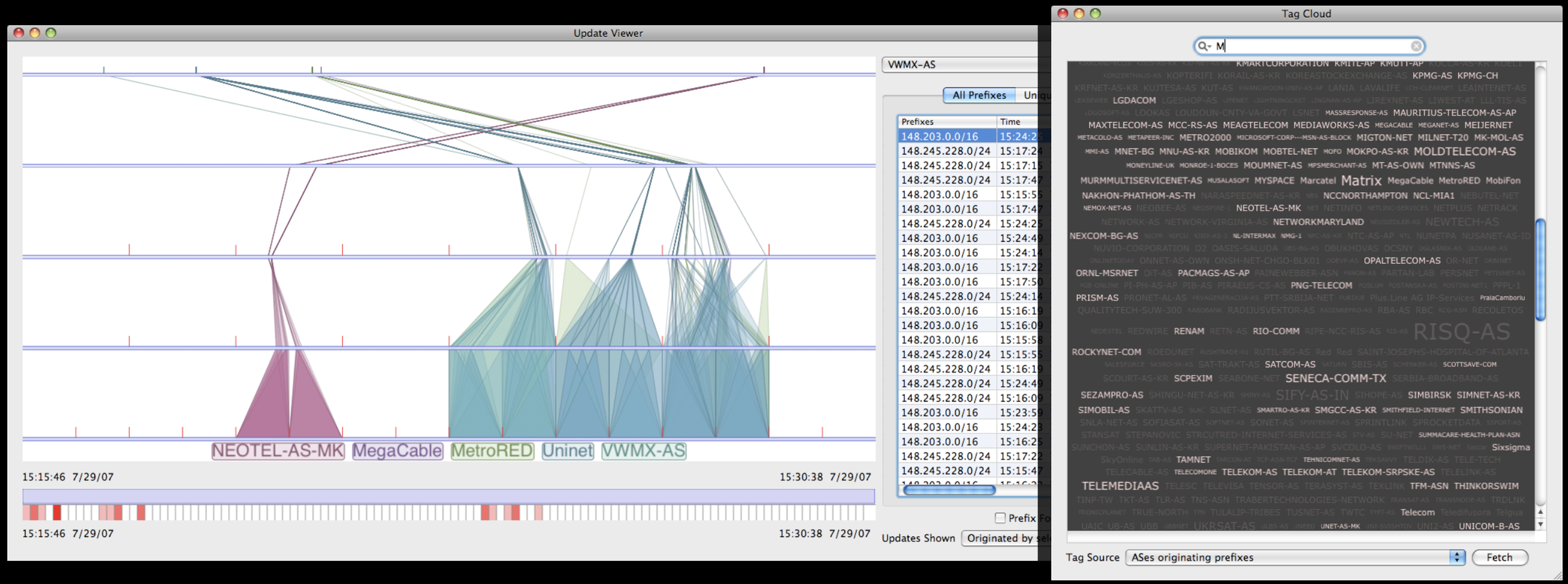
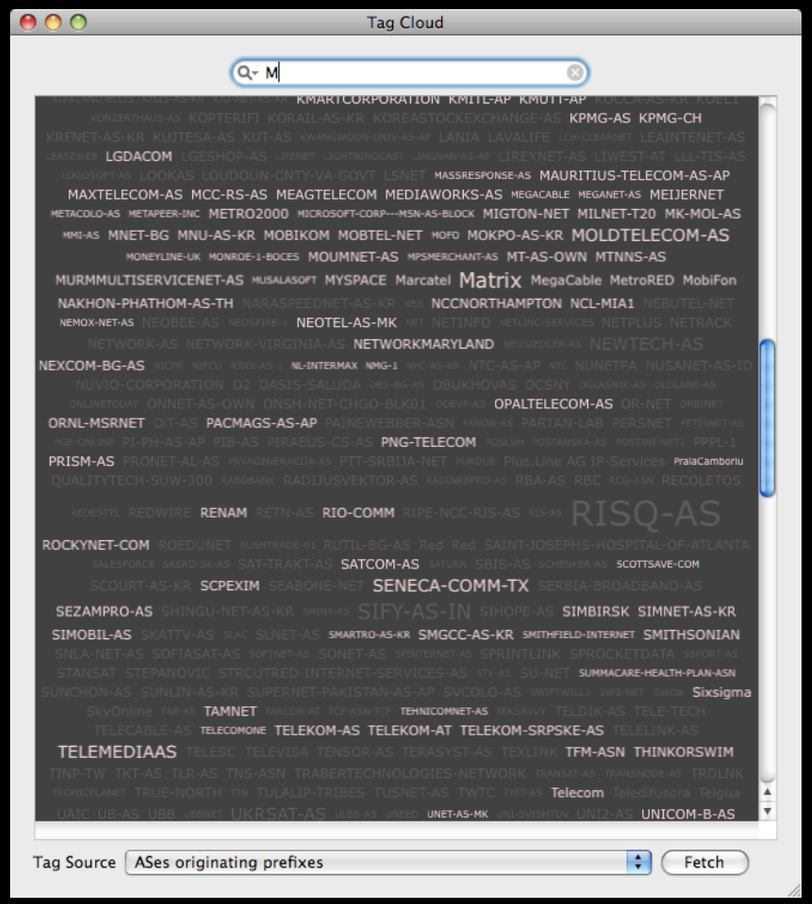
BGPeep

An IP-space Centered View for Internet Routing Data



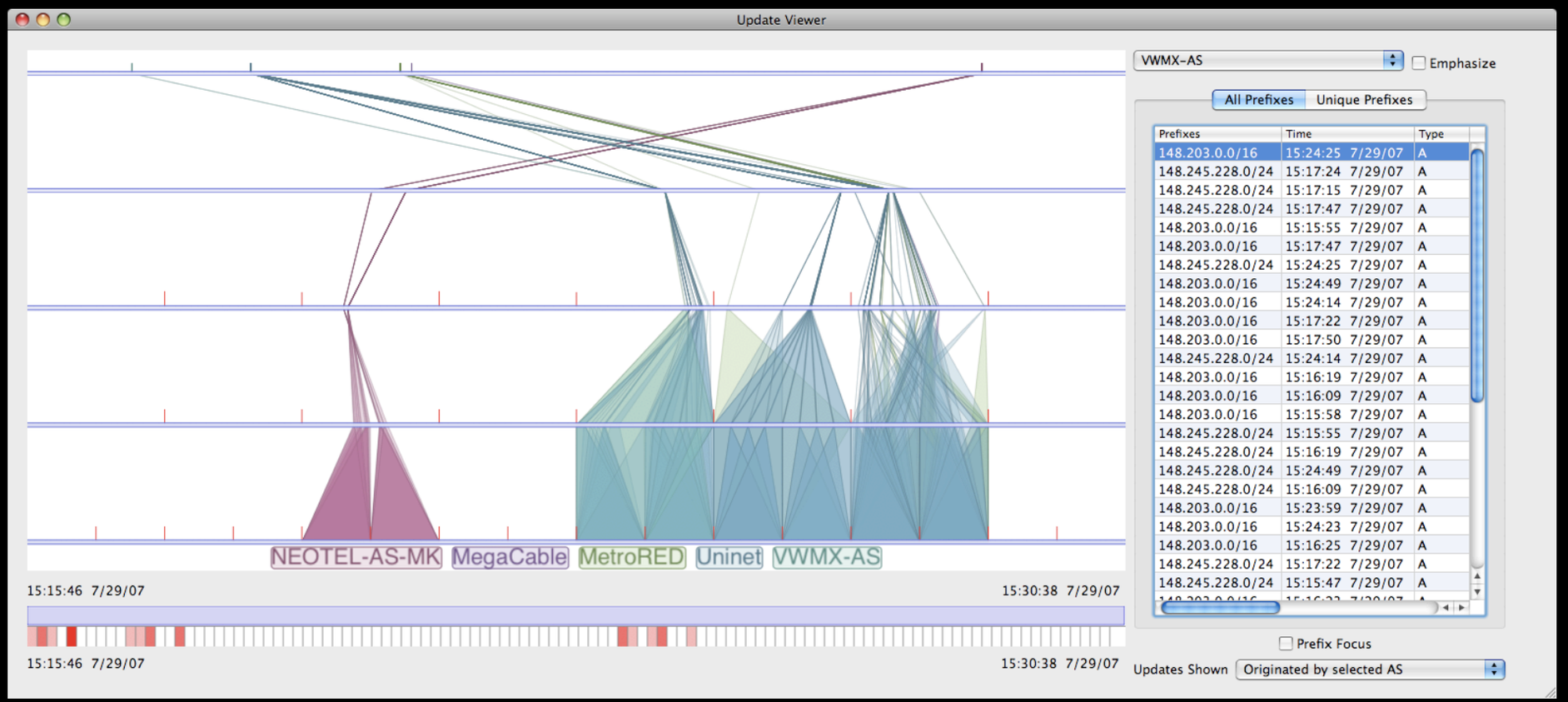
James Shearer and Kwan-Liu Ma
University of California, Davis
VIDi Lab

