Picviz

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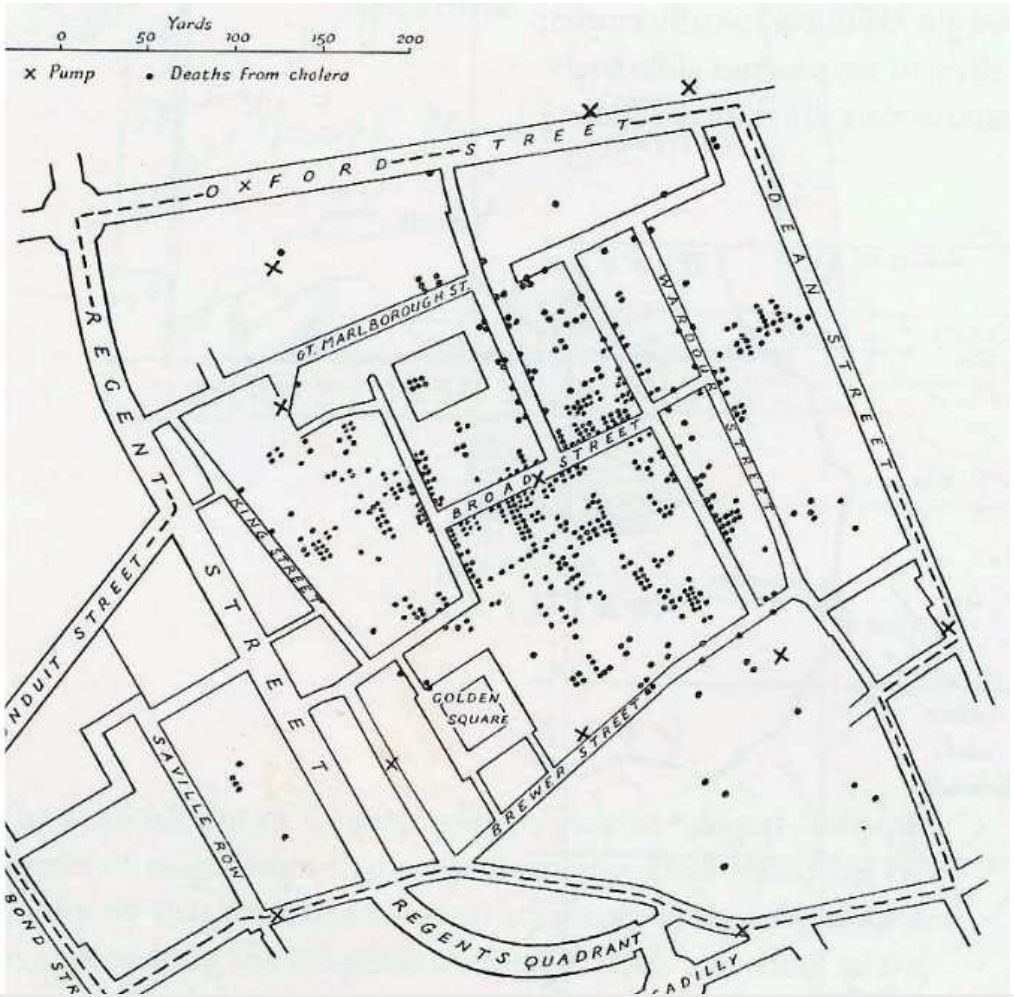
Hack.lu lighting talk, Luxembourg 2008

