

SOFTWARE ANALYTICS - AND HOW TO DRAW CONCLUSIONS OUT OF DATA

Presenting the sw-analytics toolkit!

CONTEXT



- What are software metrics?
 - LOC, #defects, #contributors, cyclomatic complexity, ...
- Which metric is the best?
 - None?
- Can SW metrics be used to draw conclusions about software?

SW-ANALYTICS TOOLKIT



- Scrapes VCS & issue tracker
 - Analyzes everything on function granularity
 - Stores in RDBMS

- Web-based “Exploratory visualization”
 - Subsystem – file - function

TREEMAP - OVERVIEW

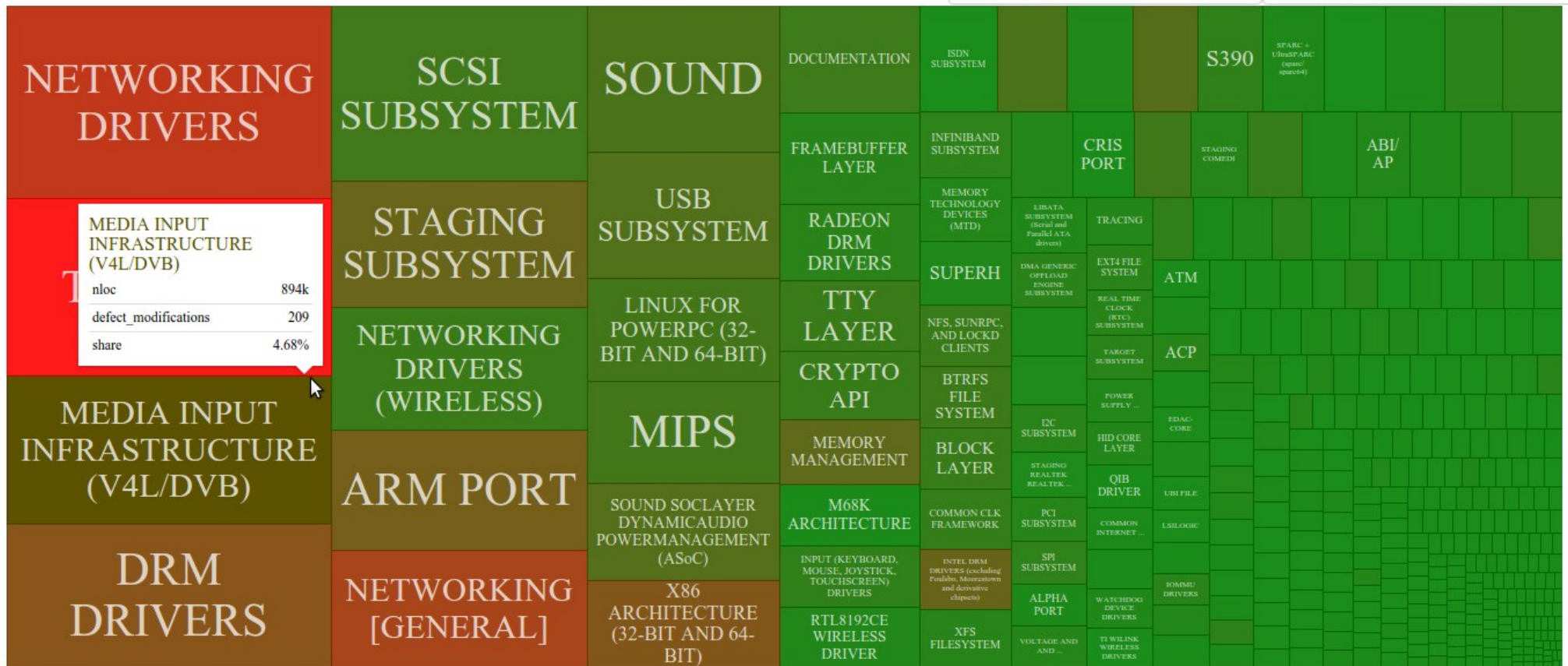


Last database update: (

Treemap Charts /docs

Root

Size: nloc Color: defect_modifications



TREEMAP - OVERVIEW

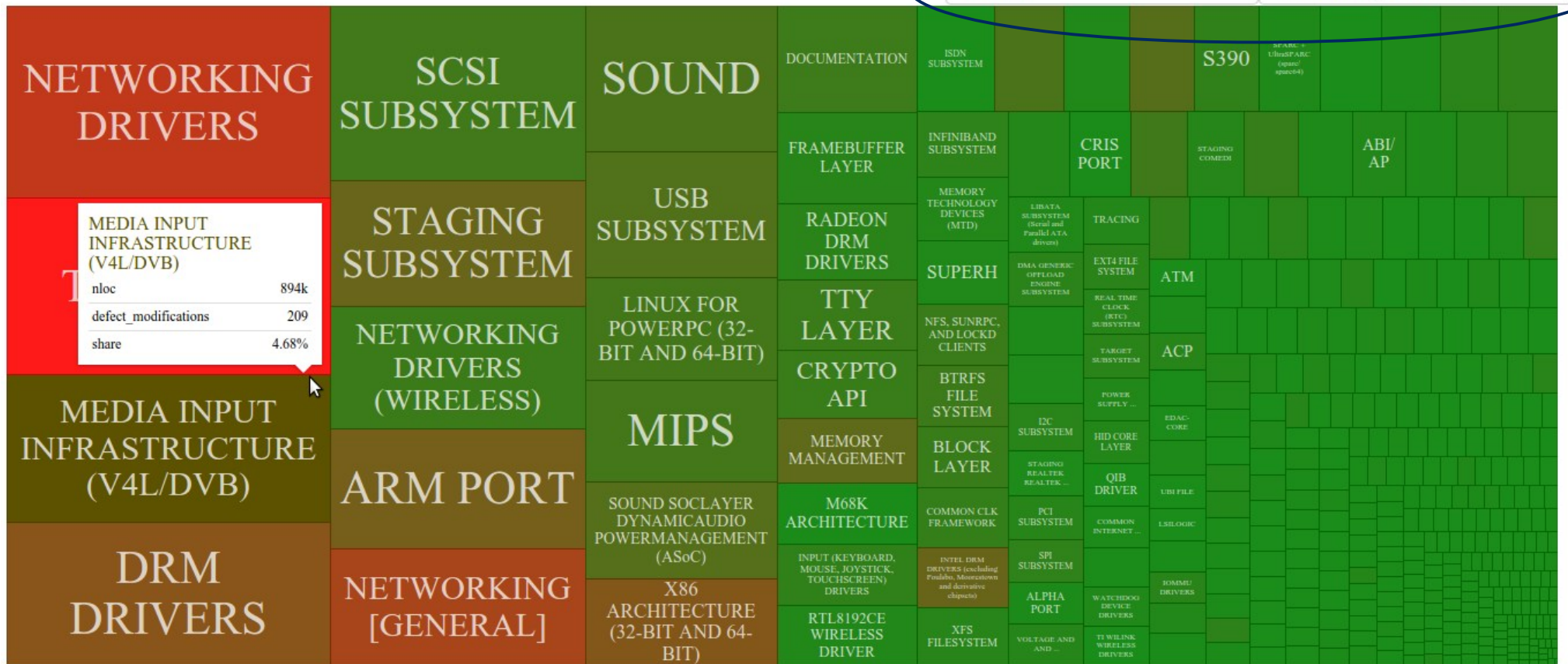


Last database update: (

Treemap [Charts](#) [/docs](#)

