

Understanding the SQALE Model

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CMU

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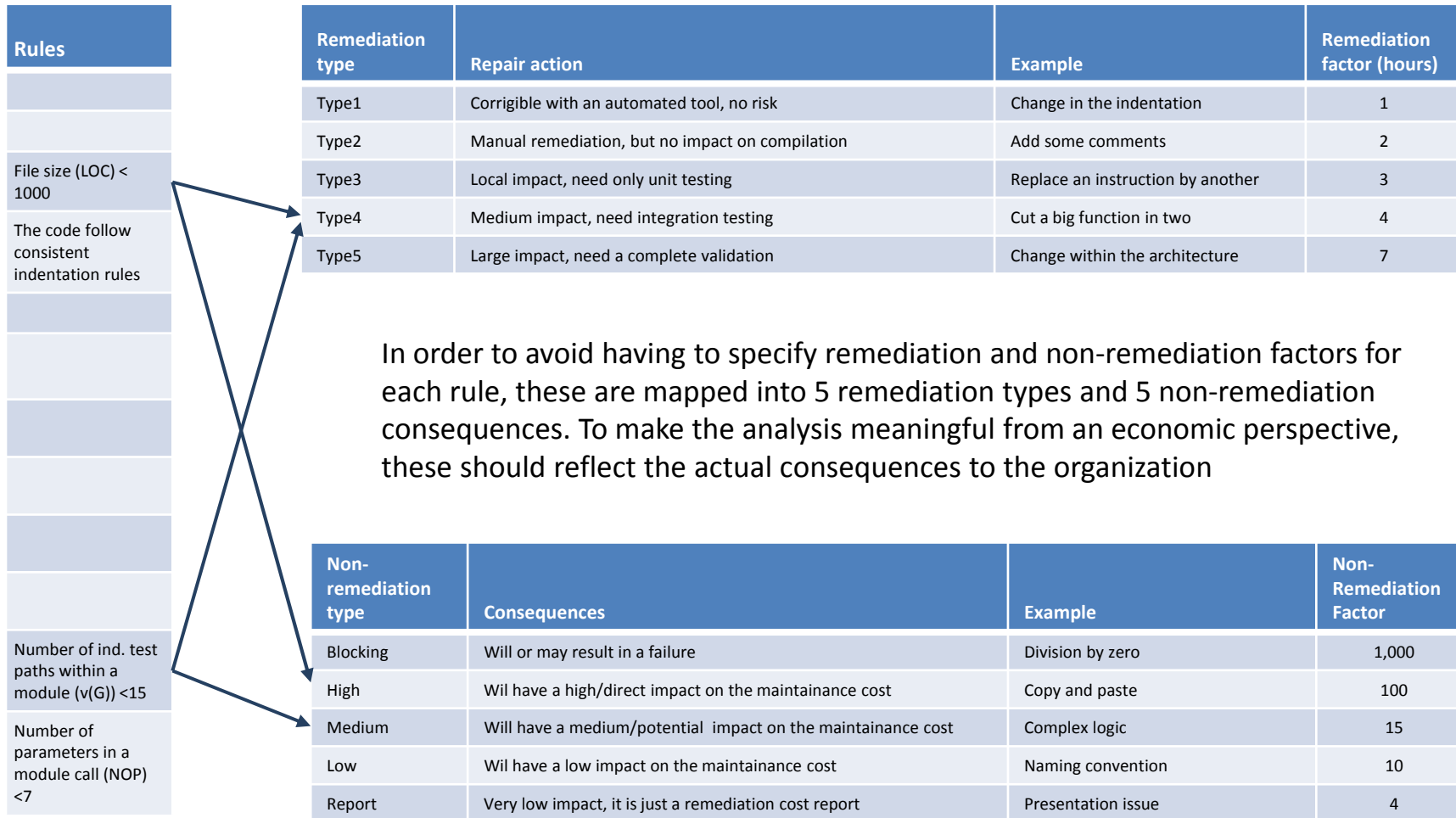
SQALE Model

Quality model			Non – compliances with SQALE quality model				Factors		Remediation & Non - Remediation cost			
Characteristic	Sub characteristic	Rule	File ₁	File ₂		File _n	Remediation factor (cost of rectifying a single non-compliance)	Non Remediation factor (cost incurred by not rectifying a single non-compliance)	File ₁	File ₂		File _n
Maintainability	Readability	File size (LOC) < 1000	1				4	10	4, 10			
		The code follow consistent indentation rules										
	Understandability		1	1			2	4	2, 4	2, 4		
						2	7	100				14, 200
Testability	Unit testing testability						3	1000				
		Number of ind. test paths within a module (v(G)) <15				3	1	10				3, 30
		Number of parameters in a module call (NOP) <7	1				3	15	3, 15			

