diurnal and geographic animated GIF generating tool

cooperative association for internet data analysis

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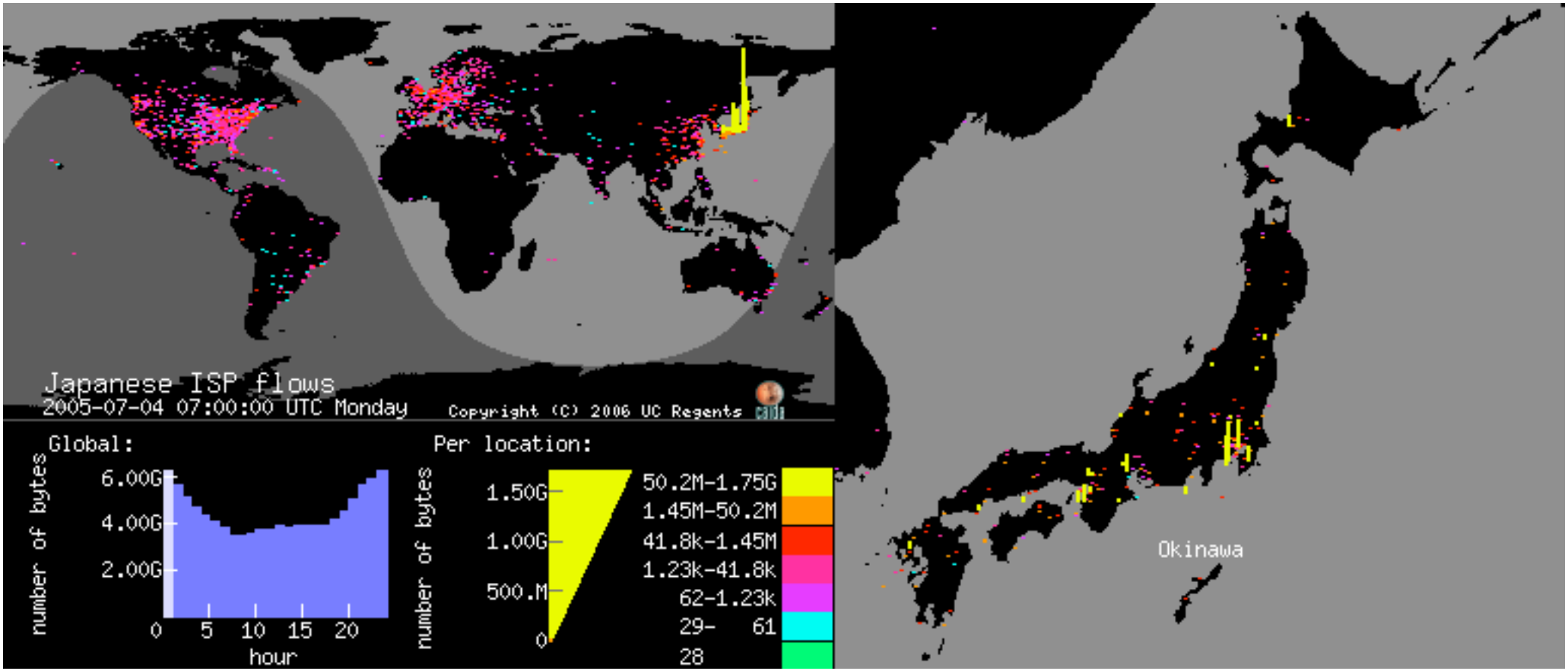
Goal

To provide an easily understood visual relationship between a data set's values over time in different geographic locations and time of day.

features

- geographical map(s)
- color coded data drawn to specific lat/lon locations
- a moving line showing the border between night and day
- optional color legend
- optional global histogram
- a static image or animated GIF

sample: Japan ISP's flows (bytes)



cuttlefish overview

code & libraries (perl)

