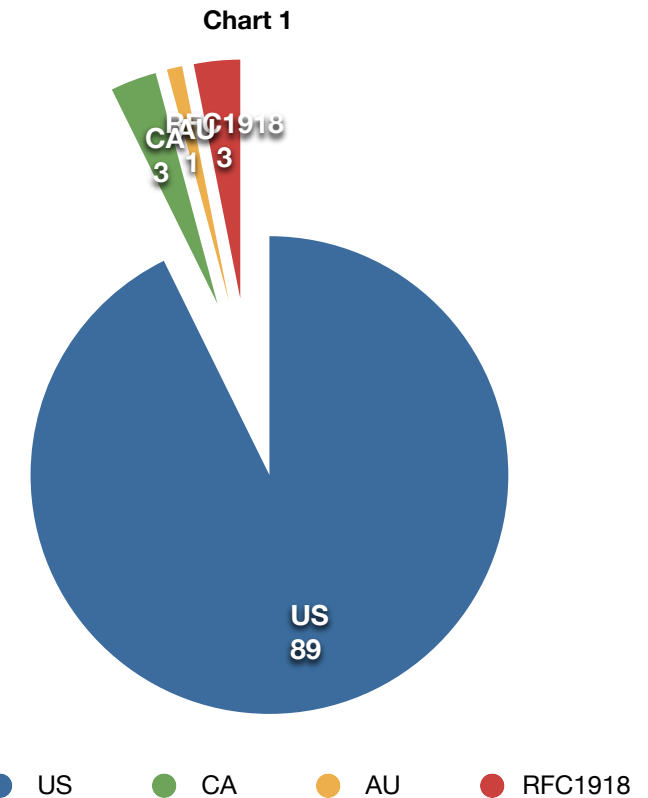


NORTH AMERICA



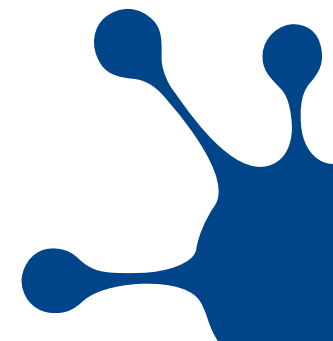
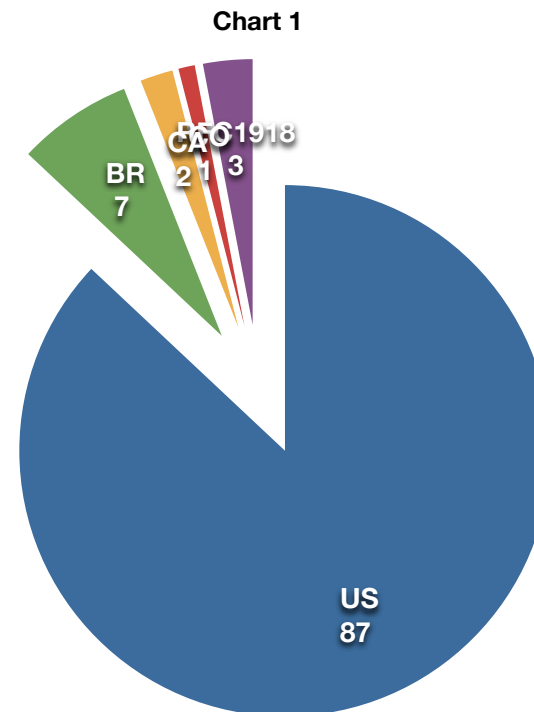
Chicago (Startup), US

5	237	US	MERIT-AS-14 - Merit Network Inc.
4	73	US	WASHINGTON-AS - University of Washington
4	14221	US	WASHINGTON-RD-AS - University of Washington
3	NA		RFC1918
3	87	US	INDIANA-AS - Indiana University
3	2381	US	WISNET1-AS - WiscNet
3	17	US	
2	81	US	NCREN - MCNC
2	7968	US	LOYOLA-UNIV-CHICAGO - Loyola University Chicago
2	59	US	WISC-MADISON-AS - University of Wisconsin Madison
2	38	US	UIUC - University of Illinois
1	6122	US	ICN-AS - Iowa Communications Network
1	3479	US	PEACHNET-AS1 - Kennesaw State University
1	3464	US	ASC-NET - Alabama Supercomputer Network
1	22742	US	CT-ED-NET - State of Connecticut
1	217	US	UMN-AGS-NET-AS - University of Minnesota
1	2152	US	CSUNET-NW - California State University Network
1	1767	US	ILIGHT-NET - Indiana Higher Education Telecommunication System
1	10430	US	WA-K20 - Washington State K-20 Telecommunications Network