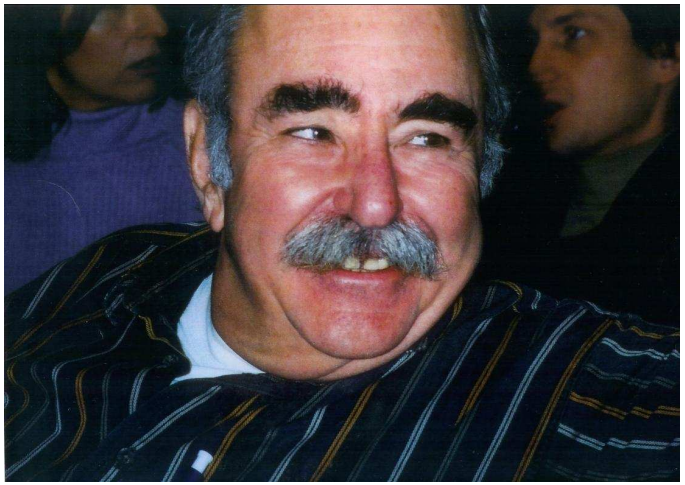
Body check

Cholera epidemic in London



Inventor

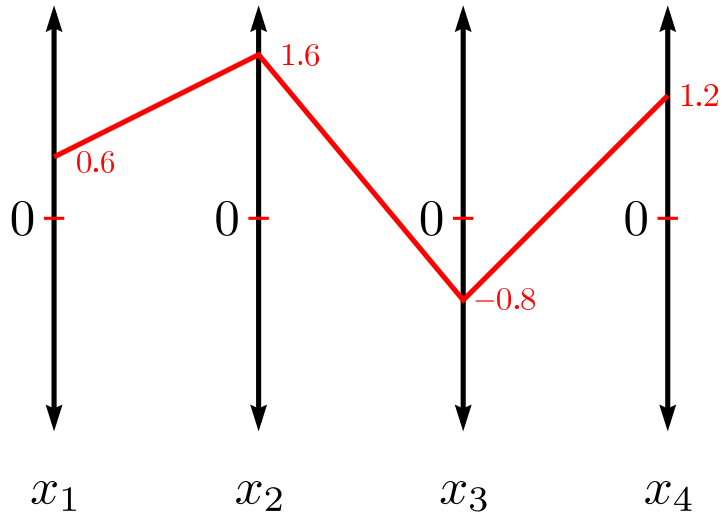
Invented and especially applied in 1959 by Alfred Inselberg.
Senior Fellow San Diego Supercomputing Center and Computer Science and Applied Mathematics Departments Tel Aviv University, Israel



- Conflict Resolution, One-Shot Problem and Air Traffic Control, 1st Canadian Conf. on Comp. Geom., 1989, 26-9

What are parallel coordinates ?

$$\vec{u} = (0.6, 1.6, -0.8, 1.2) \in \mathbb{R}^4$$



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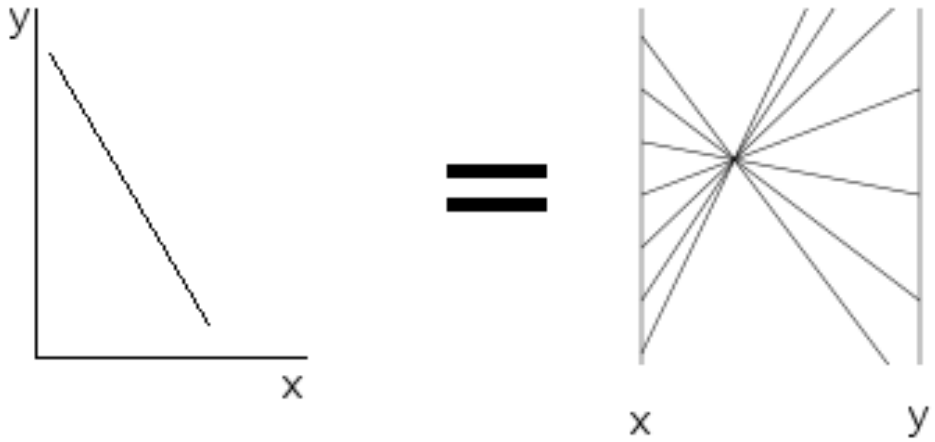
Line correlation