- cuttlefish

command line (not interactive) tool

configuration file

- stores information needed to create output file
- references external image files (GIF, PNG, JPG, etc)

output file

- generated file (single frame or animated file with multiple frames)

sample configuration file

world map

```
# Map World  ----------------------------------
object:map
image:images/world-water.jpg
x: 0
y: 0
image-geo: -90 -180 90 180
width:410
label: x:20 y:195 font:large Japanese ISP flows
label: x:20 y:205 type:date
label: x:220 y:205 font:tiny Copyright (C) 2006 UC Regents
```

japan map

```
# Map Japan ----------------------------
object:map
image:images/japan-water.jpg
x: 410
y: 0
image-geo: 30.512031 128.145 45.875482 149.25
width:360
```

nodelist

```
# Nodes ----------------------------------------
object:nodelist
0 -0.233 -78.500
1 -0.433 102.483
2 -0.983 -80.733
3 -1.283 36.833
```

frame

```
# Frame ----------------------------------------
object:frame time:1120460400
0 180
3 48
```

configuration elements

object

- elements drawn during each frame

node

- geographic point were values can be assigned

frame

- a point in time with a list of node and value mappings

object overview

purpose

- provide an abstraction for collecting related information

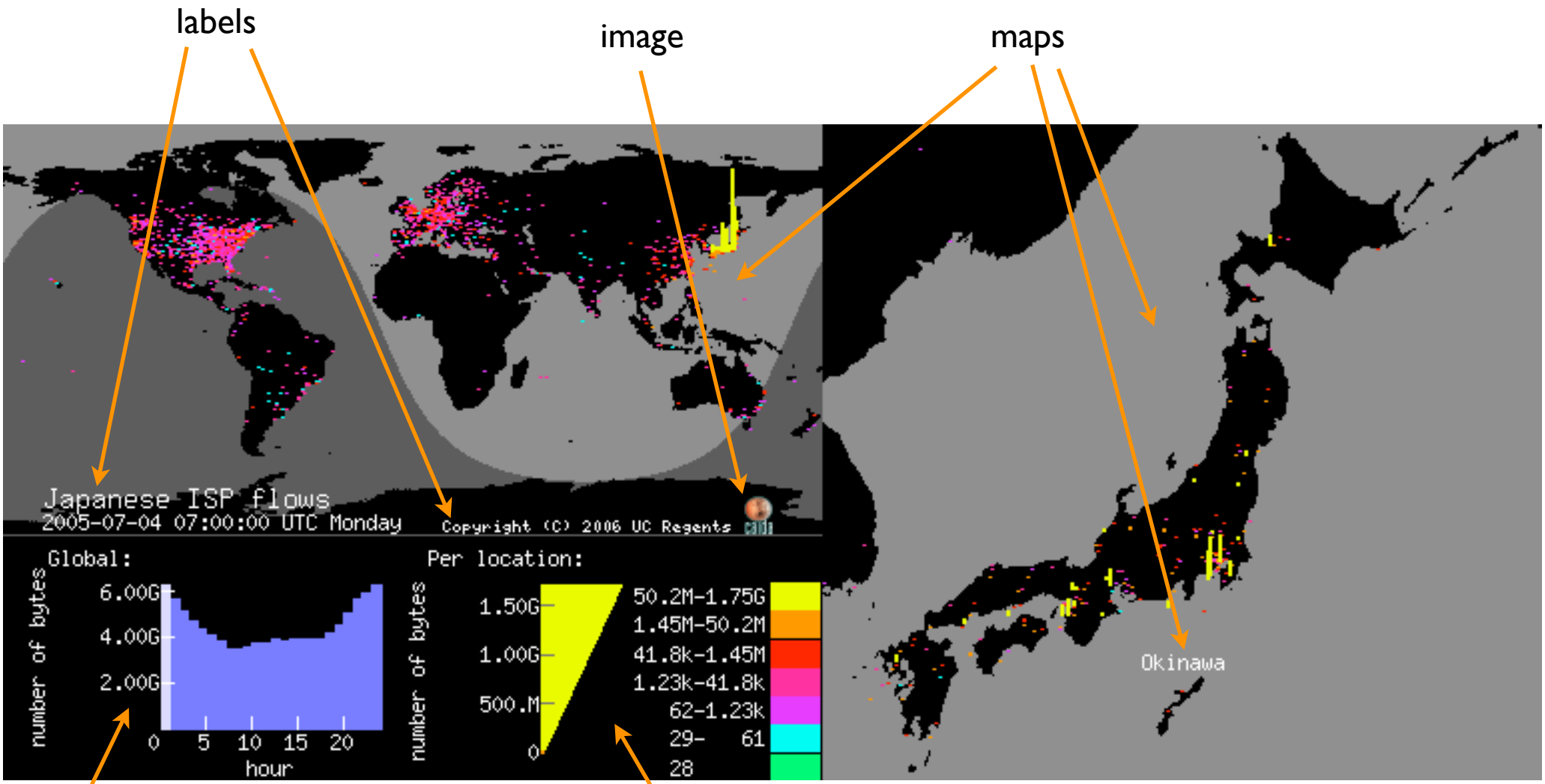
overlapping objects

- objects render in order found in file
- last object on "top"

types

- map - geographic background image will display nodes and day/night information
- image - static image (e. g. logo)
- legend - displays the value ranges of colors and height/width of nodes
- histogram - display total frequency in each frame
- nodelist - list containing all the defined nodes
- frame - a time and mapping betweeen node and value