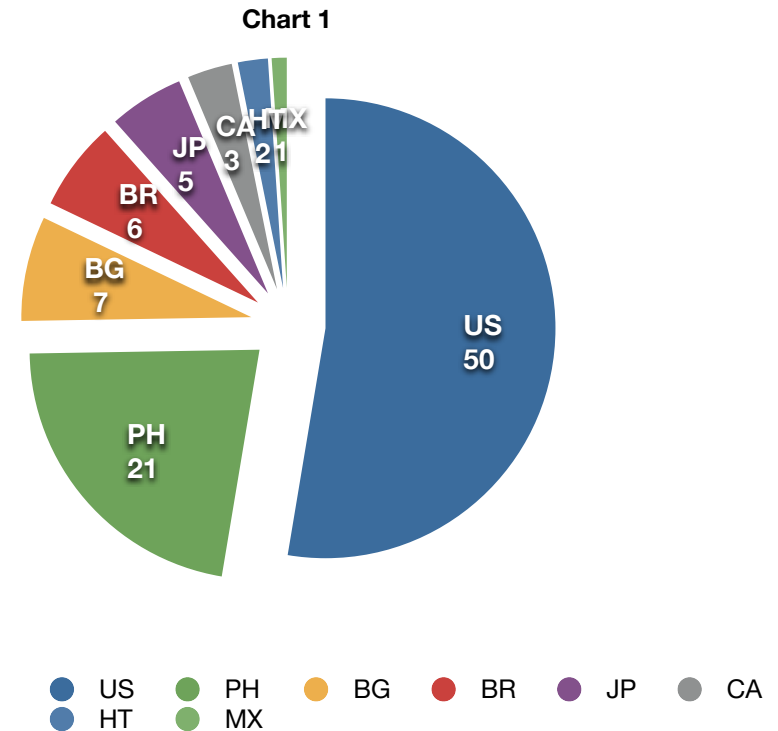
Miami (NOTA), US

57	15169	US	GOOGLE - Google Inc.
14	8075	US	MICROSOFT-CORP---MSN-AS-BLOCK - Microsoft Corp
3	NA		RFC1918
3	21844	US	THEPLANET-AS - ThePlanet.com Internet Services, Inc.
2	7738	BR	Telecomunicacoes da Bahia S.A.
2	36351	US	SOFTLAYER - SoftLayer Technologies Inc.
2	32934	US	FACEBOOK - Facebook, Inc.
1	13489	CO	EPM Telecomunicaciones S.A. E.S.P.
1	10670	BR	PRODEMGE Cia. Processamento Dados MG



Palo Alto, US

16	9299	PH	IPG-AS-AP Philippine Long Distance Telephone Company
6	13236	BG	DATAKOM-BG-AS
6	10912	US	INTERNAP-BLK - Internap Network Services Corporation
6	10139	PH	SMARTBRO-PH-AP Smart Broadband, Inc.
5	36692	US	OPENDNS - OpenDNS, LLC
5	16880	JP	TRENDMICRO Global IDC and Backbone of Trend Micro Inc.
4	30607	US	302-DIRECT-MEDIA-ASN - 302 Direct Media LLC
3	7132	US	SBIS-AS AS for SBIS-AS
3	2914	US	NTT-COMMUNICATIONS-2914 - NTT America, Inc.
2	577	CA	BACOM - Bell Canada
2	27653	HT	Alpha Communications Network
2	15224	US	OMNITURE =====
1	7018	US	ATT-INTERNET4 - AT&T Services, Inc.
1	4323	US	TWTC - tw telecom holdings, inc.
1	4230	BR	Embratel
1	28573	BR	NET Servicos de Comunicacao S.A.
1	17204	US	Nominum Global NameServer network
1	16474	US	RESPONSYS-1 - Responsys Inc.
1	12182	US	INTERNAP-2BLK - Internap Network Services Corporation