Root

Size: nloc Color: defect_modifications



TREEMAP - SUBSYSTEMS



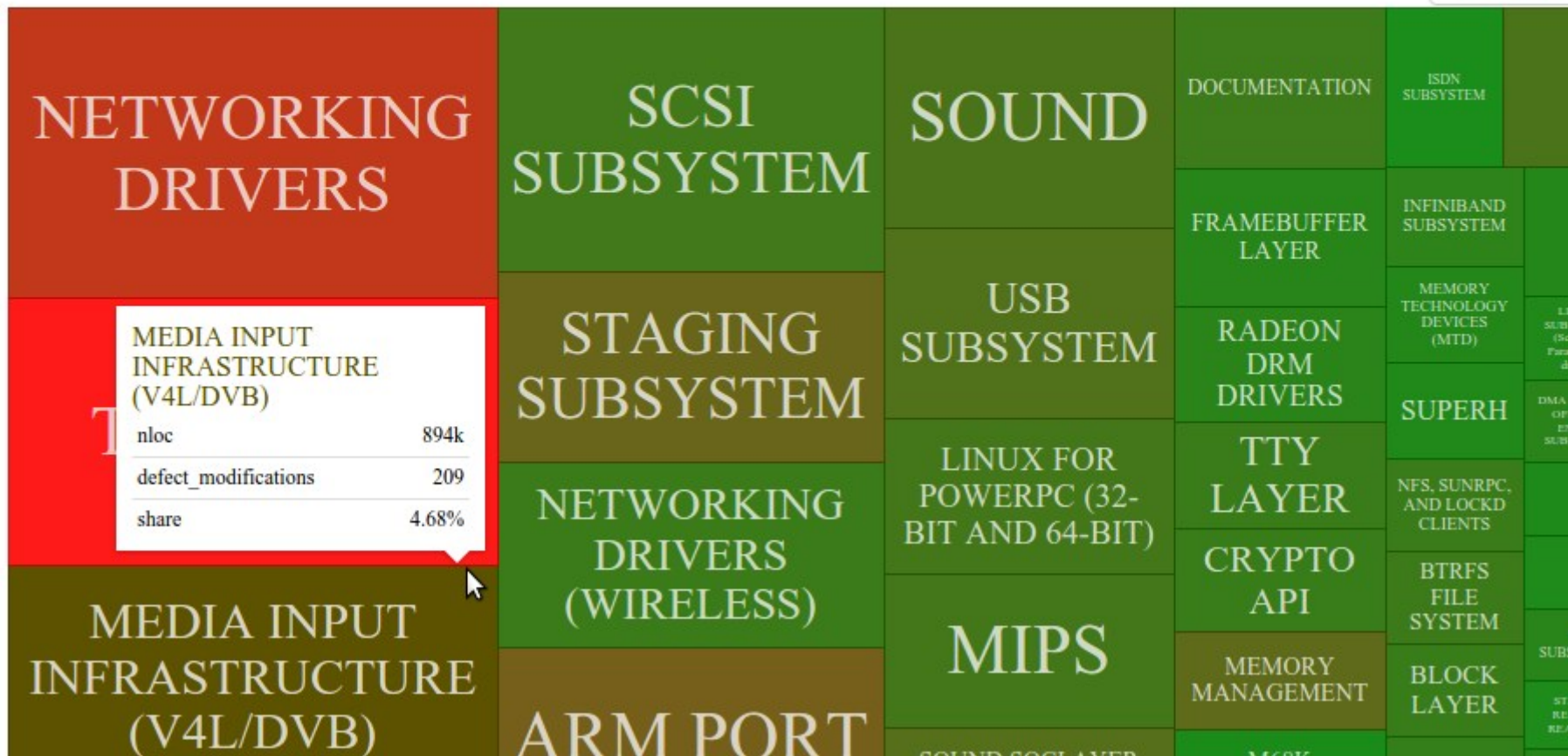
Treemap

Charts

/docs

Root

Size: nloc

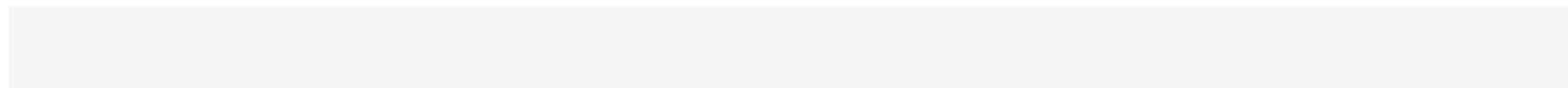


TREEMAP - FILES

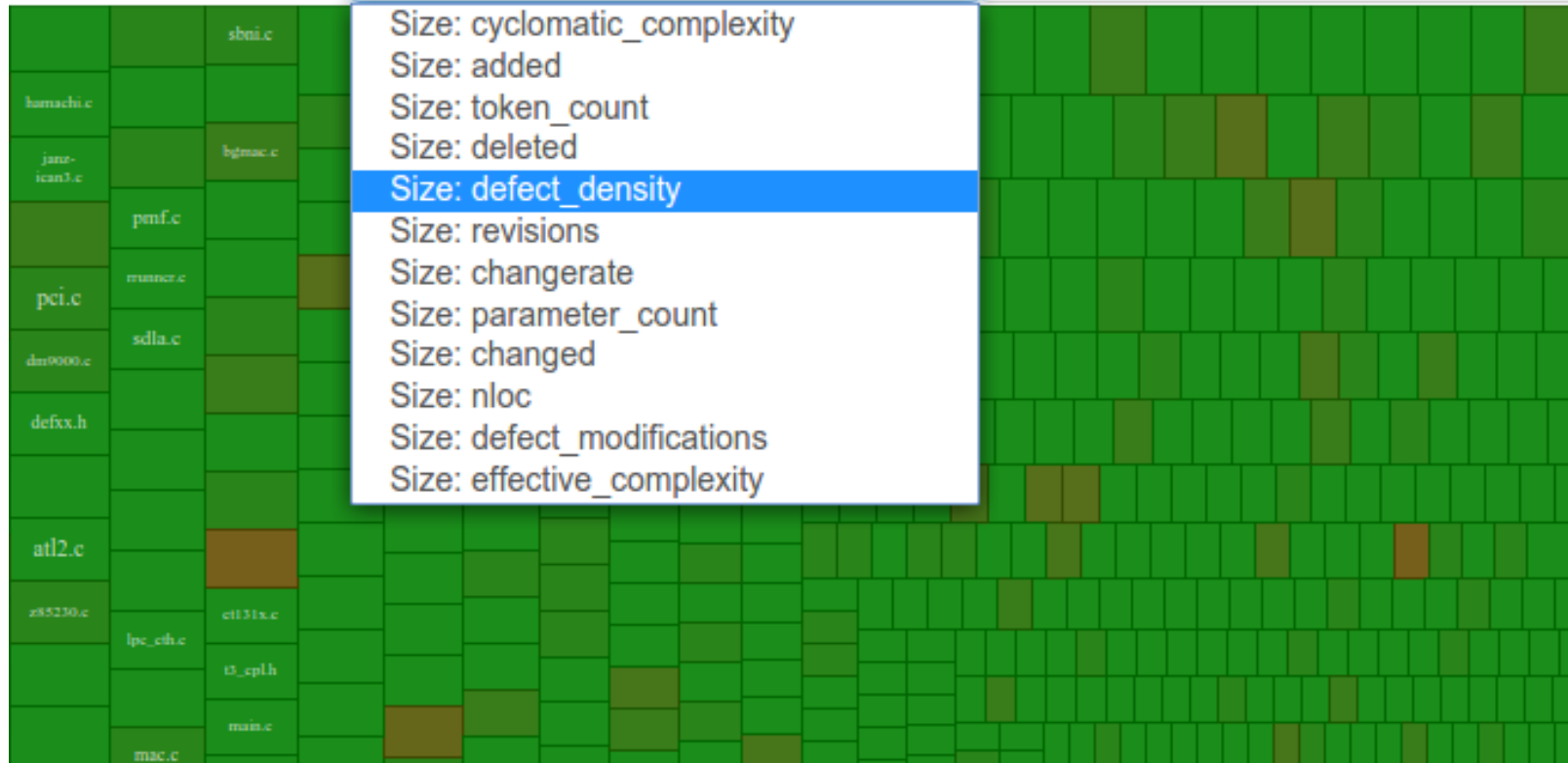


Charts /docs

Last database update: Oc



Size: nloc Color: defect_modifications



TREEMAP - FUNCTIONS



Treemap

Charts

Root / NETWORKING DRIVERS / netdev.c

e1000_flush_desc_rings

defect_modifications 3

cyclomatic_complexity 4

share 8.33%

Global Scope

e1000_flush_desc_rings

e1000e_cyclecou

e1000_clean

e1000e_down

e1000_conf

1000

CHART - FILE & FUNCTION



Last database update: Oct. 1

Treemap Charts /docs

Search...

- ixgbe_phy.c
- ixgbe_ptp.c
- ixgbe_sysfs.c
- ixgbe_sriov.c
- Global Scope
- ixgbe_check_vf_rate_limit
- ixgbe_link_mbps
- ixgbe_set_vf_rate_limit
- ixgbe_ndo_set_vf_bw
- ixgbe_ndo_set_vf_spoofchk
- ixgbe_check_vf_assignment
- ixgbe_find_enabled_vfs
- ixgbe_enable_port_vlan
- ixgbe_disable_port_vlan

Metric	Histogram Interval	Currently Active
cyclomatic_complexity		Line Histogram None
added		Line Histogram None
token_count		Line Histogram None
deleted		Line Histogram None
changerate		Line Histogram None
parameter_count		Line Histogram None
changed		Line Histogram None
nloc		Line Histogram None
defect_modifications	<input type="text" value="100"/>	Line Histogram None