Toby Kohlenberg
Intel Corporation



Tag Cloud

Identify and select data



Viewer

Visualize and explore the selection

Tag Cloud

- Select a subset of the data (pluggable)
- View the results
- Filter the results (pluggable)
- Select specific ASes for further analysis

Tag Cloud

a

b

17054 7324 8474 ABSOLUTOK ACME ACS AES ALPHARED-HOUSTON ANPM AOL-MTC2 ARNES-NET ARTCOMMUNICATION-AS AS-BG-BAS AS-PAETEC-NET ASDASD-AS ASN-ISKON ASN-NESMA ASN-YARTELECOM ASP-AS ATT-INTERNET4 AVENTCOMMTECH AXAUTSYS BARRA-NET-AS BEG-FINSOFT-AS BETANDWIN-AS BFG BG-SCHOOL-AS BIG-VALLEY BRASS BTC-AS BWIZ Banco CARNET-AS CARONET-ASN CARTELSISTEM-AS CITIGROUP-BANAMEX CITRA-AS-ID COMISION COMNET-AS CONCOM-AS CONOVA-AS COSMOFON-AS CSLOXINFO-ISP-AS-AP CTE CTIHK-AS-AP CTS-MD CUDI CYPRESSCOMM Cable Cablenet Colegio Consorcio DDN-ASNBLK DDN-ASNBLK DDN-ASNBLK DDN-ASNBLK DELTA-M DESMIE-AS DISA-ASNBLK DXTNET EFG-EUROBANK EFT EGYNET-AS EMUSIC ENERGIS-IP ERMS-EARTHLNK ERX-ERNET-AS ERX-TANET-ASN1 ETELAT EUNETAT-AS EZYNET EI FIBERPLUS FIRSTDATARS-AS Fundacao GLOBAL-GECIS GOTHAER-AS Grupo Grupo Grupo HARBOURMSP-AU-AP HS-HKB HUTCB IACP IHLASNET IMERYS-UK-PARMOOR-ASNUMBER INDENET INEX INFOSKY-AS INFOTEC-CONACYT INFOTECH-AT-AS INS-AS INS-NET-2 INTERNET4YOU ISDI ITESM ITESM ITESM ITRINET-AS-TW ITSDN-U5 IVTELECOM-AS Instituto KMARTCORPORATION KMITL-AP KMUTT-AP KOEL1 KPMG-AS LANIA LEAINTENET-AS LEASEWEB LIGHTNINGCAST MAURITIUS-TELECOM-AS-AP MAXTELECOM-AS MCC-RS-AS MEDIAWORKS-AS METAPEER-INC MOLDTELECOM-AS MTNNS-AS MURMMULTISERVICENET-AS NAKHON-PHATHOM-AS-TH NCL-MIA1 NEBUTEL-NET NET NETINFO NETPLUS NETWORKMARYLAND NEXCOM-BG-AS NUSANET-AS-ID O2 OBUKHOVAS OPALTELECOM-AS PI-PH-AS-AP PIRAEUS-CS-AS RADIJUSVEKTOR-AS RBA-AS RENAM RETN-AS ROEDUNET RUTIL-BG-AS Red Red SAT-TRAKT-AS SCPEXIM SENECA-COMM-TX SIFY-AS-IN SIHOPE-AS SIMBIRSK SOFIASAT-AS SPRINTLINK STANSAT STEPANOVIC SU-NET TELDIK-AS TELEKOM-AS TELEKOM-SRPSKE-AS TELEMEDIAAS TELESC TELEVISA TENSOR-AS TERASYST-AS TKT-AS TLR-AS TRDLNK TRUE-NORTH TWTC Teledifusora Telgua UAIC UBB UNICOM-B-AS UNITBV UNSPECIFIED UTCBNET UTCC-TH Uninet Universidad Universidad Universidade VBNS VBRN-AS-AP VIEL-AS VIPNET-AS VWMX-AS WESTEL-1 XO-15

Tag Source: ASes originating prefixes

c

Fetch

Tag Cloud

17054 7324 8474 ABSOLUTOK ACME ACS AES ALPHARED-HOUSTON ANPM AOL-MTC2 ARNES-NET
ARTCOMMUNICATION-AS AS-BG-BAS AS-PAETEC-NET ASDASD-AS ASN-ISKON ASN-NESMA
ASN-YARTELECOM ASP-AS ATT-INTERNET4 AVENTCOMMTECH
AXAUTSYS BARRA-NET-AS BEG-FINSOFT-AS BETANDWIN-AS BFG BG-SCHOOL-AS BIG-VALLEY BRASS BTC-AS
BWIZ Banco CARNET-AS CARONET-ASN CARTELSISTEM-AS CITIGROUP-BANAMEX CITRA-AS-ID COMISION
COMNET-AS CONCOM-AS CONOVA-AS COSMOFON-AS CSLOXINFO-ISP-AS-AP CTE CTIHK-AS-AP CTS-MD CUDI
CYPRESSCOMM Cable Cablenet Colegio Consorcio DDN-ASNBLK DDN-ASNBLK
DDN-ASNBLK DELTA-M DESMIE-AS DISA-ASNBLK DXTNET EFG-EUROBANK EFT EGYNET-AS EMUSIC
ENERGIS-IP ERMS-EARTHLNK ERX-ERNET-AS ERX-TANET-ASN1 ETELAT EUNETAT-AS EZYNET EI FIBERPLUS
FIRSTDATARS-AS Fundacao GLOBAL-GECIS GOTHAER-AS Grupo Grupo Grupo
HARBOURMSP-AU-AP HS-HKB HUTCB IACP IHLASNET
IMERYS-UK-PARMOOR-ASNUMBER INDENET INEX INFOSKY-AS INFOTEC-CONACYT INFOTECH-AT-AS INS-AS
INS-NET-2 INTERNET4YOU ISDI ITESM ITESM ITESM ITRINET-AS-TW ITSDN-U5 IVTELECOM-AS Instituto
KMARTCORPORATION KMITL-AP KMUTT-AP KOEL1 KPMG-AS LANIA LEAINTENET-AS LEASEWEB LIGHTNINGCAST
MAURITIUS-TELECOM-AS-AP MAXTELECOM-AS MCC-RS-AS MEDIAWORKS-AS METAPEER-INC MOLDTELECOM-AS
MTNNS-AS MURMMULTISERVICENET-AS NAKHON-PHATHOM-AS-TH NCL-MIA1 NEBUTEL-NET NET NETINFO NETPLUS
NETWORKMARYLAND NEXCOM-BG-AS NUSANET-AS-ID O2 OBUKHOVAS OPALTELECOM-AS PI-PH-AS-AP PIRAEUS-CS-AS
RADIJUSVEKTOR-AS RBA-AS RENAM RETN-AS ROEDUNET RUTIL-BG-AS Red Red SAT-TRAKT-AS SCPEXIM
SENECA-COMM-TX SIMBIRSK SOFIASAT-AS SPRINTLINK
STANSAT STEPANOVIC SU-NET TELDI TELEMEDIAAS TELESC
TELEVISA TENSOR-AS TERASYST-A TWTC Teledifusora Telgua UAIC UBB
UNICOM-B-AS UNITBV UNSPECIFIED UT Universidad Universidad Universidade VBNS
VBRN-AS-A XO-15

