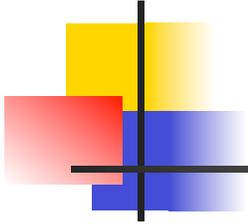


EyeP: Visualizing IPv4 Address allocation and usage

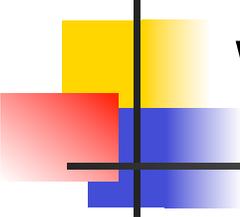
Lucas (Jiangzhe) Wang
Internet Research Lab, UCLA

Joint work with
Ricardo Olivera
Lixia Zhang



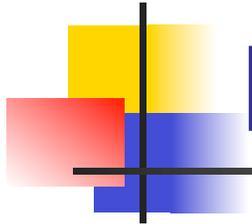
Outline

- Why EyeP
 - Focus on visualization
- A navigation through EyeP
 - The goal of this short demo: GET YOUR FEEDBACK TO MAKE EYEP MORE USEFUL
- In particular: how best to visualize IPv6 allocation



What EyeP can help with

- Get a comprehensive picture in overall IPv4 address allocation
 - whois database
 - RIR ftp allocation records
- See the relation between allocation and routing announcements
 - allocated but invisible in DFZ
 - announced but not allocated
 - allocated and announced, in many different forms



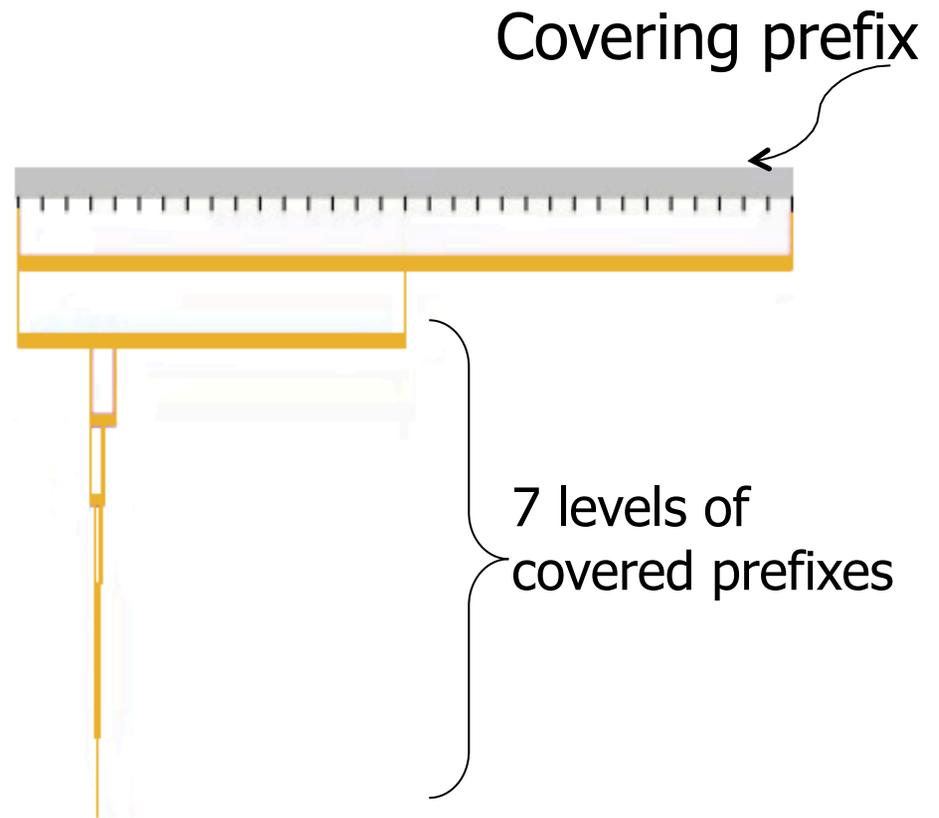
BGP data sources

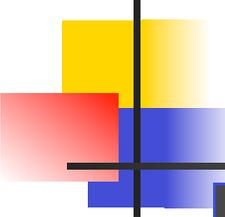
- RouteViews
- RIPE
- Abilene

One way to turn one allocated block into multiple announcements

Seen in BGP:

222.32.0.0/11
222.32.0.0/12
222.35.0.0/16
222.35.0.0/17
222.35.64.0/19
222.35.64.0/20
222.35.72.0/21
222.35.76.0/22

