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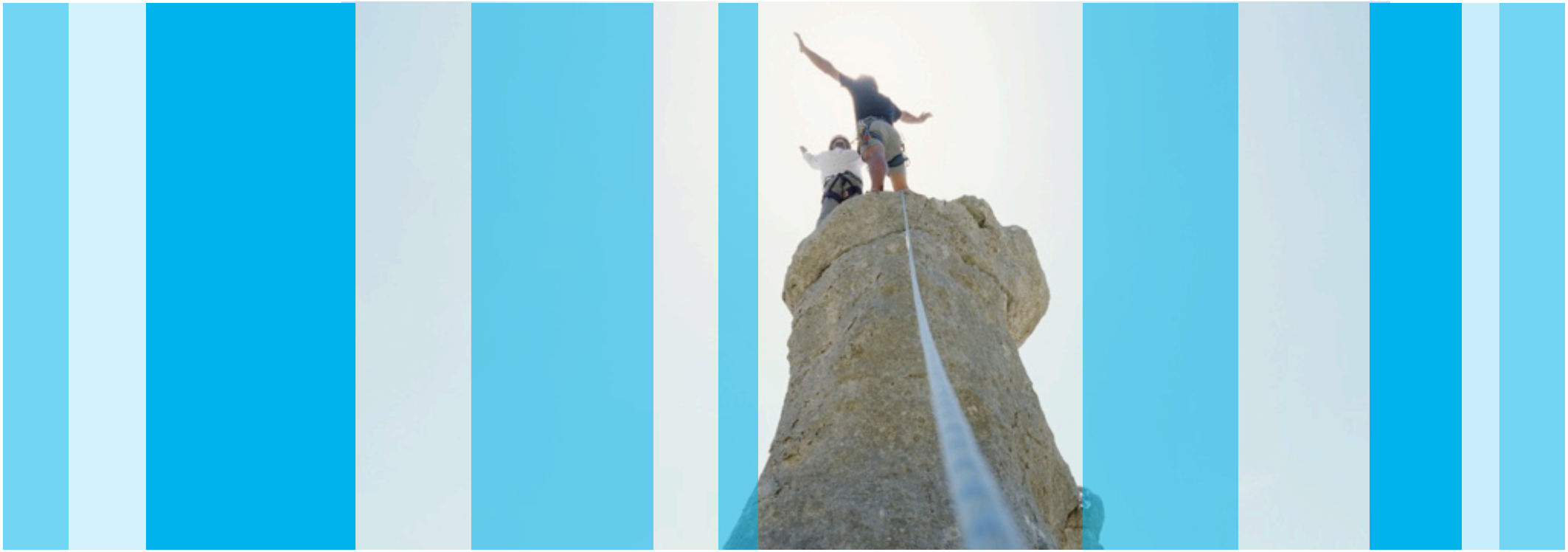

Quantifying the Analyzability of Software Architectures

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The capability of the software product to be diagnosed for deficiencies or causes of failures in the software, or for the parts to be modified to be identified

International Organization for Standardization.

ISO/IEC 9126-1: Software engineering - product quality - part 1: Quality model, 2001.

Component Balance

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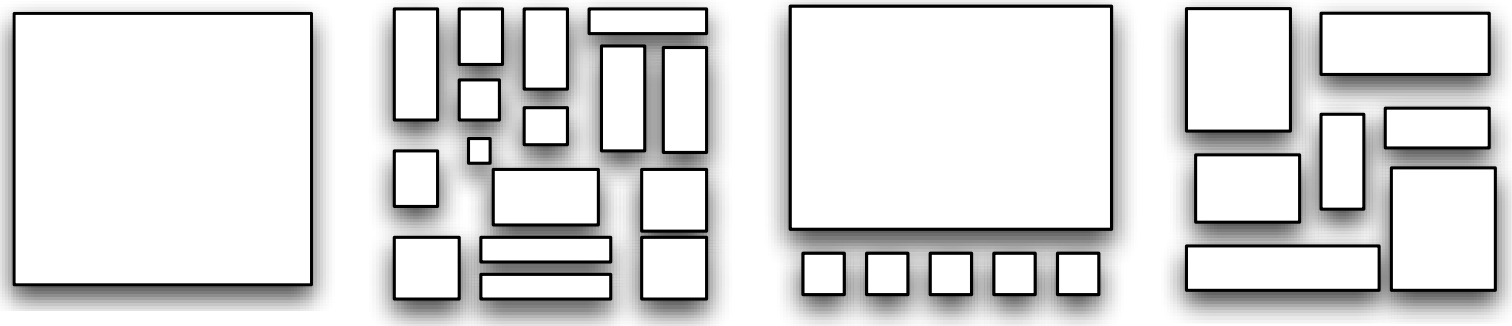

System Breakdown:	0	0.1	0.8	0.8
Component Size Uniformity:	x 1	x 0.8	x 0.2	x 0.8
Component Balance:	0	0.08	0.16	0.64

System Breakdown

How many components are ‘normal’?