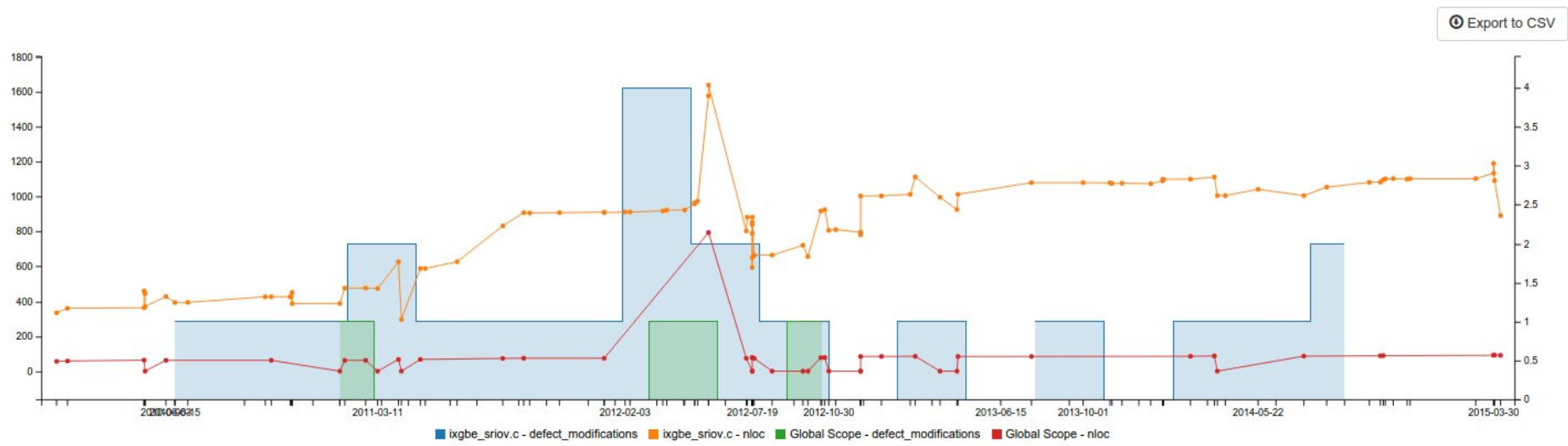


CHART – FILE & FUNCTION



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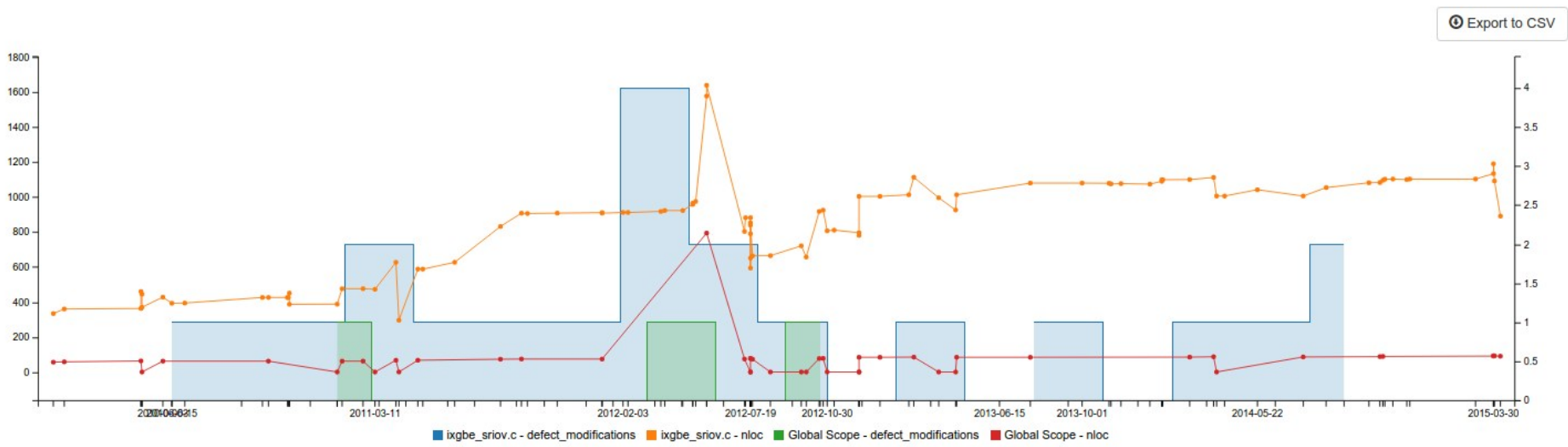


