



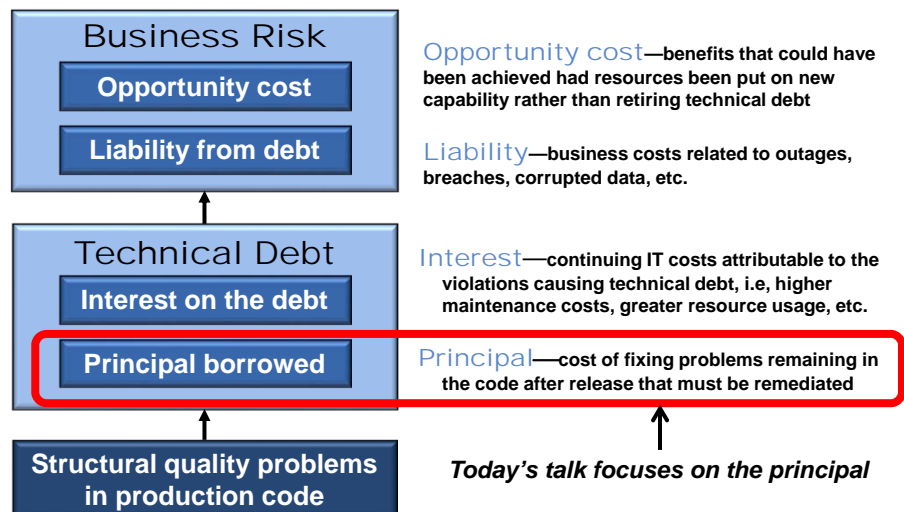
Estimating the Principal of Technical Debt

Bill Curtis, Jay Sappidi, & Alexandra Szyrkarski
CAST Research Labs

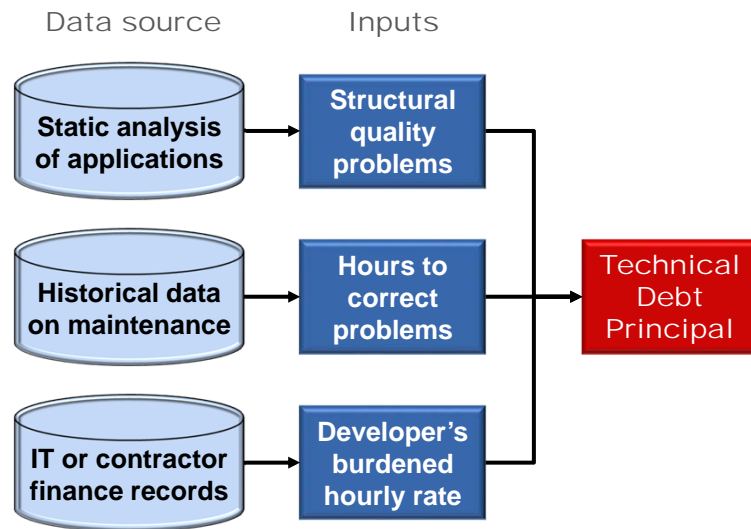
WTD'12
June 5, 2012

The Technical Debt Metaphor

Technical Debt — the future cost of defects remaining in code at release, a component of the cost of ownership



Inputs for Estimating the Principal of Technical Debt



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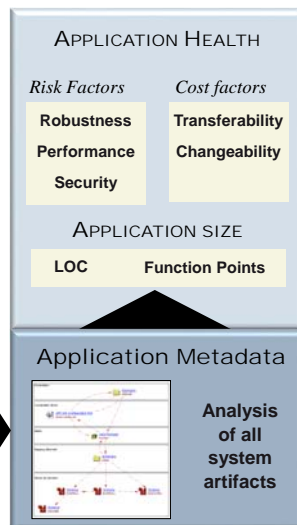
Analyzing and Measuring Structural Quality

CAST Application Intelligence Platform

ANALYZERS

Oracle PL/SQL
Sybase T-SQL
SQL Server T-SQL
IBM SQL/PSM
C, C++, C#
Pro C
Cobol
CICS
Visual Basic
VB.Net
ASP.Net
Java, J2EE
JSP
XML, HTML
Javascript
VBScript
PHP
PowerBuilder
Oracle Forms
PeopleSoft
SAP ABAP,
Netweaver
Tibco
Business Objects
Universal Analyzer