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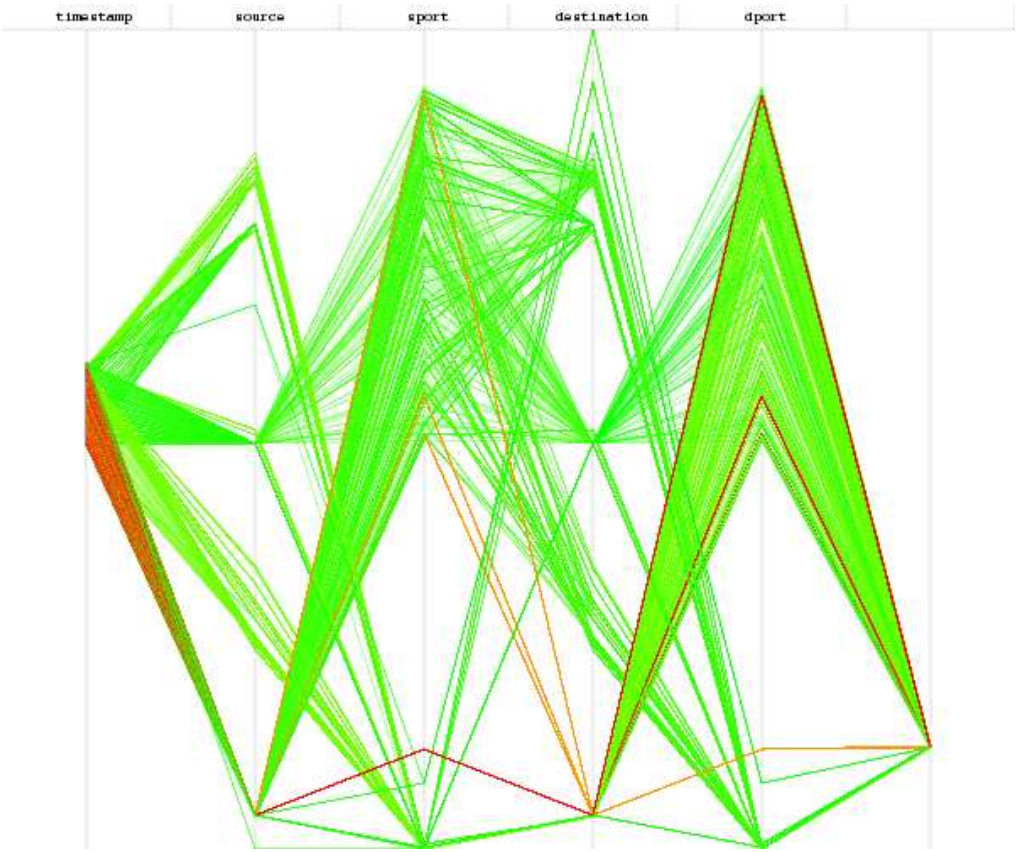
Finding OpenVPN traffic



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All you can chick

- N dimensions, ∞ of events, any kind of event
- Every axis
  - is a different variable
  - should be equidistant
  - receives the minimal value of each variable at the bottom, and maximum at the top
- The order matters
  - Time = first axis
  - Source on the left, Destination on the right
  - Garbage data on the last axis