object types



node overview

purpose

- provide a geographic location for naming and value assignment

overlapping nodes

- overlapping node's values are summed*

  * values must accumulate, when nodes overlap

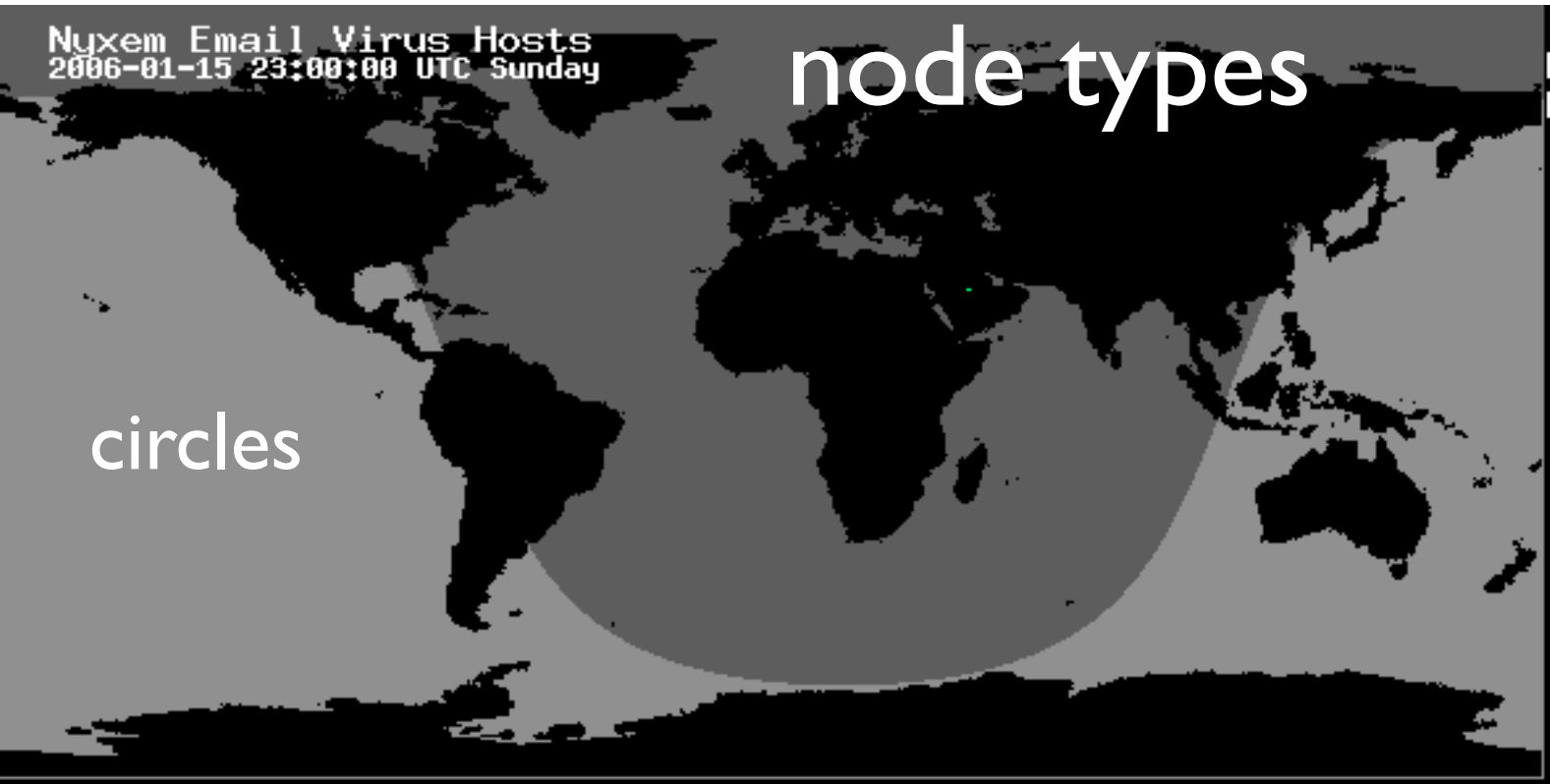
maps

- maps share nodes
- resolution of maps determines which/if nodes overlap
- only nodes falling inside a defined map's area are included in histogram and legend calculations

types