APP KNOWLEDGE BASE



DASHBOARDS & PORTALS

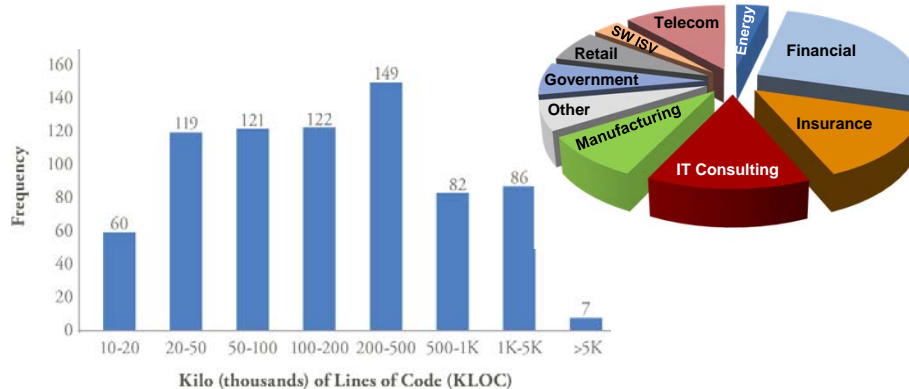


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Appmarq — CAST's Structural Quality Repository

- Industry-leading repository on structural quality
 - 745 Applications
 - 160 Companies, 14 Countries
 - 321,259,160 Lines of Code; 59,511,706 Violations



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Formulas for Estimating Technical Debt Principal

	% Violations to be fixed		Hours to Fix		Cost /Hour	
	Old	New	Old	New	Old	New
High Severity	50%	100%	1	3	\$75	\$75
Medium Severity	25%	50%	1	1	\$75	\$75
Low Severity	10%	0%	1	NA	\$75	NA

Estimated Technical Debt Principal =

$(\sum \text{high severity violations}) \times (\% \text{ to be fixed}) \times (\text{average hours to fix}) \times (\$ \text{ per hour}) +$
 $(\sum \text{medium severity violations}) \times (\% \text{ to be fixed}) \times (\text{average hours to fix}) \times (\$ \text{ per hour}) +$
 $(\sum \text{low severity violations}) \times (\% \text{ to be fixed}) \times (\text{average hours to fix}) \times (\$ \text{ per hour})$

- This is an **estimate** of Technical Debt Principal
- Customers can get more accurate estimates by adjusting the parameters in the equation

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Technical Debt Principal Estimates for Both Formulas

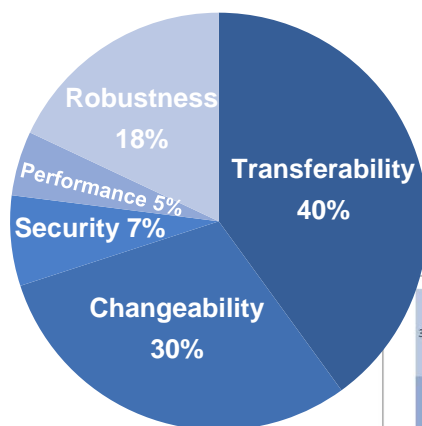
	Mean		Median		Minimum		Maximum		Std. Deviation	
	Old	New	Old	New	Old	New	Old	New	Old	New
Sample (n=744)	3.61	10.26	2.79	7.94	0.02	0.01	49.72	253.03	3.34	10.57
.NET (n=63)	3.09	12.29	2.37	10.20	0.96	0.49	16.52	73.00	2.70	11.47
ABAP (n=72)	0.43	1.90	0.41	1.73	0.05	2.00	1.42	6.89	0.23	1.08
C (n=44)	2.62	7.65	2.18	6.46	0.02	0.01	12.82	31.89	2.58	6.92
C++ (n=30)	4.33	12.95	2.41	7.83	0.02	0.01	38.08	132.91	7.02	24.42
JavaEE (n=474)	5.42	14.68	5.13	13.66	0.07	0.23	49.72	253.03	3.91	12.76
Or-Forms (n=45)	4.57	21.16	1.12	3.87	0.49	1.13	30.23	151.93	6.60	33.92
V. Basic (n=16)	2.93	9.83	2.58	8.37	0.68	2.77	12.14	45.01	2.80	10.24