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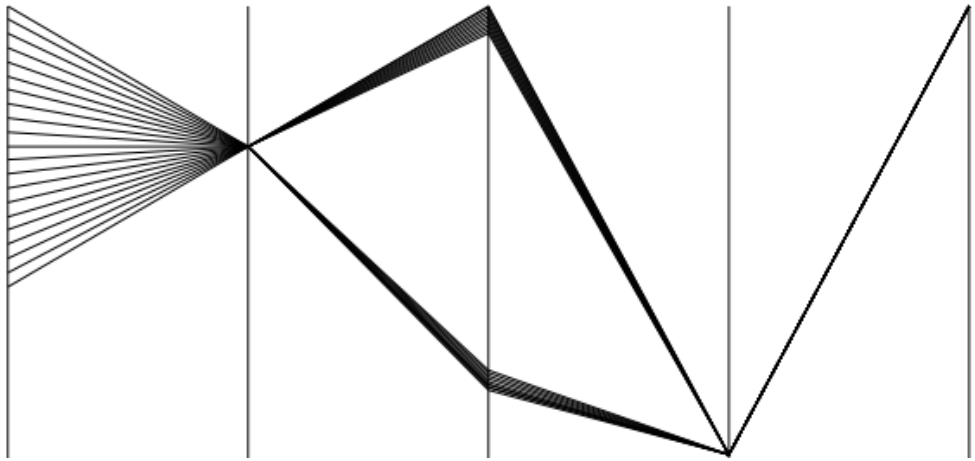

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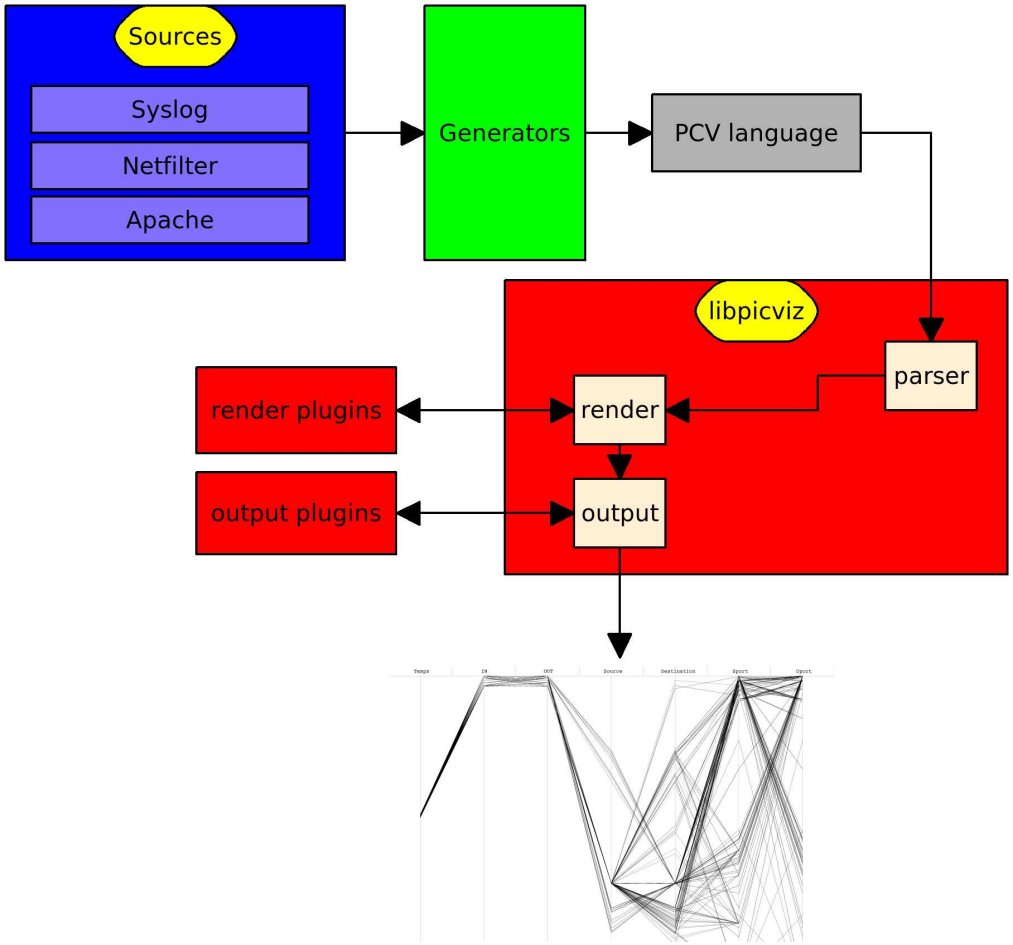
Architecture



