

Link Ranking Challenges

- Different conditions precipitate different requirements – Unified global ranking difficult
- But:
 - If you set some border conditions
 - Provide a timescale or reference timeline
- Possible to analyze AS Links in terms of their impact
 - Three metrics chosen – Route Sensitivity, Link Stability, Address Space Sensitivity

SIMPLE Metric/Ranking a.k.a IP Route Sensitivity

- Get BGPSTREAM data
- Strip links to collectors
- Strip links to stubs
- Count unique directed AS-AS links
- Count prefixes and paths

Comcast, we love you!

Show entries

Search:

AS1	AS2	Prefixes	AS-PATHes
17604 NCA	7922 Comcast Cable Communications, Inc.	55784	56295
7922 Comcast Cable Communications, Inc.	6453 TATA COMMUNICATIONS (AMERICA) INC	23757	30085
7922 Comcast Cable Communications, Inc.	3257 Tinet Spa	7244	12417
6453 TATA COMMUNICATIONS (AMERICA) INC	7922 Comcast Cable Communications, Inc.	6993	131272
7473 Singapore Telecommunications Ltd	7922 Comcast Cable Communications, Inc.	5858	6341
11164 Internet2	7922 Comcast Cable Communications, Inc.	5486	51888
577 Bell Canada	7922 Comcast Cable Communications, Inc.	5328	5329
7922 Comcast Cable Communications, Inc.	3320 Deutsche Telekom AG	5181	7767
12956 Telefonica International Wholesale Services, SL	7922 Comcast Cable Communications, Inc.	4859	14865
6762 TELECOM ITALIA SPARKLE S.p.A.	7922 Comcast Cable Communications, Inc.	4591	25046
2516 KDDI CORPORATION	7922 Comcast Cable Communications, Inc.	4562	4655
4637 Telstra Global	7922 Comcast Cable Communications, Inc.	4192	7849
3491 Beyond The Network America, Inc.	7922 Comcast Cable Communications, Inc.	4024	9341
1239 Sprint	7922 Comcast Cable Communications, Inc.	3818	9307