EMUSIC (14906)
eMusic.com Inc.
Spoken updates: 0
In paths: 649
"Origin" updates: 649

Tag Source: ASes originating prefixes

Fetch

Tag Cloud

net

AS name contains
AS name starts with
AS number equals
✓ AS description contains
Prefix begins with

17054 7324 8474 ALPHARED-HOUSTON ANPM AOL-MTC2 ARNES-NET
ARTCOMMUNICATIO SDASD-AS ASN-ISKON ASN-NESMA
ASN-YART ATT-INTERNET4 AVENTCOMMTECH
AXAUTSYS BARRA-NET-AS BEG-FINSOFT-AS BETANDWIN-AS BFG BG-SCHOOL-AS BIG-VALLEY BRASS BTC-AS
BWIZ Banco CARNET-AS CARONET-ASN CARTELSISTEM-AS CITIGROUP-BANAMEX CITRA-AS-ID COMISION
COMNET-AS CONCOM-AS CONOVA-AS COSMOFON-AS CSLOXINFO-ISP-AS-AP CTE CTIHK-AS-AP CTS-MD CUDI
CYPRESSCOMM Cable Cablenet Colegio Consorcio DDN-ASNBLK DDN-ASNBLK
DDN-ASNBLK DELTA-M DESMIE-AS DISA-ASNBLK DXTNET EFG-EUROBANK EFT EGYNET-AS EMUSIC
ENERGIS-IP ERMS-EARTHLNK ERX-ERNET-AS ERX-TANET-ASN1 ETELAT EUNETAT-AS EZYNET EI FIBERPLUS
FIRSTDATARS-AS Fundacao GLOBAL-GECIS GOTHAER-AS Grupo Grupo Grupo
HARBOURMSP-AU-AP HS-HKB HUTCB IACP IHLASNET
IMERYS-UK-PARMOOR-ASNUMBER INDENET INEX INFOSKY-AS INFOTEC-CONACYT INFOTECH-AT-AS INS-AS
INS-NET-2 INTERNET4YOU ISDI ITESM ITESM ITESM ITRINET-AS-TW ITSDN-U5 IVTELECOM-AS Instituto
KMARTCORPORATION KMITL-AP KMUTT-AP KOEL1 KPMG-AS LANIA LEAINTENET-AS LEASEWEB LIGHTNINGCAST
MAURITIUS-TELECOM-AS-AP MAXTELECOM-AS MCC-RS-AS MEDIAWORKS-AS METAPEER-INC MOLDTELECOM-AS
MTNNS-AS MURMMULTISERVICENET-AS NAKHON-PHATHOM-AS-TH NCL-MIA1 NEBUTEL-NET NET NETINFO NETPLUS
NETWORKMARYLAND NEXCOM-BG-AS NUSANET-AS-ID O2 OBUKHOVAS OPALTELECOM-AS PI-PH-AS-AP PIRAEUS-CS-AS
RADIJUSVEKTOR-AS RBA-AS RENAM RETN-AS ROEDUNET RUTIL-BG-AS Red Red SAT-TRAKT-AS SCPEXIM
SENECA-COMM-TX SIFY-AS-IN SIHOPE-AS SIMBIRSK SOFIASAT-AS SPRINTLINK
STANSAT STEPANOVIC SU-NET TELDIK-AS TELEKOM-AS TELEKOM-SRPSKE-AS TELEMEDIAAS TELESC
TELEVISA TENSOR-AS TERASYST-AS TKT-AS TLR-AS TRDLNK TRUE-NORTH TWTC Teledifusora Telgua UAIC UBB
UNICOM-B-AS UNITBV UNSPECIFIED UTCBNET UTCC-TH Uninet Universidad Universidad Universidade VBNS
VBRN-AS-AP VIEL-AS VIPNET-AS VWMX-AS WESTEL-1 XO-15

Tag Source: ASes originating prefixes

Fetch

Update View

- Visualization of many, many updates from multiple ASes
- Controls to focus in one one AS or prefix *in context*
- Time-based restriction
- Linked “traditional” view for additional detail