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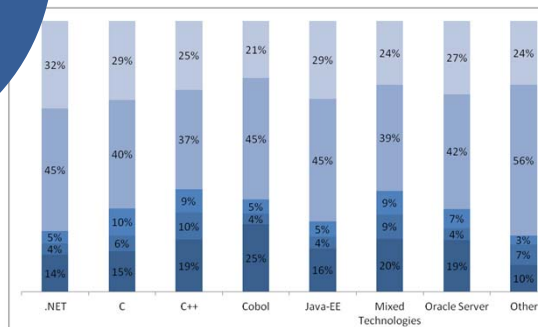
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Estimates of Technical Debt Principal by Health Factor



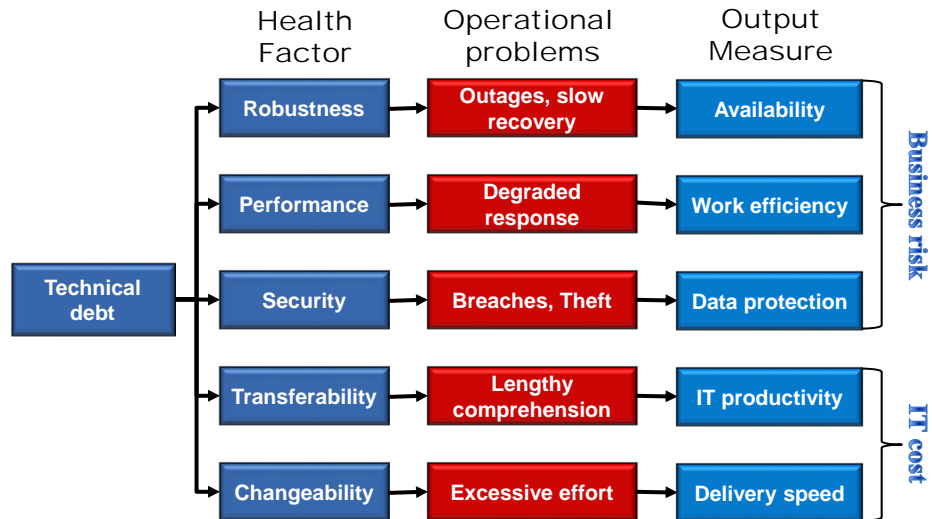
- 70% of Technical Debt is in IT Cost (Transferability, Changeability)
- 30% of Technical Debt is in Business Risk (Robustness, Performance, Security)
- Health Factor proportions are mostly consistent across technologies



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Relating Technical Debt to Business Value

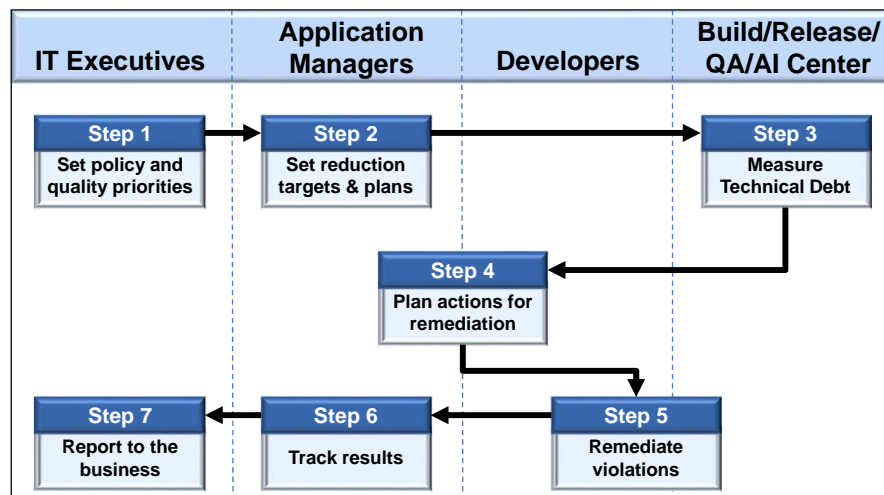


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Technical Debt Management Cycle



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