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Goal

- Allow creation and exploitation of parallel coordinates
  - Easy to script
  - Easy to understand (after some training ;))
  - Easy to filter
  - Magical when one want to understand millions of events

Tools

Picviz provides:

- **Perl scripts**: Parse logs to create PCV
- **pcv**: Binairy transforming PCV into image
- **picviz-gui**: Graphical UI to dig into lines

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Using

PCV source

```
header { title = "Hacklu"; }
axes {
    timeline t;
    integer  in;
}
data {
   t="14:42", in="12" [color="red"];
   t="14:45", in="432";
}
```

Generate the image

```
pcv -Tplplot fichier.pcv 'filter'
```

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Filtrer

- Filtering points: show plot > 250 on axis 2
- Filtering points: show plot > 50% on axis 2
- Filtering strings: hide value = ".*[fF]oo.*" on axis 1

Axes types

- Time: timeline, years
- Numbers: integer, short, gold, char
- Addresses: ipv4, ipv6
- Strings: string

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Time matters

- Scale the variable
- a 24h representation:
  - Allows to see what time events occur
  - Prevent you from differenciate days
- By showing my logs during lectures, people know when I go sleep :-D

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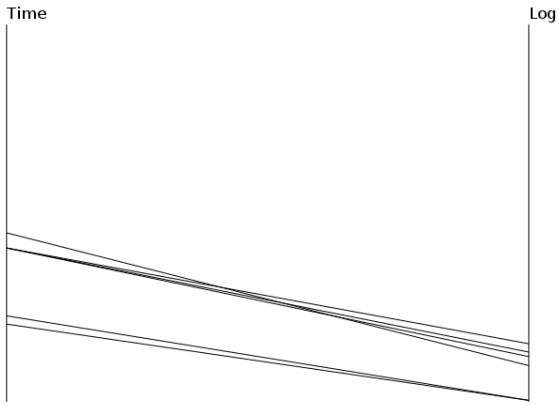
String position

Basic algorithm:

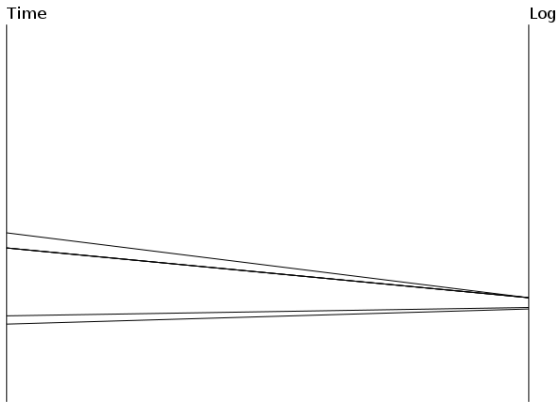


Logs

```
ab
ba
invalid user carlabru
invalid user blingbling
invalid user admin
invalid user root
```

String position

Prefix algorithm:



Logs

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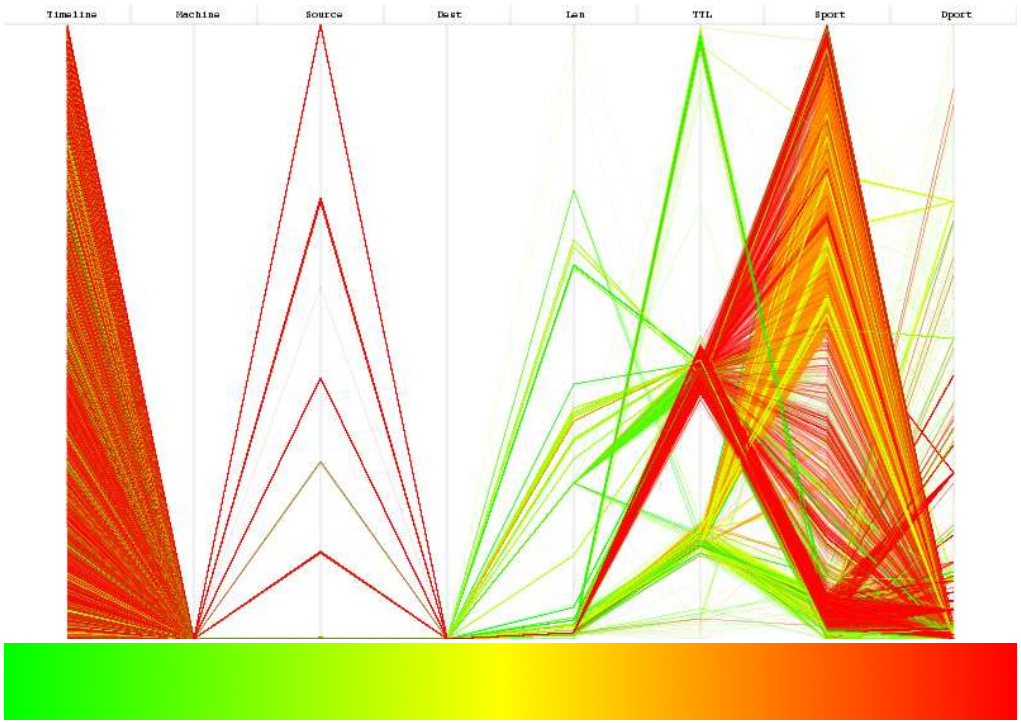
Heatlines

The more the line is drawn, the more red it gets



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Picviz::Dshield

```
use Picviz::Dshield;
$dshield = Picviz::Dshield->new();

if ($dshield->ip_check("192.168.1.42")) {
    print "IP found";
} else {
    print "IP not found";
}
```

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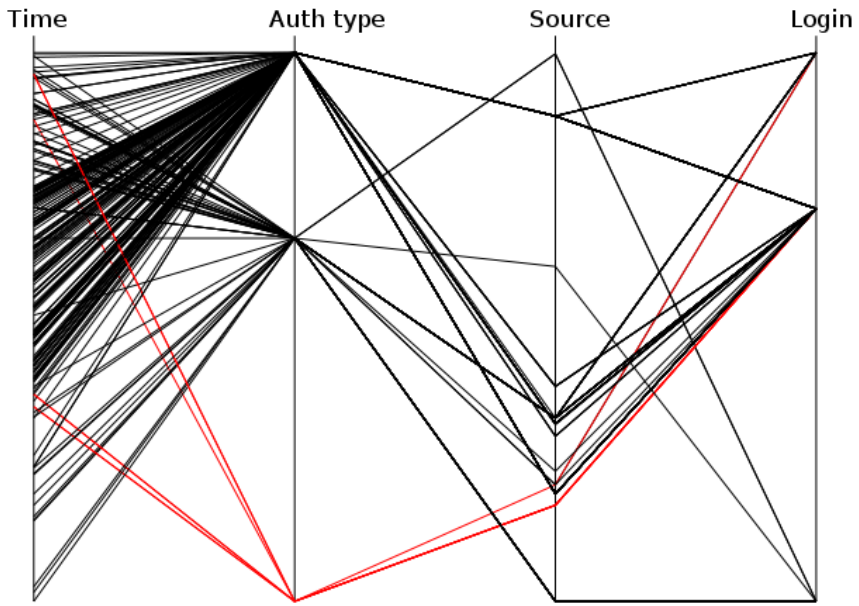
SSH authentication



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Artcor.pl

- Simple script written from looking at PC images
- Alert if:
  - IP and port matches Dshield database
  - Same login authentications from multiple IP addresses
  - Several authentication methods used

Questions ?

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http://www.wallinfire.net/picviz
Slides: http://www.wallinfire.net/files/picviz-hacklu2008.pdf