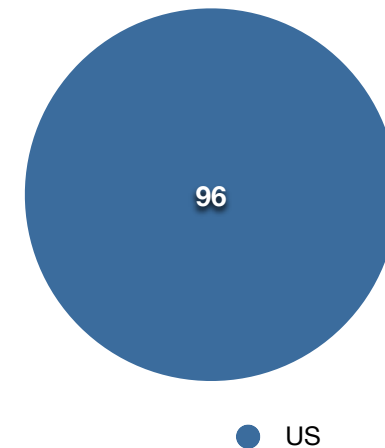
WHY ARE NETWORKS IN BULGARIA AND THE PHILIPPINES SENDING TRAFFIC TO PAOLO ALTO? CUSTOMERS?



Palo Alto, US - IPv6

49	7018	US	ATT-INTERNET4
20	15133	US	EDGECAST - EdgeCast Networks, Inc.
9	20057	US	AT&T Wireless Service
7	22394	US	CELLCO - Cellco Partnership DBA Verizon Wireless
2	4323	US	TWTC - tw telecom holdings, inc.
2	2914	US	NTT-COMMUNICATIONS-2914 - NTT America, Inc.
2	12008	US	ULTRADNS - NeuStar, Inc.
1	5650	US	FRONTIER-FRTR - Frontier Communications of America, Inc.

Chart 2



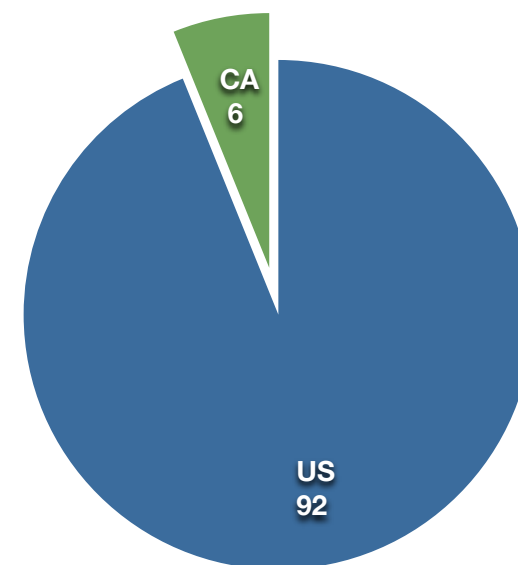
WHY IS A NETWORK IN BULGARIA
SENDING THEIR TRAFFIC TO PALO
ALTO? MOST LIKELY
A CUSTOMER...



Washington D.C, US

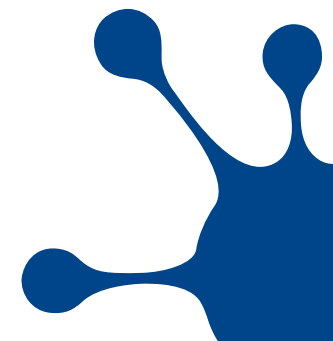
13	20115	US	CHARTER-NET-HKY-NC - Charter Communications
12	209	US	ASN-QWEST-US NOVARTIS-DMZ-US
4	852	CA	ASN852 - Telus Advanced Communications
3	7155	US	WB-DEN2 - Viasat Communications Inc.
3	6621	US	HNS-DIRECPC - Hughes Network Systems
3	4436	US	AS-NLAYER - nLayer Communications, Inc.
2	4323	US	TWTC - tw telecom holdings, inc.
2	3561	US	SAVVIS-AS SAVVIS-AS3561
2	33588	US	BRESNAN-AS - Bresnan Communications, LLC.
2	27357	US	RACKSPACE - Rackspace Hosting
2	2532	US	LOC - Library of Congress
1	7381	US	SASUSA SunGard Availability Services USA
1	721	US	DNIC-ASBLK-00721-00726 - DoD Network Information Center
1	7132	US	SBIS-AS AS for SBIS-AS
1	7018	US	ATT-INTERNET4 - AT&T Services, Inc.
1	36271	US	SYNACOR-CLUSTER - Synacor, Inc.
1	22561	US	DIGITAL-TELEPORT - Digital Teleport Inc.