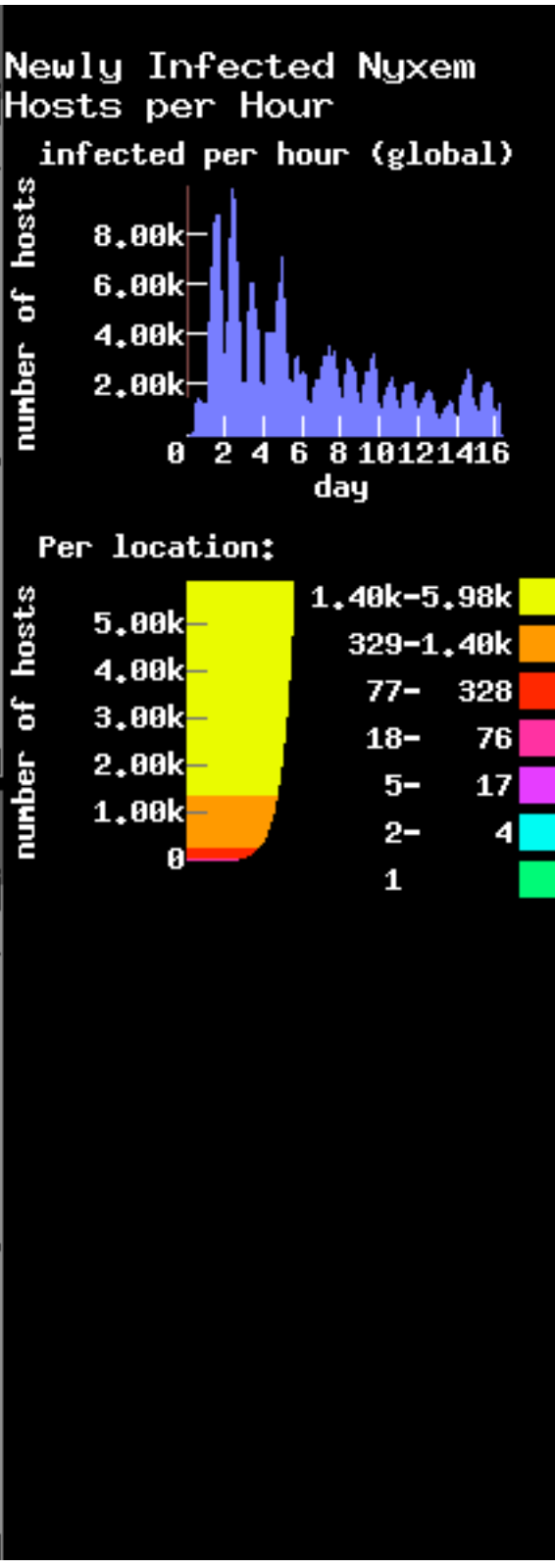
- bar - thin bars rising from node's location to height set by location's value
- circle - circles centered on node's location with radius set by location's value

node types



circles

bars



conclusion

URL

- http://www.caida.org/tools/visualization/cuttlefish/

dependencies

- Perl, GD, ImageMagick, Gifsicle

possible data sets

- number of bytes, number hosts, number of flows

license

- GNU General Public License

questions?