Update Viewer

a

ATT-INTERNET4 SENECA-COMM-TX DDN-ASNBLK ABSOLUTOK

15:15:46 7/29/07

15:30:38 7/29/07

b

15:22:48 7/29/07

15:25:44 7/29/07

ATT-INTERNET4

Emphasize

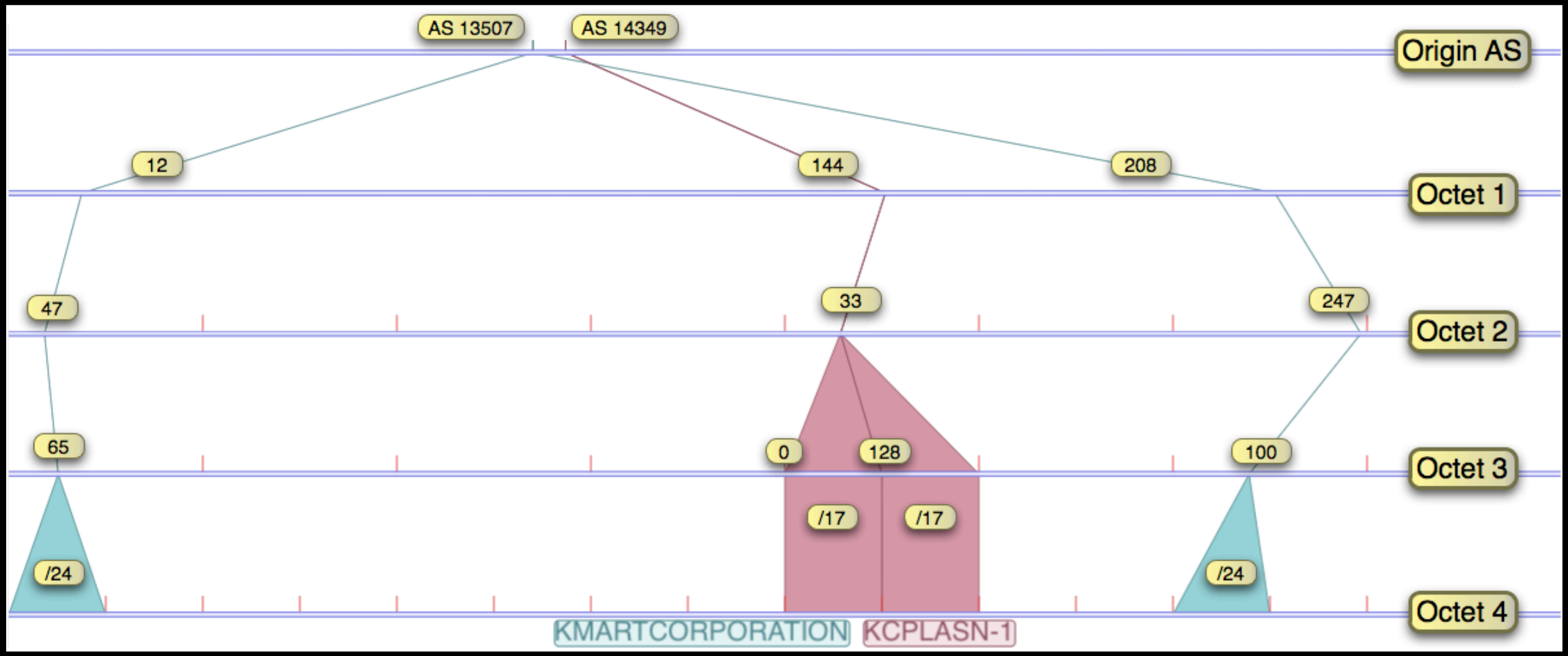
c

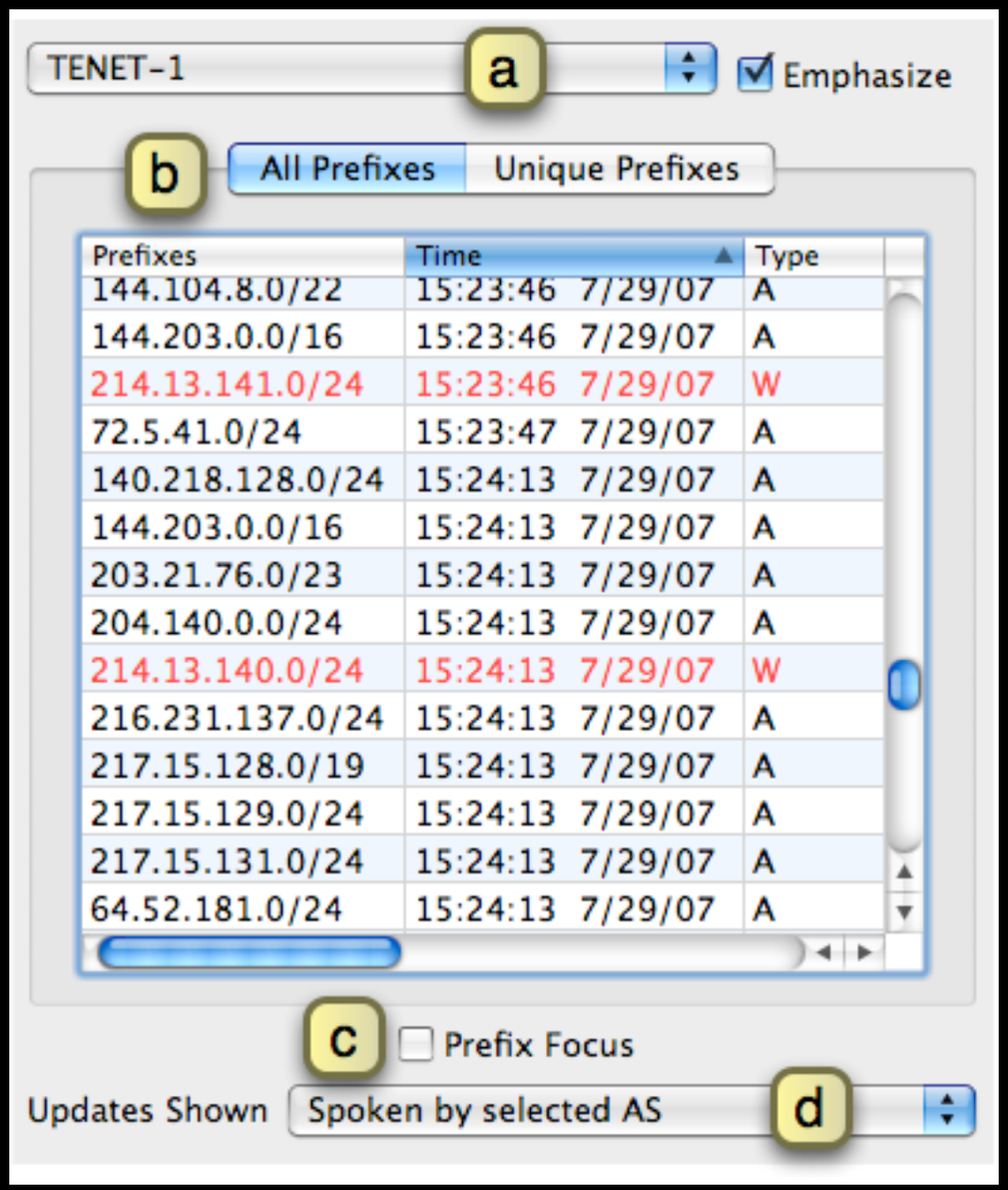
All Prefixes | Unique Prefixes

Prefixes	Time	Type
209.155.238.0/24	15:25:36 7/29/07	A
209.155.238.0/24	15:25:36 7/29/07	A
209.60.254.0/24	15:25:36 7/29/07	A
209.60.254.0/24	15:25:36 7/29/07	A
209.155.192.0/23	15:25:22 7/29/07	A
209.155.238.0/24	15:25:22 7/29/07	A
209.60.164.0/24	15:25:22 7/29/07	A
209.60.223.0/24	15:25:22 7/29/07	A
209.60.252.0/23	15:25:22 7/29/07	A
209.60.254.0/24	15:25:22 7/29/07	A
209.155.192.0/23	15:25:21 7/29/07	A
209.155.238.0/24	15:25:21 7/29/07	A
209.60.164.0/24	15:25:21 7/29/07	A
209.60.223.0/24	15:25:21 7/29/07	A
209.60.252.0/23	15:25:21 7/29/07	A
209.60.254.0/24	15:25:21 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A
209.155.192.0/23	15:25:16 7/29/07	A