CHART - FILE & FUNCTION



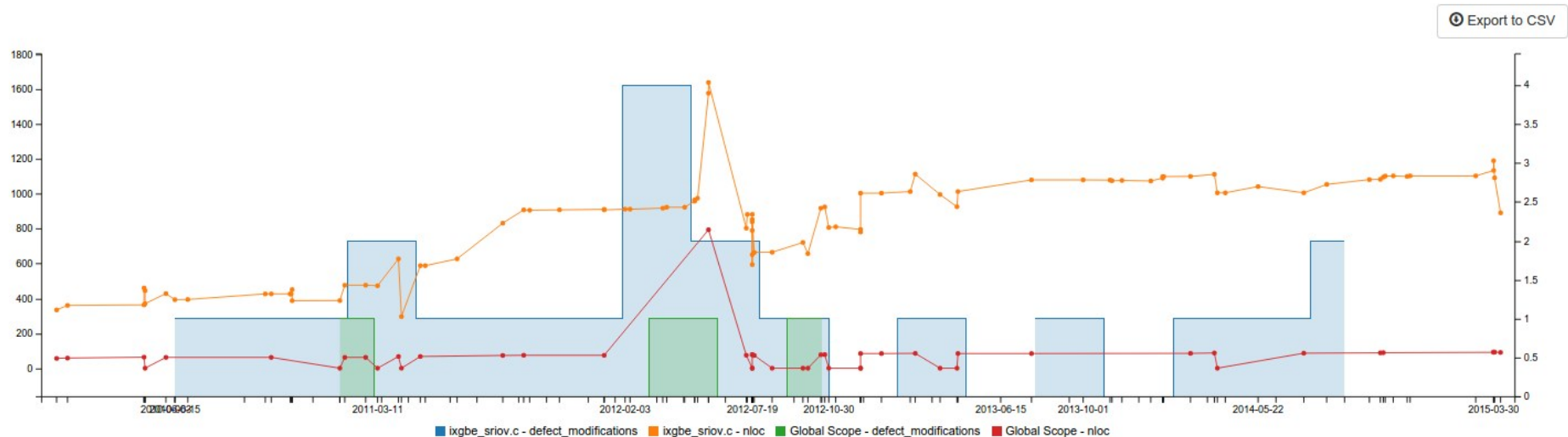
Last database update: Oct. 1

Treemap Charts /docs

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nloc		Line Histogram None
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COMING ATTRACTIONS