Chart 1

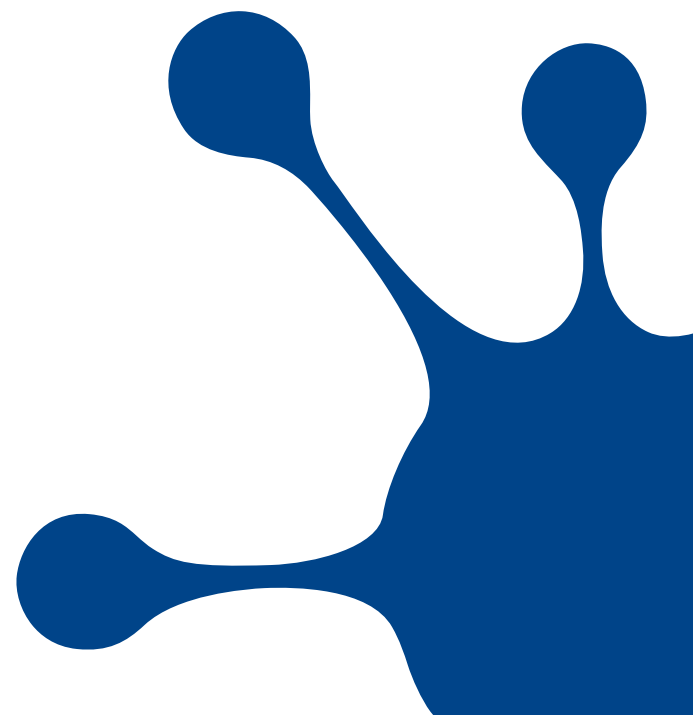


● US

● CA

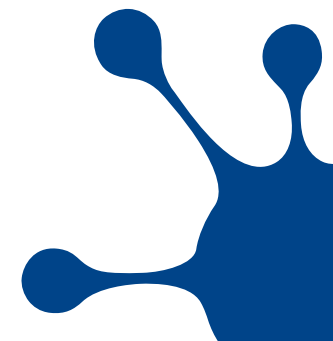
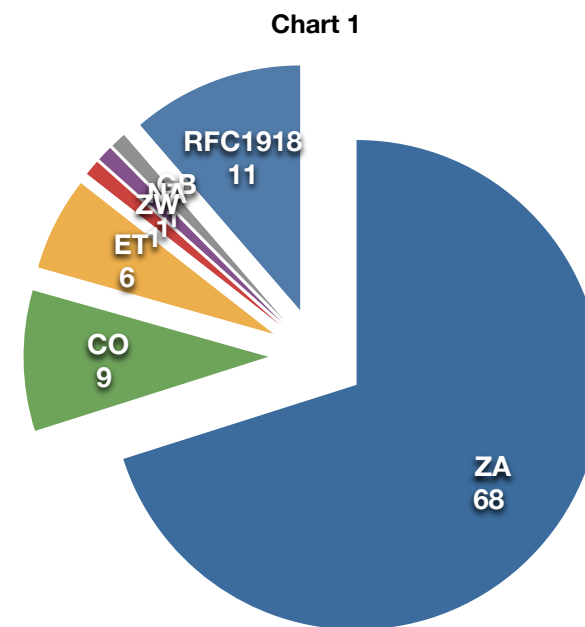