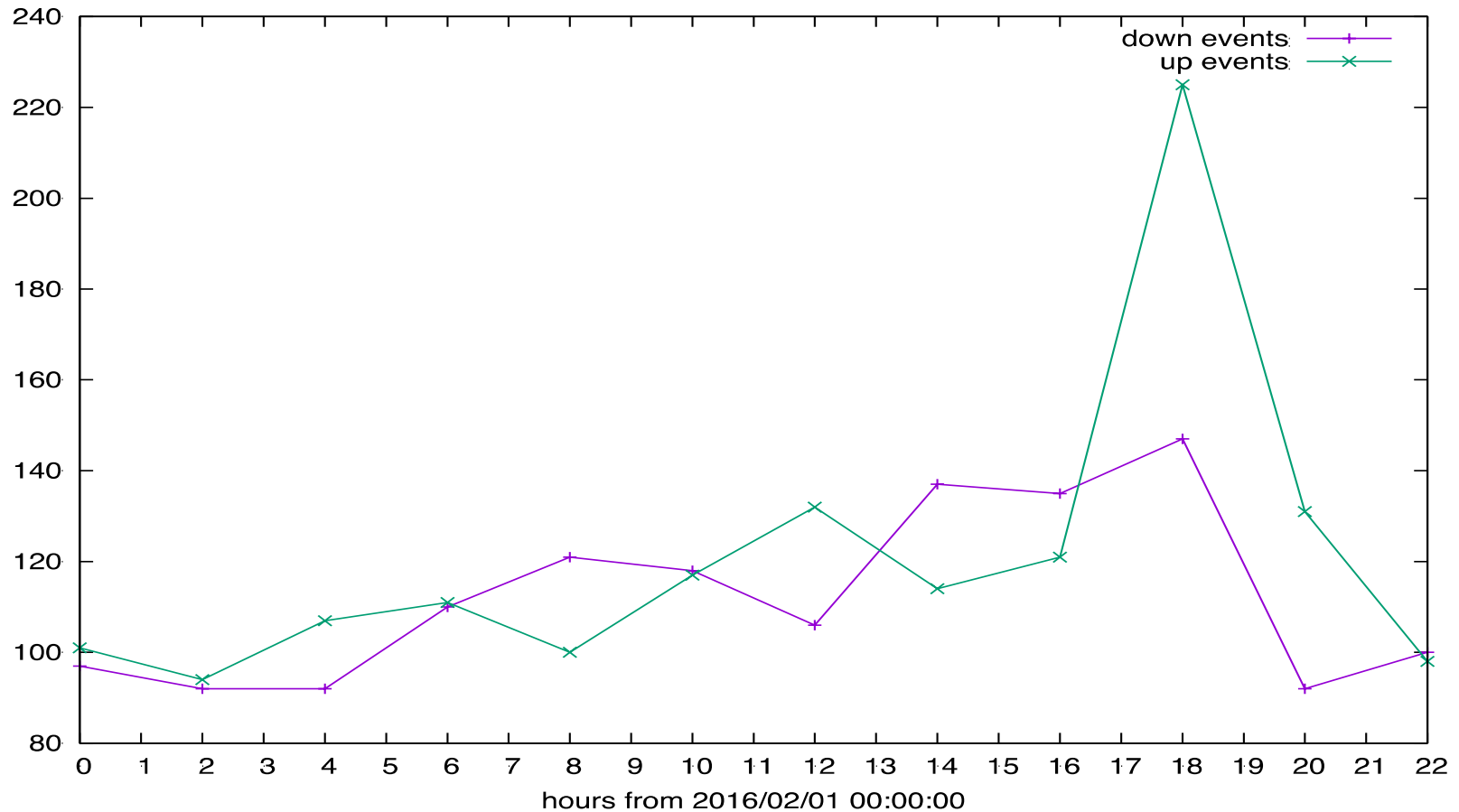
Country specific - RU

AS1	AS2	Prefixes ▼	AS-PATHes ▼
47872 Sofia Connect EOOD	28917 LLC "TRC FIORD"	20225	20582
6939 Hurricane Electric, Inc.	12389 OJSC Rostelecom	13965	1396352
3257 Tinet Spa	12389 OJSC Rostelecom	13601	103137
7473 Singapore Telecommunications Ltd	12389 OJSC Rostelecom	11717	20071
4739 Internode Pty Ltd	20485 Closed Joint Stock Company TransTeleCom	11584	11584
2516 KDDI CORPORATION	12389 OJSC Rostelecom	10178	24665
6453 TATA COMMUNICATIONS (AMERICA) INC	12389 OJSC Rostelecom	10043	128372
6453 TATA COMMUNICATIONS (AMERICA) INC	20485 Closed Joint Stock Company TransTeleCom	9467	121669
5580 TripartZ B.V.	12389 OJSC Rostelecom	8565	11431
1273 Cable and Wireless Worldwide plc	12389 OJSC Rostelecom	7847	88026
6762 TELECOM ITALIA SPARKLE S.p.A.	20485 Closed Joint Stock Company TransTeleCom	7433	63398
6762 TELECOM ITALIA SPARKLE S.p.A.	12389 OJSC Rostelecom	7300	110156
4637 Telstra Global	12389 OJSC Rostelecom	7213	15499

Ranking Future Work

- Classify links
- Decrease dependence on vantage points
- Advanced web interface
- More funny analysis
- Interface to ranking