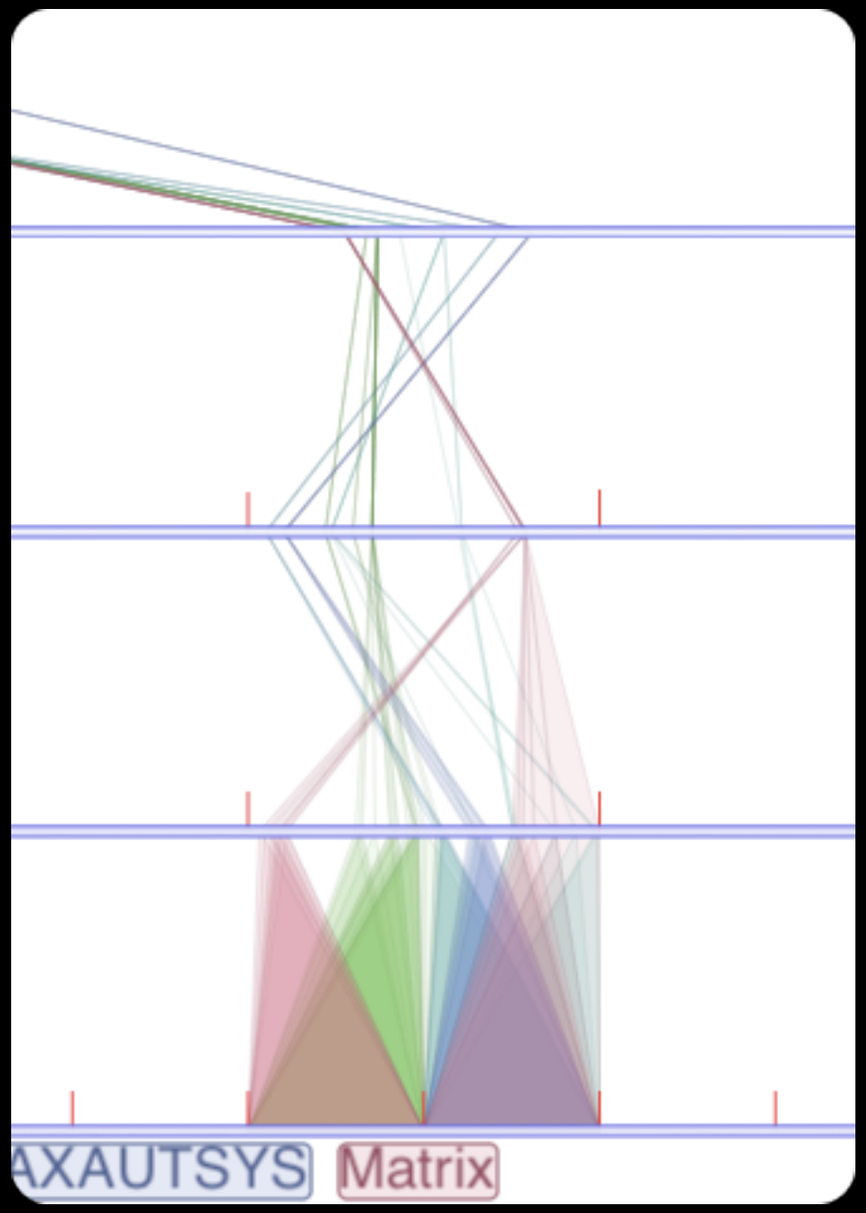
Prefix Focus

Updates Shown: Originated by selected AS

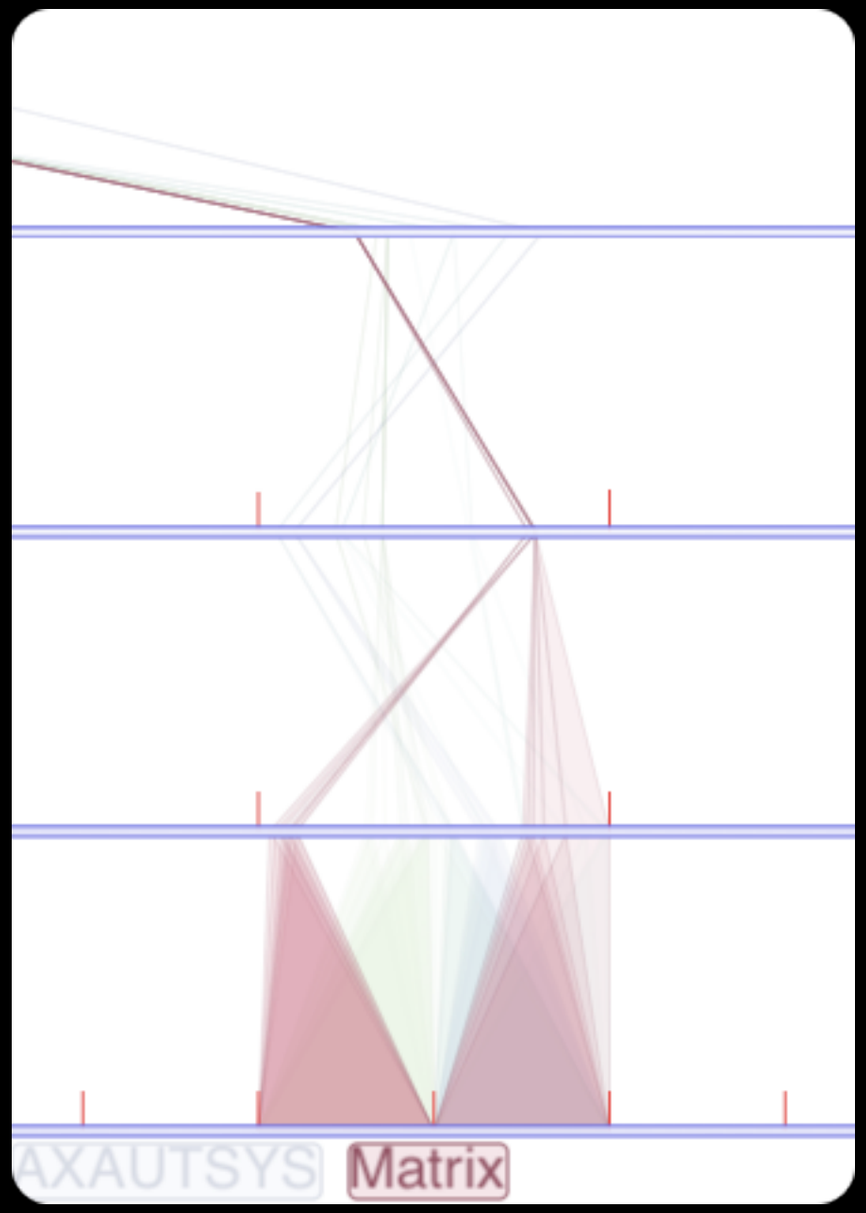

AS 13507
AS 14349
Origin AS
12
144
208
Octet 1
47
33
247
Octet 2
65
0
128
100
Octet 3
/17
/17
/24
/24
Octet 4
KMARTCORPORATION
KCPLASN-1


TENET-1
a
Emphasize
b
All Prefixes
Unique Prefixes
Prefixes
Time
Type
144.104.8.0/22 15:23:46 7/29/07 A
144.203.0.0/16 15:23:46 7/29/07 A
214.13.141.0/24 15:23:46 7/29/07 W
72.5.41.0/24 15:23:47 7/29/07 A
140.218.128.0/24 15:24:13 7/29/07 A
144.203.0.0/16 15:24:13 7/29/07 A
203.21.76.0/23 15:24:13 7/29/07 A
204.140.0.0/24 15:24:13 7/29/07 A
214.13.140.0/24 15:24:13 7/29/07 W
216.231.137.0/24 15:24:13 7/29/07 A
217.15.128.0/19 15:24:13 7/29/07 A
217.15.129.0/24 15:24:13 7/29/07 A
217.15.131.0/24 15:24:13 7/29/07 A
64.52.181.0/24 15:24:13 7/29/07 A
c
Prefix Focus
Updates Shown
Spoken by selected AS
d