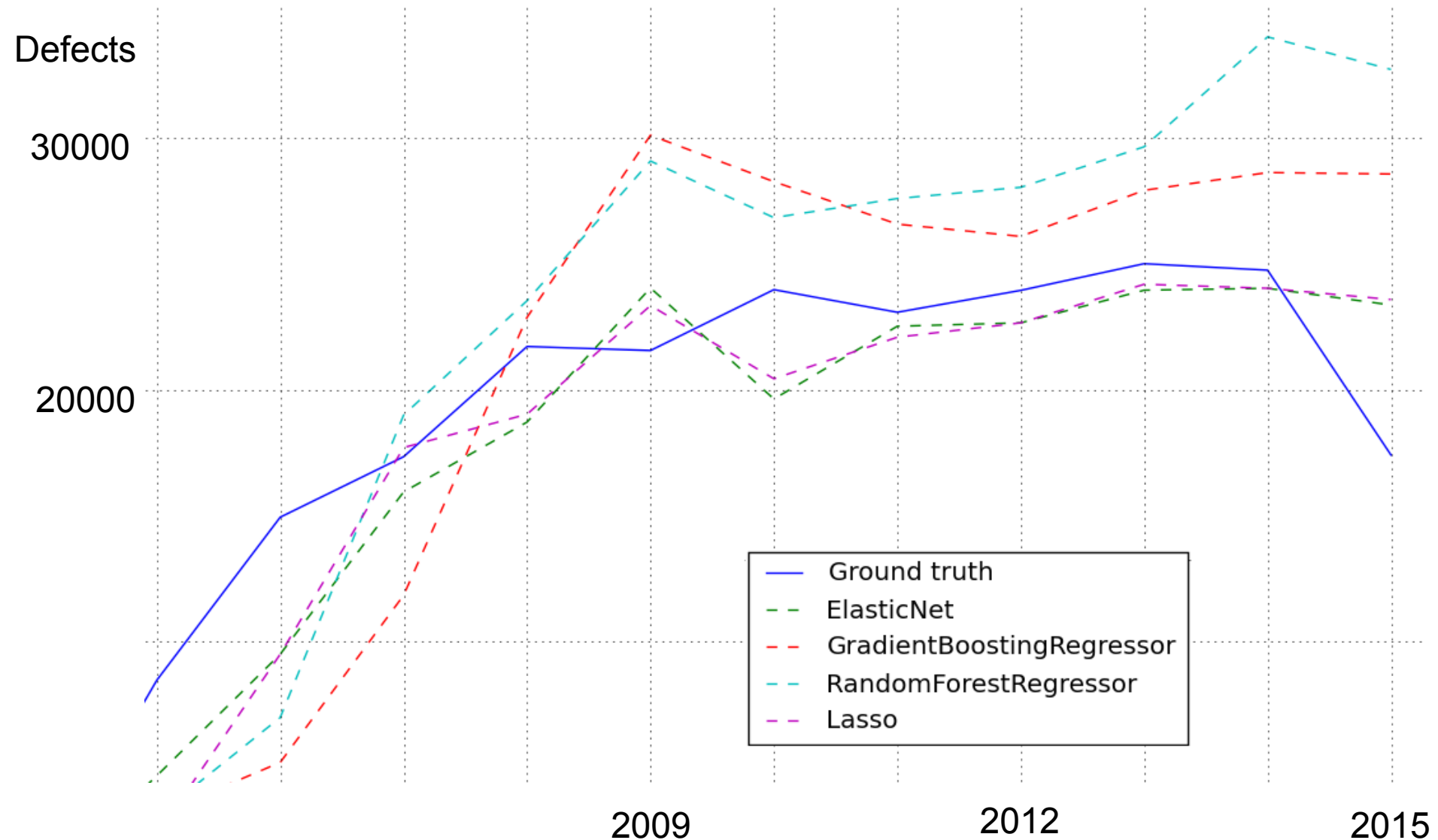
- Defect predictions
 - Subsystem – file – function