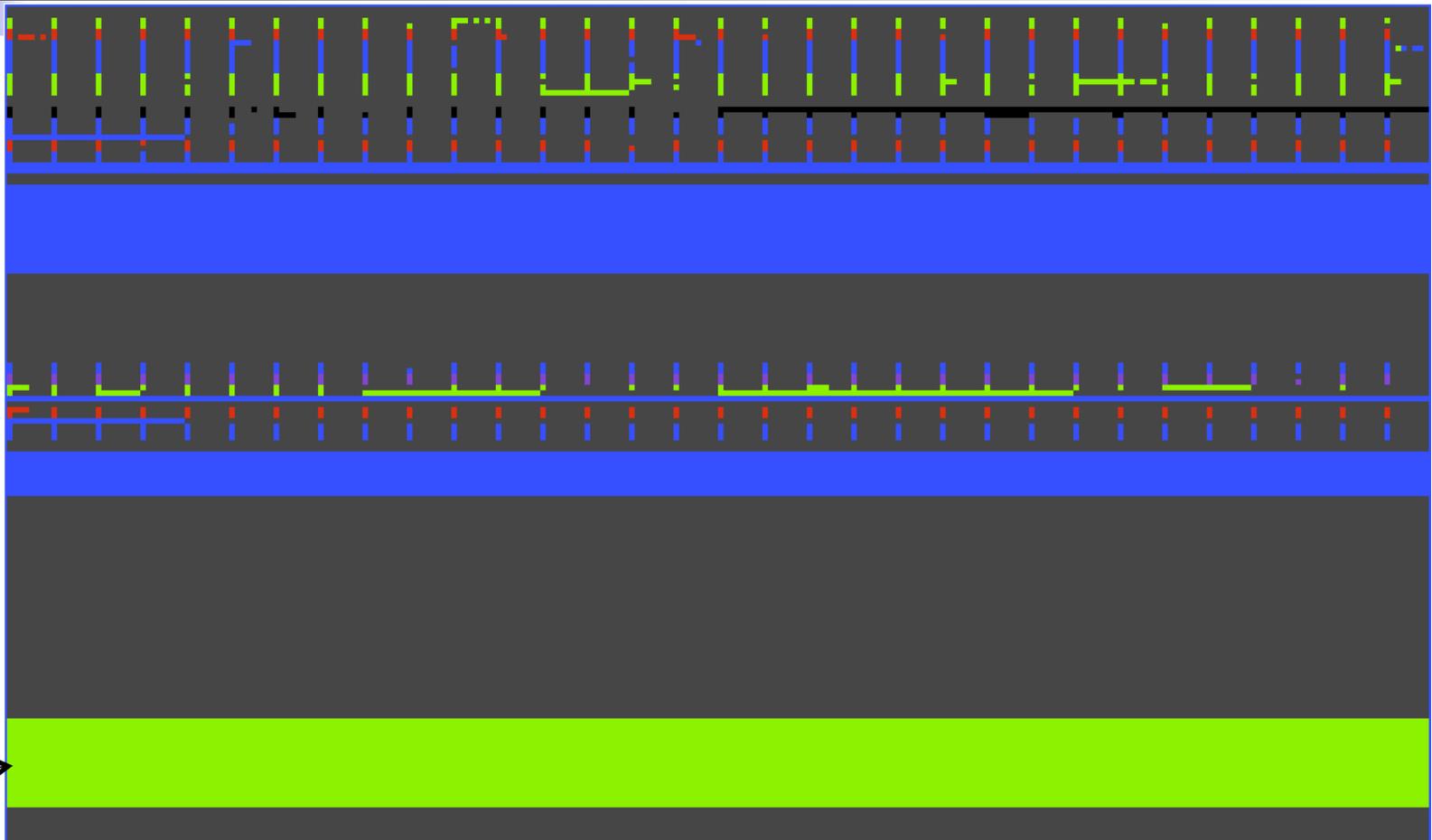




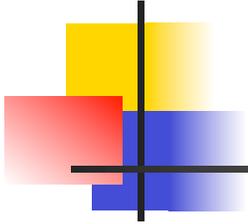
Challenge: how to view the huge IPv6 address space in a comprehensive way?