AS Emphasis

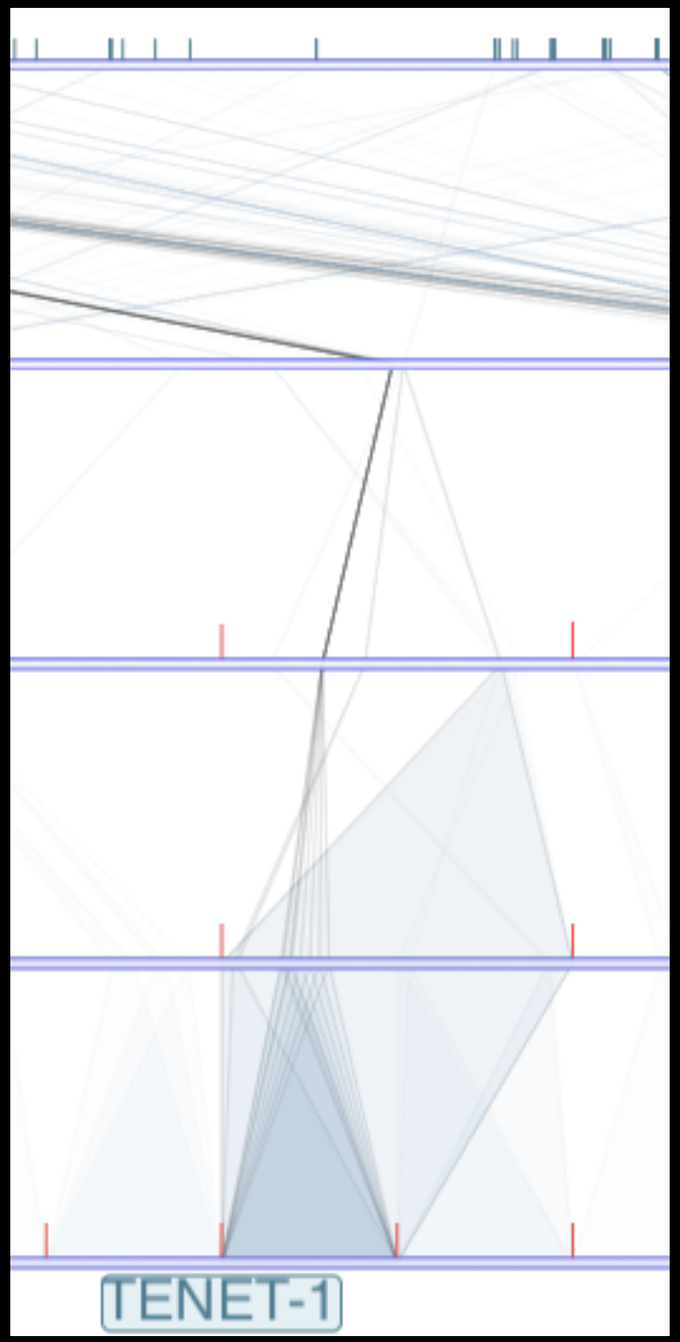


Off

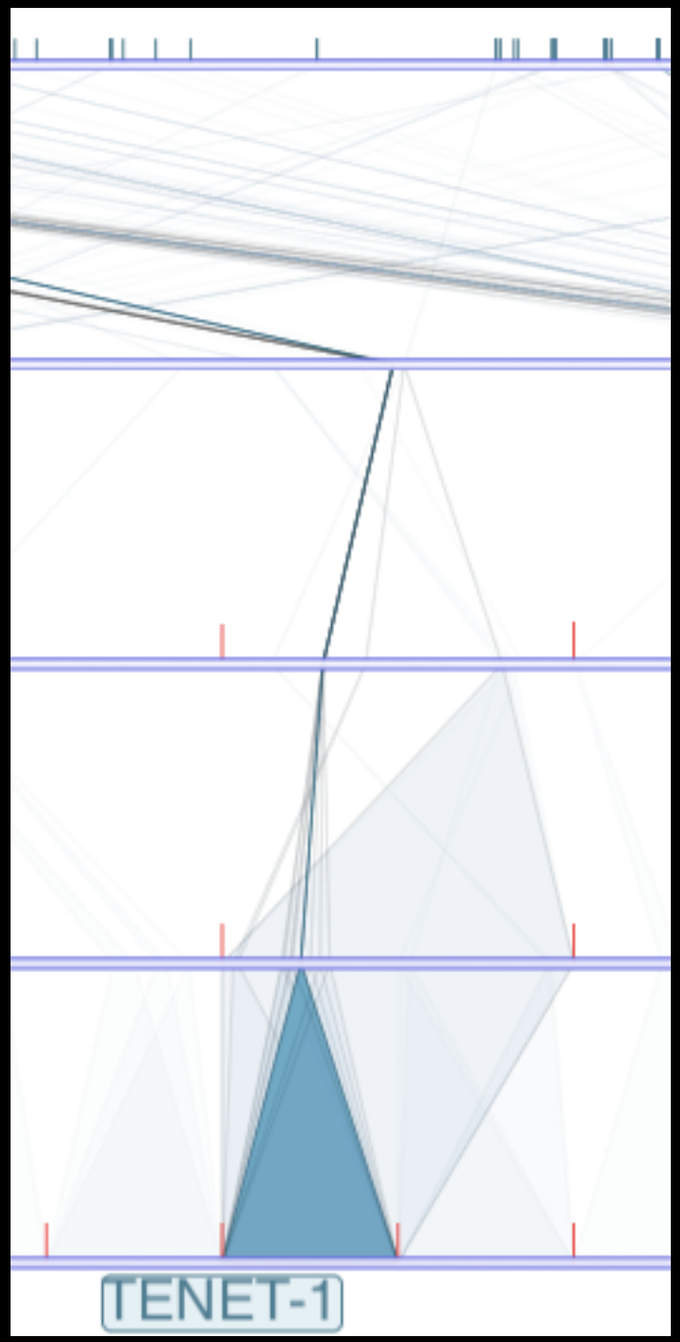


On

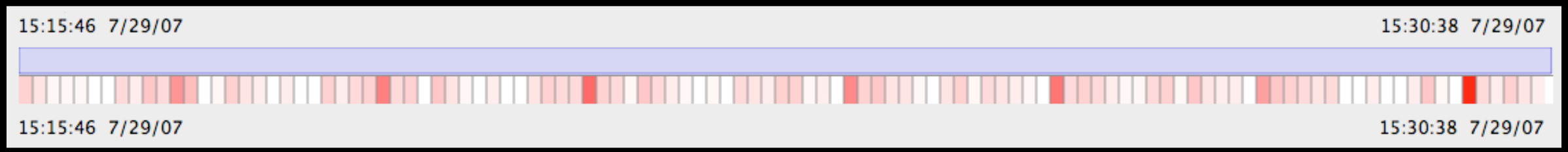
Prefix Focus



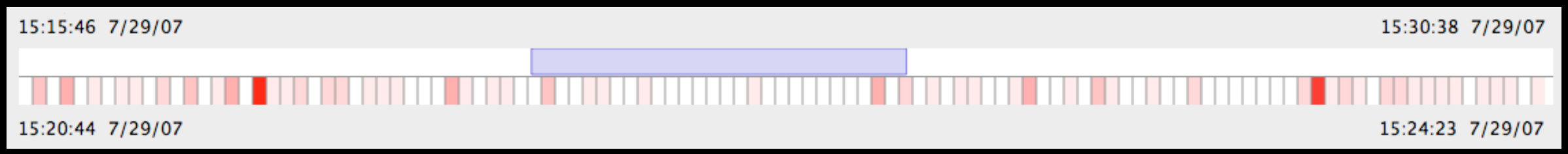
Off



On

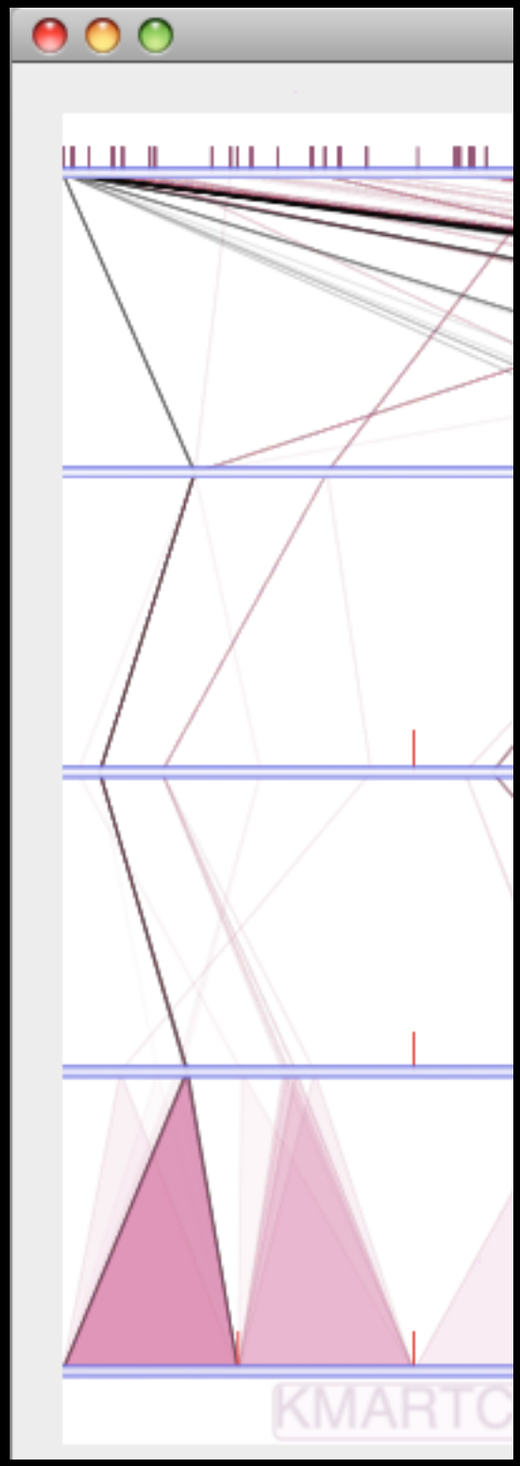


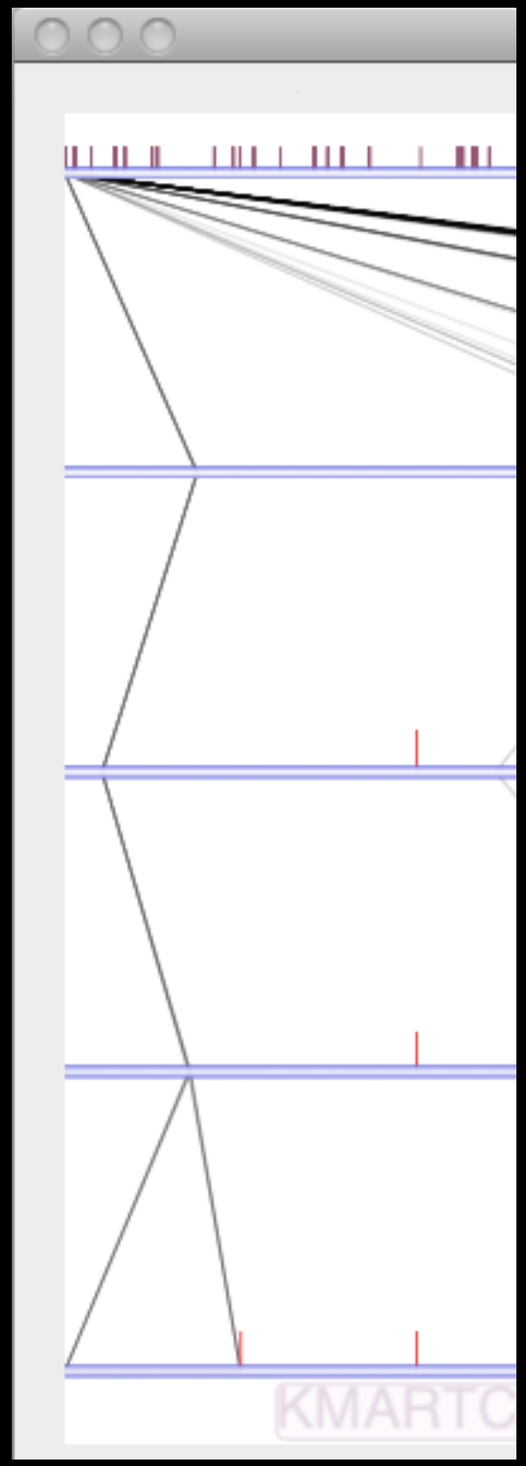
Entire time range slected



Subset of time selected

Route Flapping

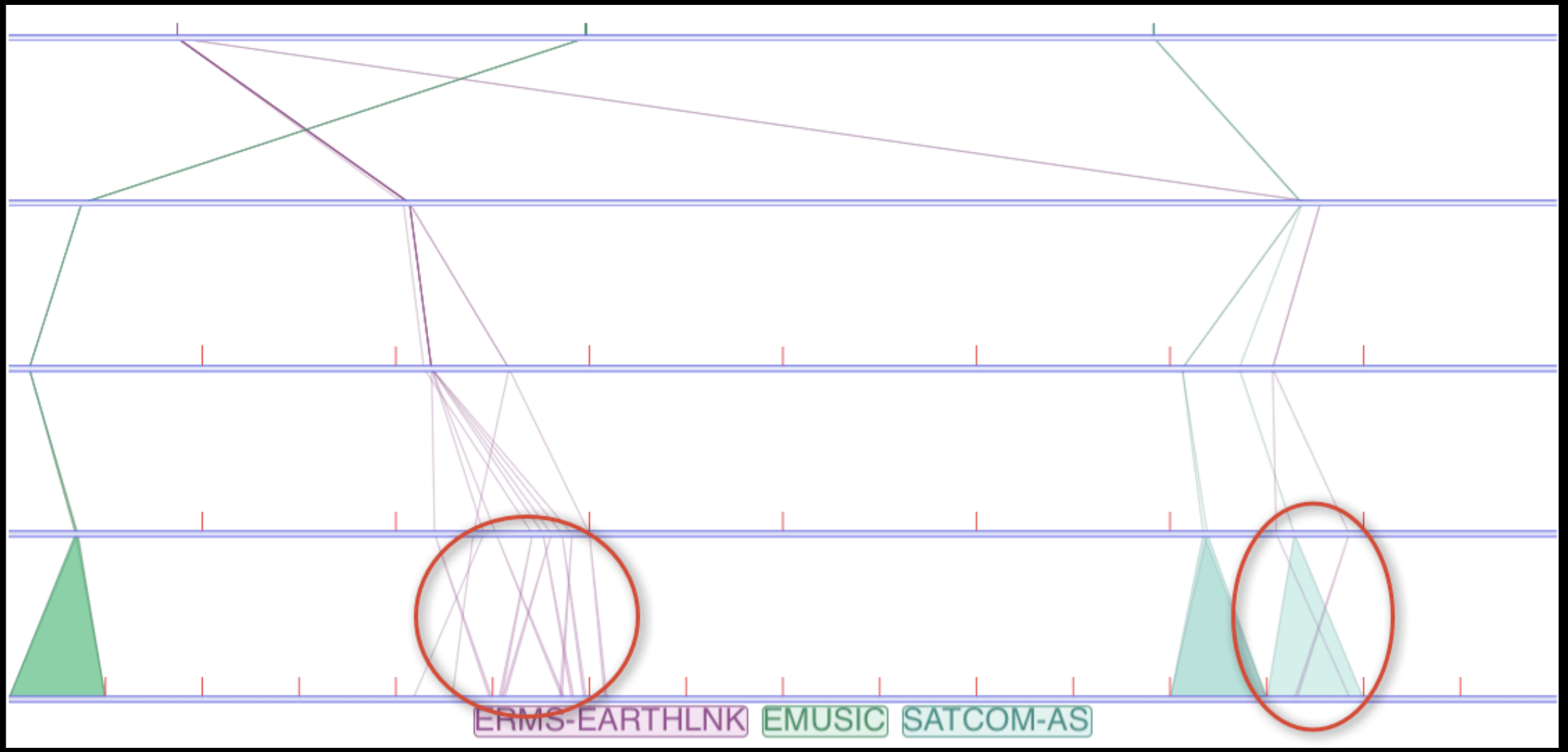


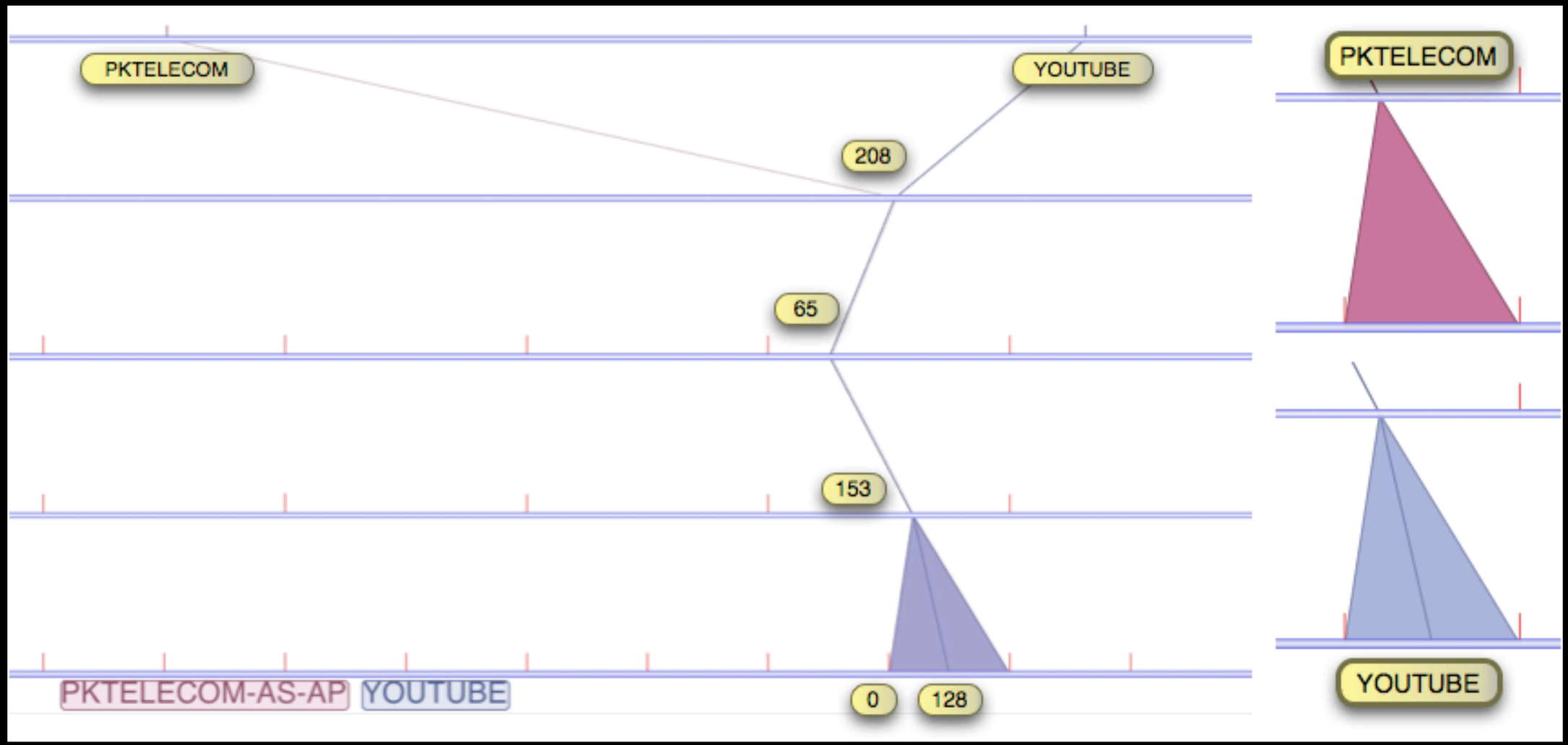


ATT-INTERNET4 Emphasize

All Prefixes | Unique Prefixes

Prefixes	Time	Type