- Automatic redesign/refactoring identification
 - Effort distribution

-

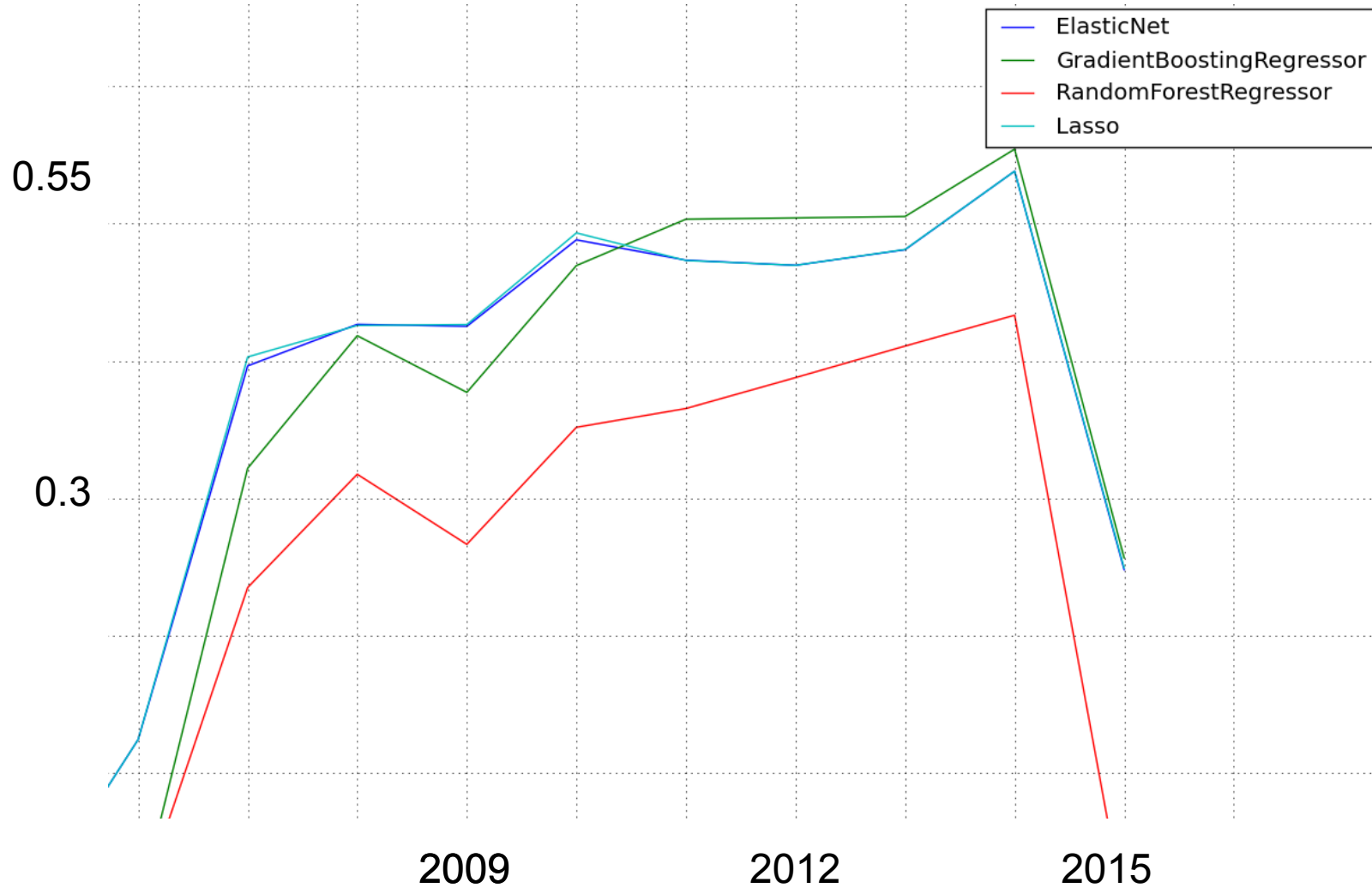
DEFECT PREDICTION

SUM OF ALL DEFECTS



DEFECT PREDICTION

R² OVER TIME

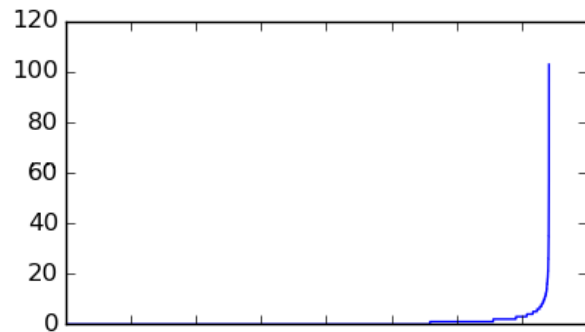


DEFECT PREDICTION

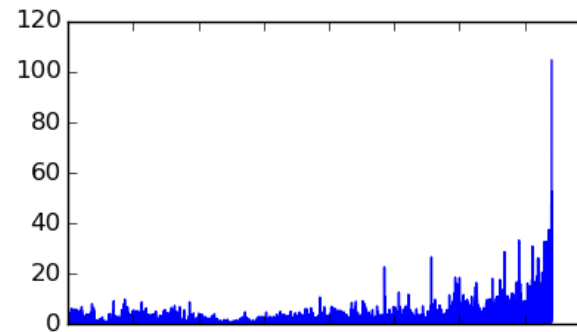
PER FILE FOR 2014



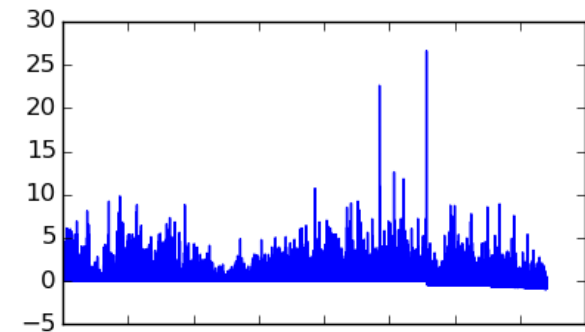
RandomForestRegressor



Ground truth



Predicted



predicted/truth

CONCLUSIONS



- No single metric exists that will tell you what your problem is!
- SW-analytics toolkit helps you analyze your code in a robust way
- SW-analytics toolkit have some really cool features coming up! =)



SW-ANALYTICS TOOLKIT:

<http://www.github.com/jderehag/swat>



ERICSSON