IPv6 allocatoin within 2001::/16



2001:5000::/21



Thank you
Questions / suggestions?
lucas@cs.ucla.edu



Data updated on:
2010-03-19

- RIRs Allocation
- Seen in BGP

Input IP Range:

Organization Name:

Input ASN:



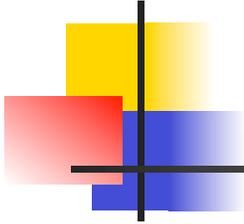
From:0.0.0.0 To:255.255.255.255

/8

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

This page is maintained by Lucas Wang @ UCLA. Please send suggestions/bugs/questions to [eyep at cs.ucla.edu](mailto:eyep@cs.ucla.edu)





Block Color Coding: IANA Allocations

From:0.0.0.0 To:255.255.255.255

1/8

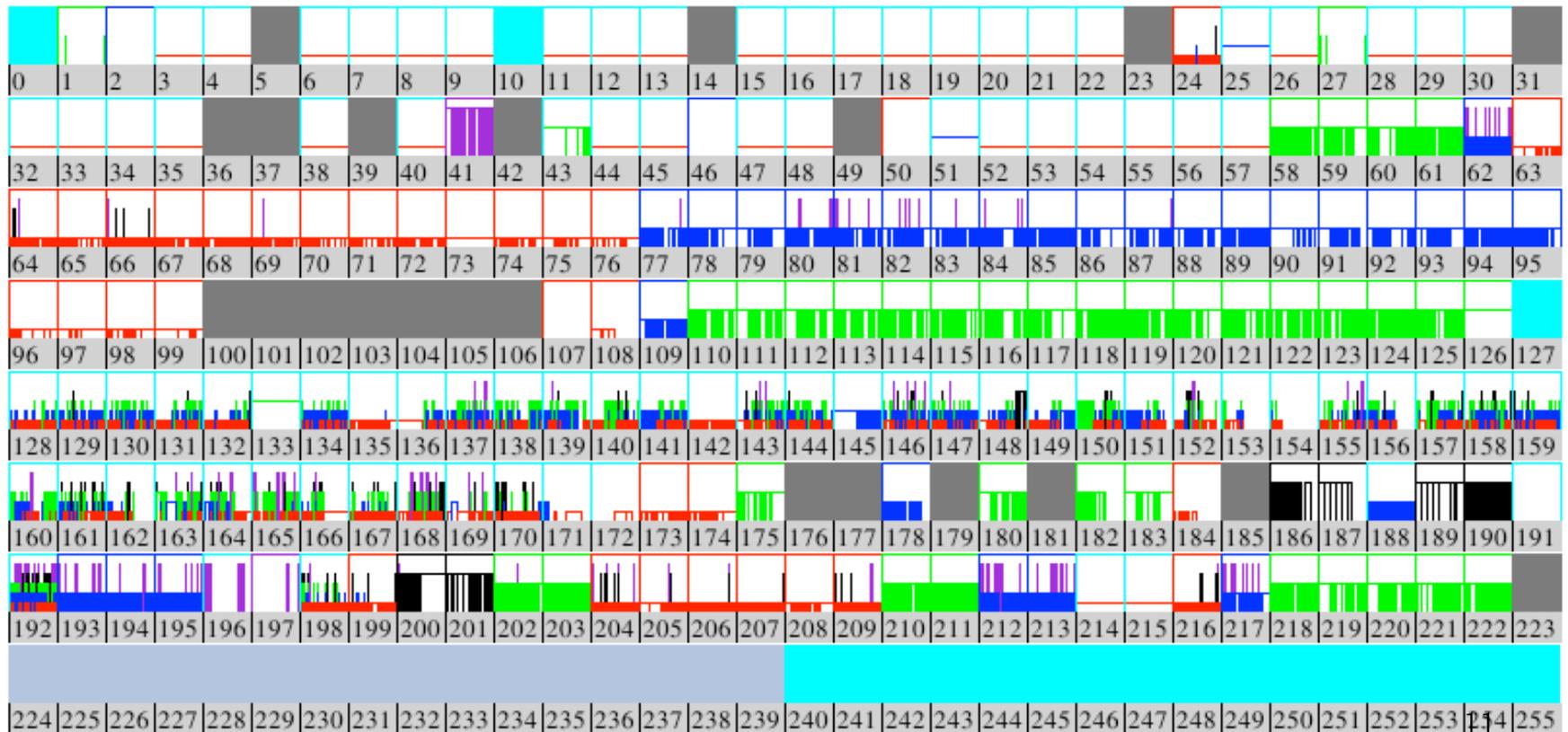
0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127
128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159
160	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191
192	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223
224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247	248	249	250	251	252	253	254	255