X

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Factors and types

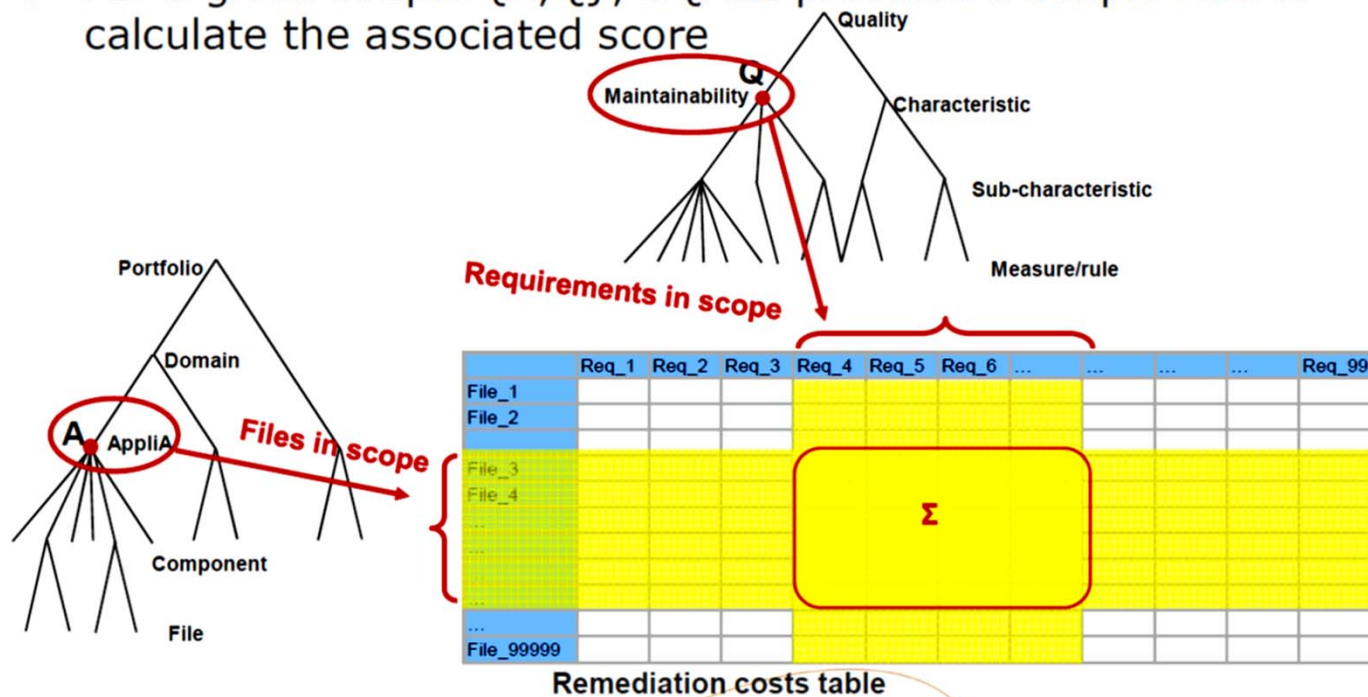


SQALE's Hierarchies

The SQALE Analysis Model



- For a given couple {A,Q}, SQALE provides a simple rule to calculate the associated score



The positions into the 2 hierarchies define the perimeter of remediation costs to be added

Source Code Quality Evaluation:
The SQALE method, Labouze, 2011

Indices and consolidate indices

Characteristic	File ₁	File ₂	File _n	Indices	File ₁	File ₂	File _n																					
Reusability				SRuI																								
Portability				SPI																								
Maintainability	4, 10			SMI				8																				
	2, 4	2, 4			6		2																					
Security			14, 200	SSI				14																				
Efficiency				SEI																								
Changeability				SCI																								
Reliability				SRI																								
Testability			3, 15	STI	3			3																				
	3, 12																											
Consolidated indices					SCTI = 3	SCRI = 3	SCCI = 3	SCEI = 3	SCSI = 9	SCMI = 9	SCPI = 9	SCRuI = 9	SCTI = 0	SCRI = 0	SCCI = 0	SCEI = 0	SCSI = 0	SCMI = 2	SCPI = 2	SCRuI = 2	SCTI = 3	SCRI = 3	SCCI = 3	SCEI = 3	SCSI = 17	SCMI = 17	SCPI = 17	SCRuI = 17
Technical debt = SQI					9				2				17				28											