Link Instability Plots – 1 Day



Link Instability Inferences

('131702', '55685')	8	up-2016/02/01-02:00:00 down-2016/02/01-04:00:00 up-2016/02/01-06:00:00 down-2016/02/01-08:00:00 up-2016/02/01-10:00:00 down-2016/02/01-12:00:00 up-2016/02/01-18:00:00 down-2016/02/01-22:00:00
('3728', '19837')	6	down-2016/02/01-04:00:00 up-2016/02/01-06:00:00 down-2016/02/01-16:00:00 up-2016/02/01-18:00:00 down-2016/02/01-22:00:00 up-2016/02/02-00:00:00
('29465', '327895')	6	down-2016/02/01-04:00:00 up-2016/02/01-06:00:00 down-2016/02/01-10:00:00 up-2016/02/01-12:00:00 down-2016/02/01-16:00:00 up-2016/02/01-18:00:00
('262254', '197695')	5	down-2016/02/01-02:00:00 up-2016/02/01-06:00:00 down-2016/02/01-08:00:00 up-2016/02/01-10:00:00 down-2016/02/02-00:00:00
('51230', '56636')	5	up-2016/02/01-16:00:00 down-2016/02/01-18:00:00 up-2016/02/01-20:00:00 down-2016/02/01-22:00:00 up-2016/02/02-00:00:00
('25761', '61440')	5	down-2016/02/01-02:00:00 up-2016/02/01-12:00:00 down-2016/02/01-14:00:00 up-2016/02/01-16:00:00 down-2016/02/01-18:00:00
('7713', '134620')	5	up-2016/02/01-06:00:00 down-2016/02/01-08:00:00 up-2016/02/01-10:00:00 down-2016/02/01-14:00:00 up-2016/02/01-16:00:00
('6939', '394648')	5	down-2016/02/01-02:00:00 up-2016/02/01-14:00:00 down-2016/02/01-16:00:00 up-2016/02/01-18:00:00 down-2016/02/01-20:00:00
('6713', '25543')	4	down-2016/02/01-14:00:00 up-2016/02/01-16:00:00 down-2016/02/01-18:00:00 up-2016/02/01-22:00:00
('25543', '37163')	4	down-2016/02/01-14:00:00 up-2016/02/01-16:00:00 down-2016/02/01-18:00:00 up-2016/02/01-22:00:00

Link Stability Sliding Window

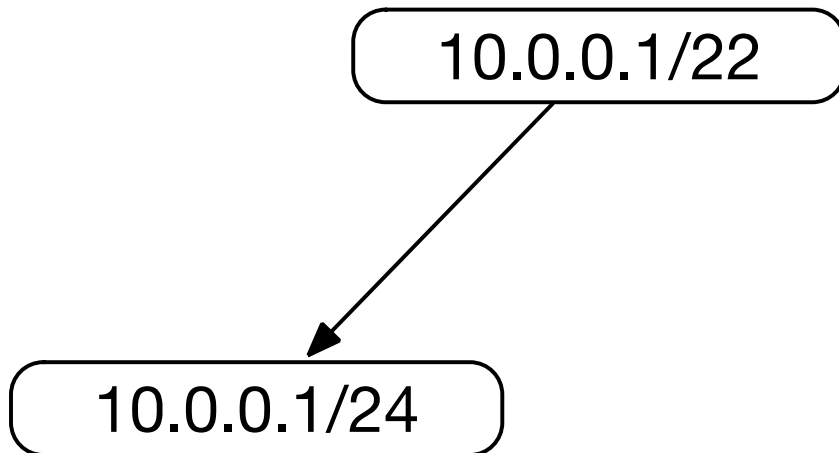
```
past6: [ 1 ]: 552 [ 2 ]: 347 [ 3 ]: 12 [ 4 ]: 11 [ 5 ]: 2  
past6: [ 1 ]: 674 [ 2 ]: 330 [ 3 ]: 19 [ 4 ]: 12 [ 5 ]: 1  
past6: [ 1 ]: 701 [ 2 ]: 341 [ 3 ]: 15 [ 4 ]: 13 [ 5 ]: 4 [ 6 ]: 1
```


Link Instability Future Work

- Provide a reference timeline for analysis
- Time scale gives perspective – how many link flaps occur over a given time duration?
 - How does the stability vary with as the time scale changes?
 - Good indicator of relative link stability

SENSITIVITY METRIC

Number of /24 prefixes =
Number of /24 prefixes matched at
this node - number of /24 prefixes
matched at next level children



Number of /24 prefixes =
 $2^{(24-22)} = 4 - 1 = 3$