AFRICA



Johannesburg (JINX), ZA

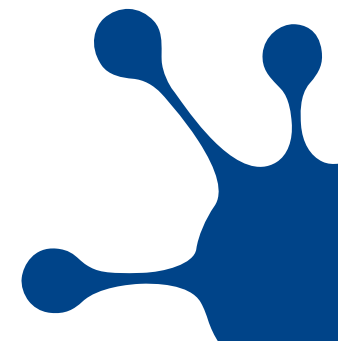
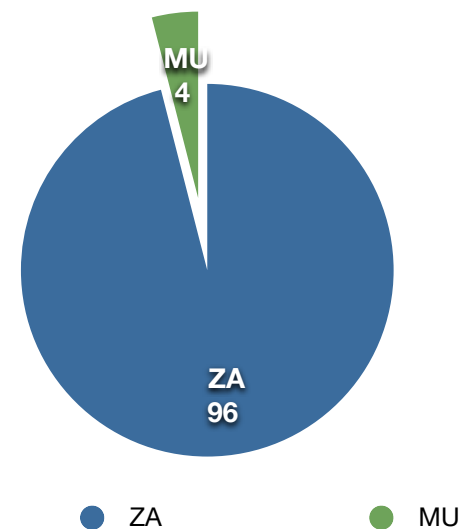
28	3741	ZA	IS
22	10474	ZA	MWEB-10474
19	NA	RFC1918	
6	24757	ET	EthioNet-AS
4	2018	ZA	TENET-1
2	37130	ZA	SITA-AS
2	37079	ZA	SMMT
2	12258	ZA	MWEB-12258
1	33762	ZA	WBSMOBILE
1	30844	GB	LIQUID-AS Liquid Telecommunications Backbone



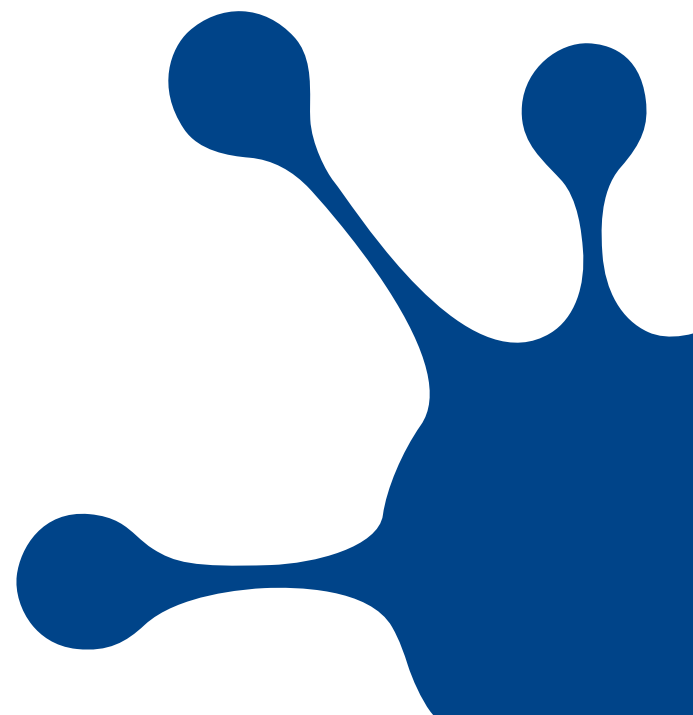
Johannesburg (JINX), ZA - IPv6

73	36943	ZA	webafrica
9	37105	ZA	NEOLOGY-AS
8	6968	ZA	UNIFORUM-SA
6	3741	ZA	IS
4	33764	MU	AFRINIC-ZA-AS

Chart 1



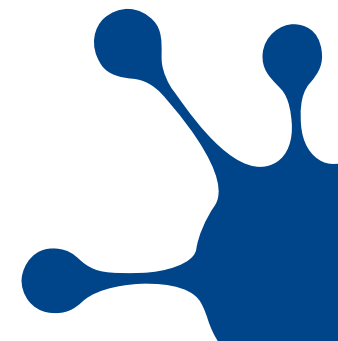
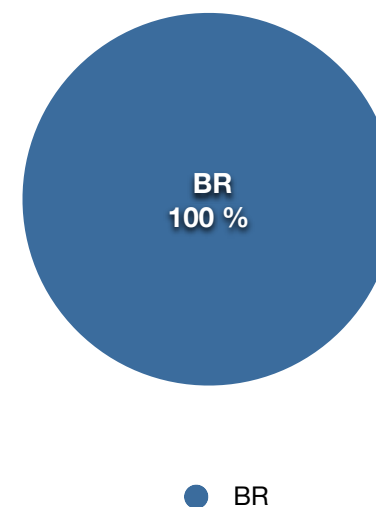
SOUTH AMERICA