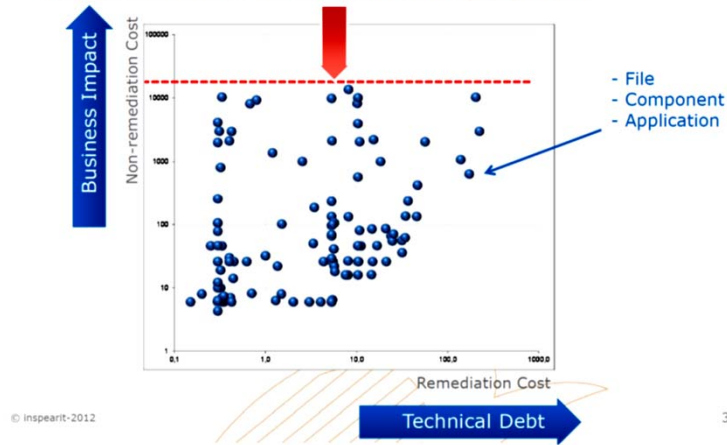
Business Impact

Characteristic	Sub characteristic	File ₁			File ₂							File _n							SBII							
		File ₁	File ₂	File _n	File ₁	File ₂	File _n	File ₁	File ₂	File _n	File ₁	File ₂	File _n													
Reusability																										
Portability																										
Maintainability	Readability	4, 10																								
		2, 4	2, 4					14					4													
	Understandability																									
Security				14, 200												200										
Efficiency																										
Changeability																										
Reliability																										
Testability	Unit testing testability																									
				3, 15					15						15											
		3, 15																								
Business Impact Index = SBII					29							4							215							248

Strategies

The SQALE Debt Map

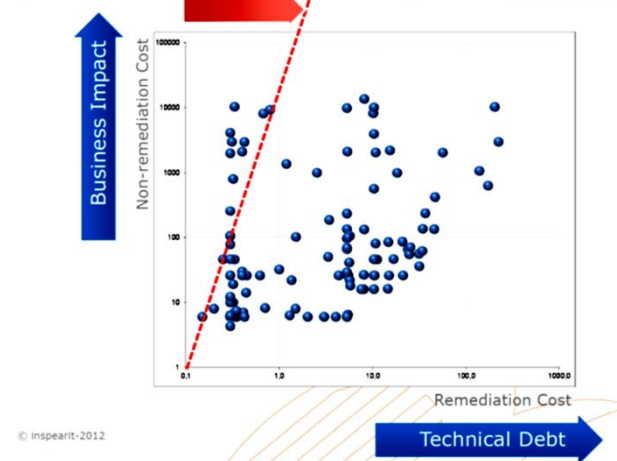
- ⚡ An analysis indicator valid at all artifact level. Use the business impact to support the **business perspective**



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Optimize your remediation budget

- ⚡ Use the impact/cost ratio to support the **combined perspective**



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Analyze your Technical Debt

- ⚡ The SQALE Pyramid provides a **technical perspective: Impact** on the project's activities

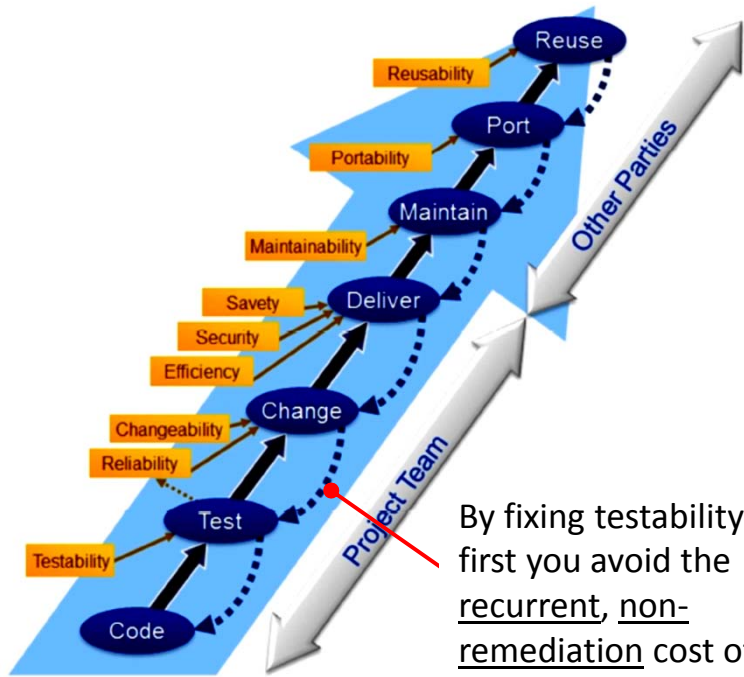


SQALE Pyramid		Cost	Total
Portability		0.8	1,314.4
Maintainability		353.7	1,313.6
Security		32.1	959.9
Efficiency		39.1	927.8
Changeability		665.7	888.7
Reliability		146.0	223.0
Testability		77.0	77.0



Adapted from Source Code Quality Evaluation: The SQALE method, Letouzey, 2011

SQALE Pyramid: Discussion



The SQALE Method for Evaluating Technical Debt
Jean-Louis Letouzey, ICSE 2012

By fixing testability first you avoid the recurrent, non-remediation cost of testing non-compliances every time you repair something higher-up in the SQALE pyramid

While the pyramid makes sense in terms of its levels, impact should be measured by the non-remediation cost and not by the cost of fixing it

Analyze your Technical Debt



- The SQALE Pyramid provides a **technical perspective**: Impact on the project's activities

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These are the remediation costs of each characteristic. These costs do not recur. Once you fix the non-compliances they are gone

Questions?