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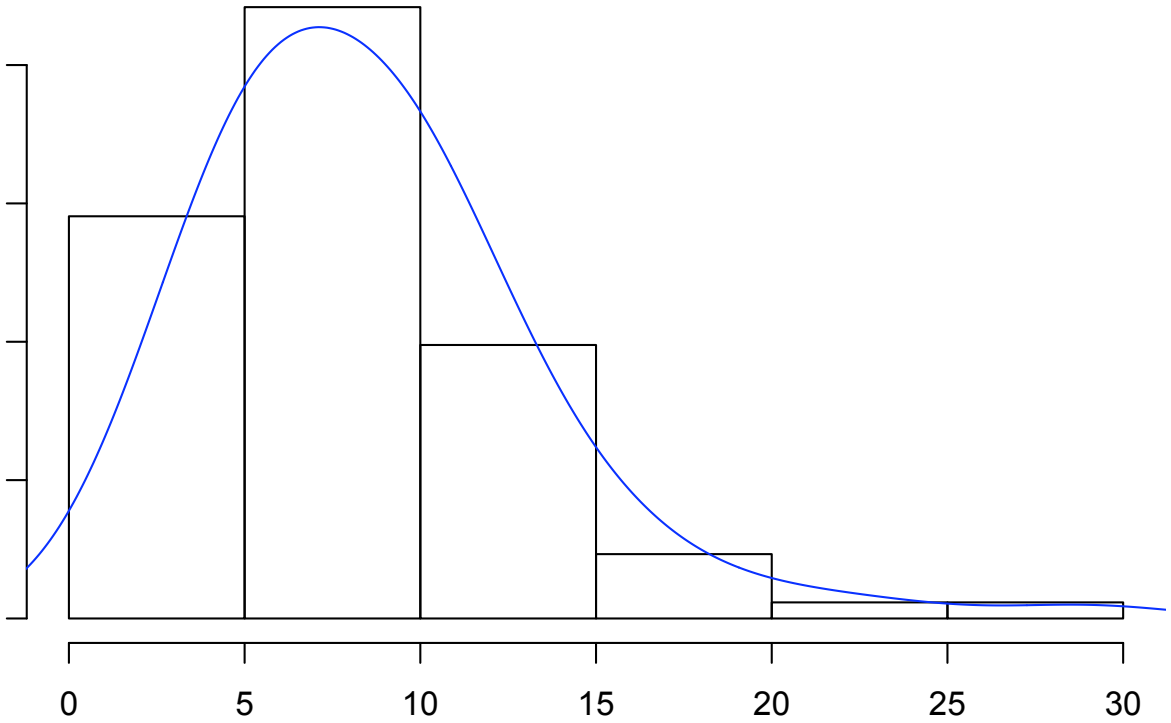
	Java	.NET	C/C++	Total
Industry	35	19	5	59
Open source	17	4	6	27
Total	52	23	11	86



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Size Distribution metrics:

Gini coefficient (Gini)

C. Gini. Measurement of inequality of income. Economic Journal, 31:22–43, 1921.

Module Size Uniformity Index (MSUI)

S. Sarkar, G. M. Rama, and A. C. Kak. API-based and information- theoretic metrics for measuring the quality of software modularization. IEEE Transactions of Software Engineering, 33(1):14–32, 2007.

Evaluation
Making the right choices

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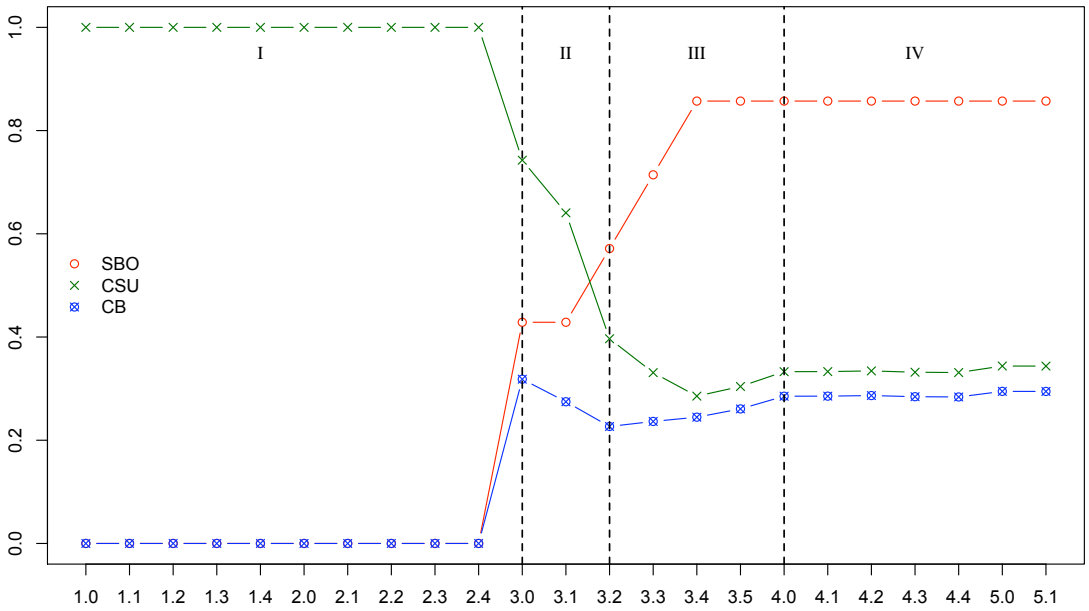
Quantitative