Color Bars: Allocations managed by 5 RIRs

RIR is coded in both color and bar height

From:0.0.0.0 To:255.255.255.255

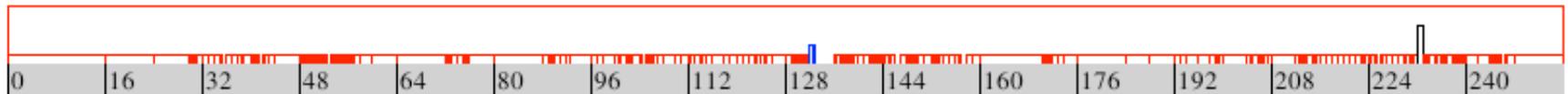
1/8



Further Zoom in to See More Detail

From:24.0.0.0 To:24.255.255.255

/12



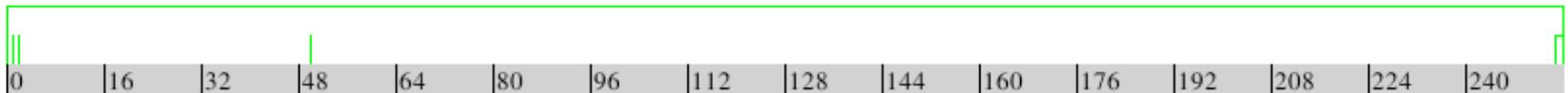
From:193.0.0.0 To:193.255.255.255

/12



From:1.0.0.0 To:1.255.255.255

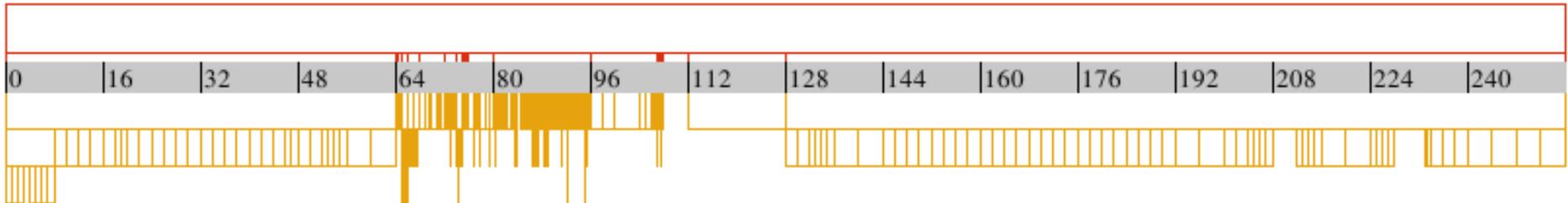
/12



Combining Information from Allocation with BGP Announcements

From:97.0.0.0 To:97.255.255.255

/12



Total of 36 row(s)

CIDR↓	Allocation Date	RIR	Organization	Country	City	# of Covering Prefixes	Exact Match	# of Covered Prefixes
97.0.0.0/10	2007-01-22	arin	Cellco Partnership DBA Verizon Wireless	US	Bedminster	0	1	38
97.64.0.0/17	2009-04-08	arin				0	1	0
97.64.128.0/17	2009-04-13	arin				0	0	77
97.65.0.0/16	2008-05-14	arin	tw telecom holdings, inc.	US	Littleton	0	1	127
97.66.0.0/15	2007-06-05	arin	ITC^Deltacom	US	Anniston	0	0	37
97.68.0.0/14	2007-04-19	arin	BRIGHT HOUSE NETWORKS, LLC	US	Riverview	0	0	20
97.72.0.0/15	2007-08-03	arin	Hughes Network Systems	US	Germantown	0	0	15
97.74.0.0/16	2008-08-14	arin	GoDaddy.com, Inc.	US	Scottsdale	0	1	62
97.75.0.0/18	2008-08-14	arin	Rogers Cable Communications Inc.	CA	Toronto	0	1	0
97.75.64.0/18	2010-02-19	arin				0	1	0
97.75.128.0/20	2009-11-30	arin				0	1	0
97.75.160.0/19	2009-12-01	arin				0	1	0
97.75.192.0/19	2009-12-02	arin				0	1	0
97.75.224.0/19	2009-12-03	arin				0	0	4
97.76.0.0/14	2007-09-11	arin	Road Runner HoldCo LLC	US	Herndon	0	0	12
97.80.0.0/12	2007-03-21	arin	Charter Communications	US	St. Louis	0	0	127
97.96.0.0--97.107.0.0	2007-04-09	arin				0	0	0
97.107.0.0/20	2008-12-04	arin	Managed Network Solutions, Inc.	US	Bryan	0	0	0
97.107.16.0/20	2008-12-04	arin	Yesmail Inc	US	Portland	0	1	0
97.107.32.0/20	2008-12-05	arin	ONLINE DOOR COUNTY	US	FISH CREEK	0	1	3