12.27.90.0/24	15:15:46 7/29/07	A
12.27.90.0/24	15:17:50 7/29/07	W
12.27.90.0/24	15:19:54 7/29/07	A
12.27.90.0/24	15:20:34 7/29/07	A
12.27.90.0/24	15:20:46 7/29/07	W
12.27.90.0/24	15:21:14 7/29/07	A
12.27.90.0/24	15:21:14 7/29/07	A
12.27.90.0/24	15:23:25 7/29/07	A
12.27.90.0/24	15:23:29 7/29/07	W
12.27.90.0/24	15:25:31 7/29/07	A
12.27.90.0/24	15:26:15 7/29/07	A
12.27.90.0/24	15:26:19 7/29/07	W
12.27.90.0/24	15:26:50 7/29/07	A
12.27.90.0/24	15:29:01 7/29/07	A
12.27.90.0/24	15:29:01 7/29/07	W
12.27.90.0/24	15:30:17 7/29/07	A
12.27.90.0/24	15:30:17 7/29/07	A
12.27.91.0/24	15:17:50 7/29/07	W
12.27.91.0/24	15:19:59 7/29/07	A
12.27.91.0/24	15:20:34 7/29/07	A
12.27.91.0/24	15:20:46 7/29/07	W
12.27.91.0/24	15:21:14 7/29/07	A
12.27.91.0/24	15:21:14 7/29/07	A
12.27.91.0/24	15:23:25 7/29/07	A


ERMS-EARTHLNK
EMUSIC
SATCOM-AS


PKTELECOM
YOUTUBE
208
65
153
PKTELECOM-AS-AP
YOUTUBE
0
128
PKTELECOM
YOUTUBE

Future Work

- Monitoring mode is essential
- Performance
- Additional filters and searches

Annotated video demonstration at:
http://vidi.cs.ucdavis.edu/research

Questions?