Compare ratings given by experts with values of metric

System	Language	$\|C\|$	KLOC	Rating
A	Java	8	53	2
B	Java	10	153	3
C	VB.NET	2	87	2.25
D	C#	11	22	2
E	C#	9	82	2
F	Java	5	273	3
G	Java	5	64	2.5
H	Java	51	333	1
I	Java	5	35	3.5
J	Java	5	25	3
K	Java	11	145	2
L	Java	14	512	2
M	C#	16	125	2
N	Java	9	197	5

Qualitative

Case-study on value of metric for Checkstyle



Contributions

- An empirical exploration of how systems are decomposed into top-level components
- A metric to measure the balance of components which is usable across all life-cycle phases of a project
- The metric is correlated with the opinion of experts about the analyzability of a software system

Future Work
Combination with dependencies

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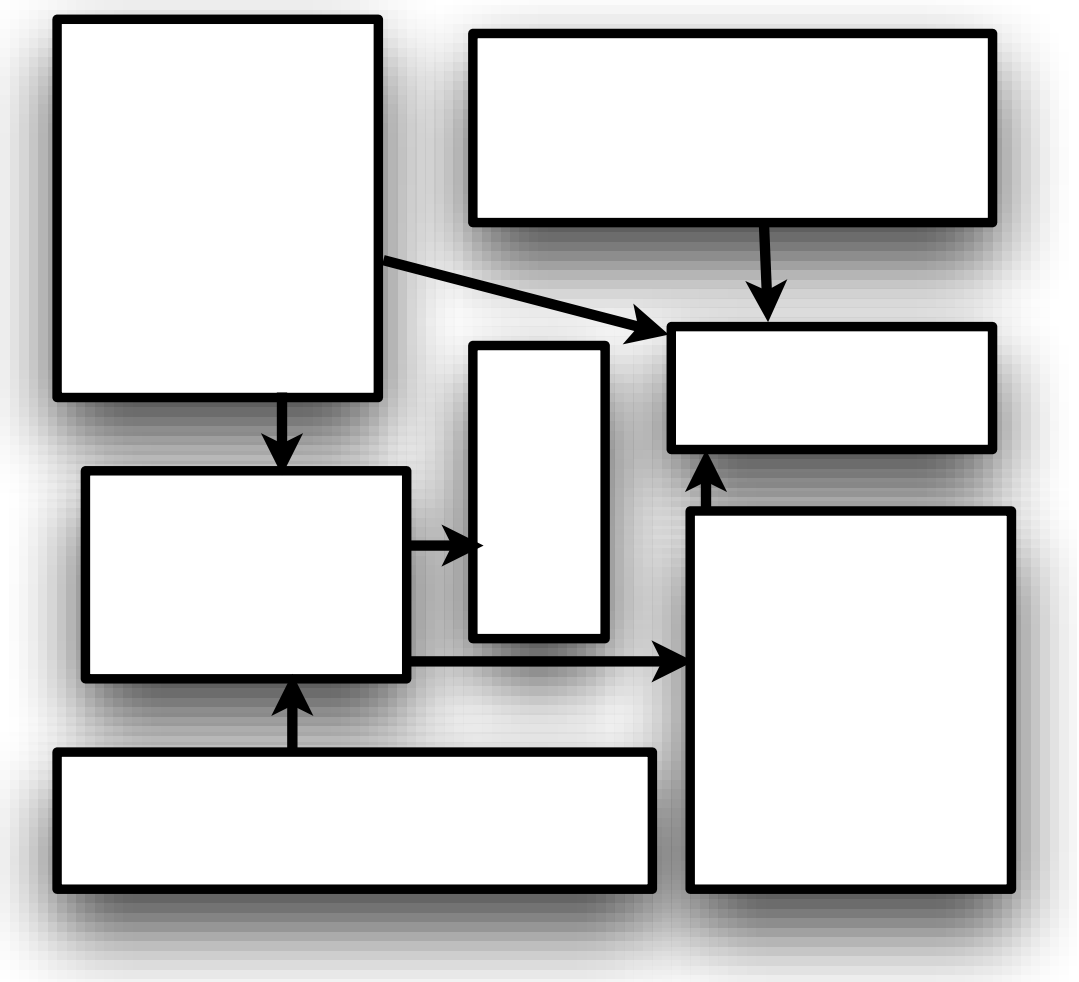

Thank you

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