Porto Alegre (PTTMetro), BR

33	18881	BR	Global Village Telecom
9	1916	BR	Rede Nacional de E1
4	28271	BR	DataCorpore Serviços e Representações
3	28573	BR	NET Servicos de Comunicacao S.A.
2	7465	BR	PROCERGS - Cia. de Processamento de Dados do RGS
2	28571	BR	Universidade de Sao Paulo - USP
2	28343	BR	
2	28299	BR	NO_NAME
2	2715	BR	Fundacao de Amparo a Pesquisa/RJ
2	14840	BR	CommCorp Comunicaes Corporativas Ltda.
1	19200	BR	Universidade Federal do Rio Grande do Sul
1	2716	BR	Universidade Federal do Rio Grande do Sul / Rede Tche

Chart 1



Summary

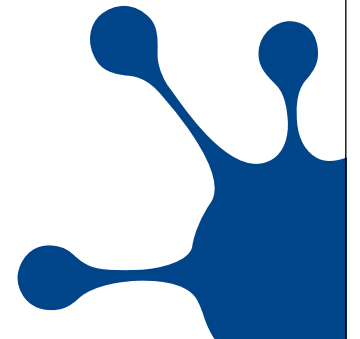
TRAFFIC MOSTLY SEEMS OPTIMIZED AND KEPT LOCAL

A FEW CASES ARE QUITE HARD TO EXPLAIN - AT LEAST WITHOUT MORE INFO

SOME (MOSTLY LARGE) OPERATORS SEEMS TO SUFFER FROM THEIR OWN PEERING POLICIES

- More local peering would improve performance

GOOGLE IS THE SINGLE LARGEST SRC OF QUERIES!

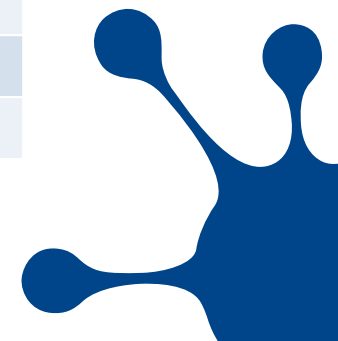


Conclusions

A LOT OF RFC1918 SOURCES AT SOME LOCATIONS - SHOULD NOT BE THERE AT ALL

HAVE INCREASED SINCE I LAST CHECKED

# of occurrences	IP
4385	10.120.1.3
4079	172.31.11.1
2433	10.8.13.38
1873	1873 10.0.1.41
1829	1829 10.2.4.70
1373	1373 10.0.2.21
1322	1322 172.26.200.20
1227	1227 172.26.200.19
1131	1131 10.185.101.101
1027	1027 10.1.0.3



Conclusions

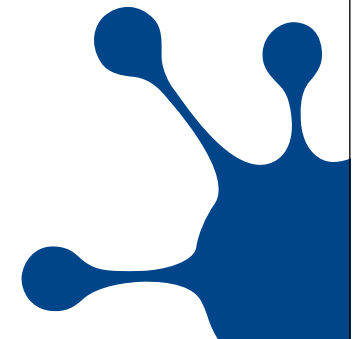
MOST NODES BEHAVES AS EXPECTED

SOME IXPs SEE TRAFFIC FROM FAR AWAY WHERE THERE ARE CLOSER INSTANCES OF I.ROOT - VERY ODD ROUTING

NODES WITH A LOT OF TRANSIT GET TRAFFIC FROM DIVERSE LOCATIONS, AND GLOBAL EYEBALL PROVIDERS

LARGE IXPs HAVE A DIVERSITY OF ECONOMIES REPRESENTED - AS EXPECTED

SMALLER IXPs/NATIONAL IXPs HAVE HIGH % OF NATIONAL TRAFFIC - AS EXPECTED



IPv6

HAS IMPROVED A LOT!

STILL VERY.....DIFFERENT

PEOPLE SEEM TO HAVE DIFFERENT IPv4 AND IPv6 POLICIES

PARTLY MIGHT BE DUE TO US NOT HAVING IPv6 GLOBALLY

PARTLY BECAUSE THE PEERING LANDSCAPE IS VERY DIFFERENT

PARTLY BECAUSE JUST BECAUSE WE PEER DOESN'T MEAN THAT WE ARE SENT TRAFFIC....

