



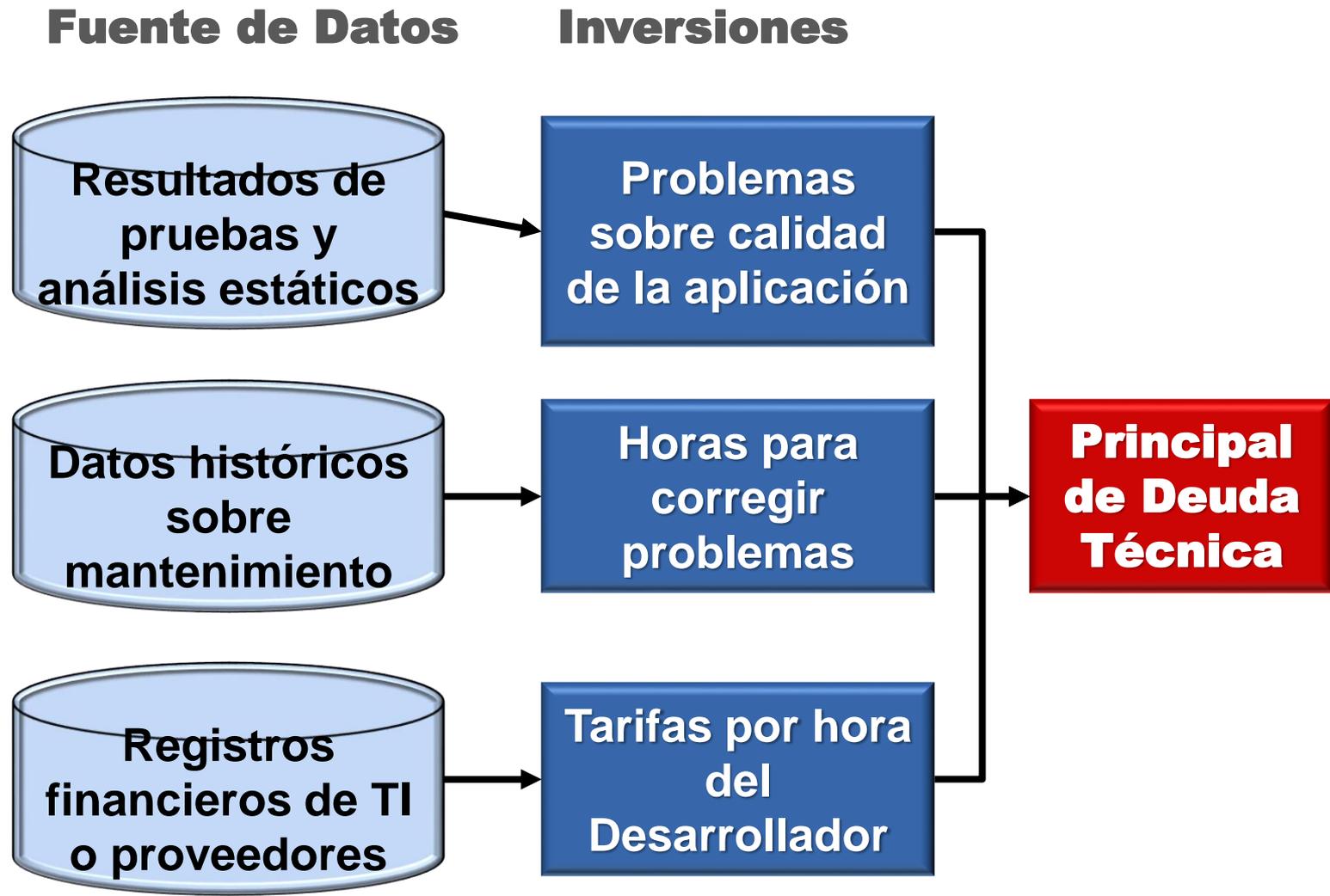
Medición y Administración de Deuda Técnica

Dr. Bill Curtis

SVP & Chief Scientist, CAST Research Labs

Director, Consorcio para IT Software Quality

Inversiones para estimar el Principal



Análisis de la calidad estructural a nivel de sistema

Analizadores Sintácticos

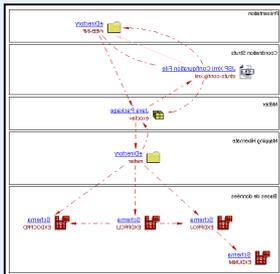
Oracle PL/SQL
Sybase T-SQL
ServidorSQL T-SQL
IBM SQL/PSM
C, C++, C#
Pro C
Cobol
CICS
Visual Basic
VB.Net
ASP.Net
Java, J2EE
JSP
XML
HTML
Javascript
VBScript
PHP
PowerBuilder
Oracle Forms
PeopleSoft
SAP ABAP,
Netweaver
Tibco
Business Objects
Analizador Universal
para otros lenguajes

Análisis de Aplicación

Plataforma de Inteligencia de Aplicación CAST

Evaluación de 1200+ reglas de codificación & de arquitectura

Metadatos de aplicación



Faltas Detectadas

Costosa operación en ciclo
Conexiones estáticas vs. agrupadas
Consulta compleja en tabla grande
Grandes índices en tabla grande

Bloque CATCH vacío
Acceso a datos no controlado
Mal manejo de la memoria
Recurso abierto no cerrado

Inyección de SQL
"Cross-site scripting"
Desbordamiento de búfer
Cadenas de formato no controladas

Código no estructurado
Mal uso de herencia
Falta de comentarios
Incumplimiento de convención de Nomenclatura

Componente altamente acoplado
Código Duplicado
Index modificado en loop
Alta Complejidad ciclométrica

Medidas de Calidad

Rendimiento

Robustez

Seguridad

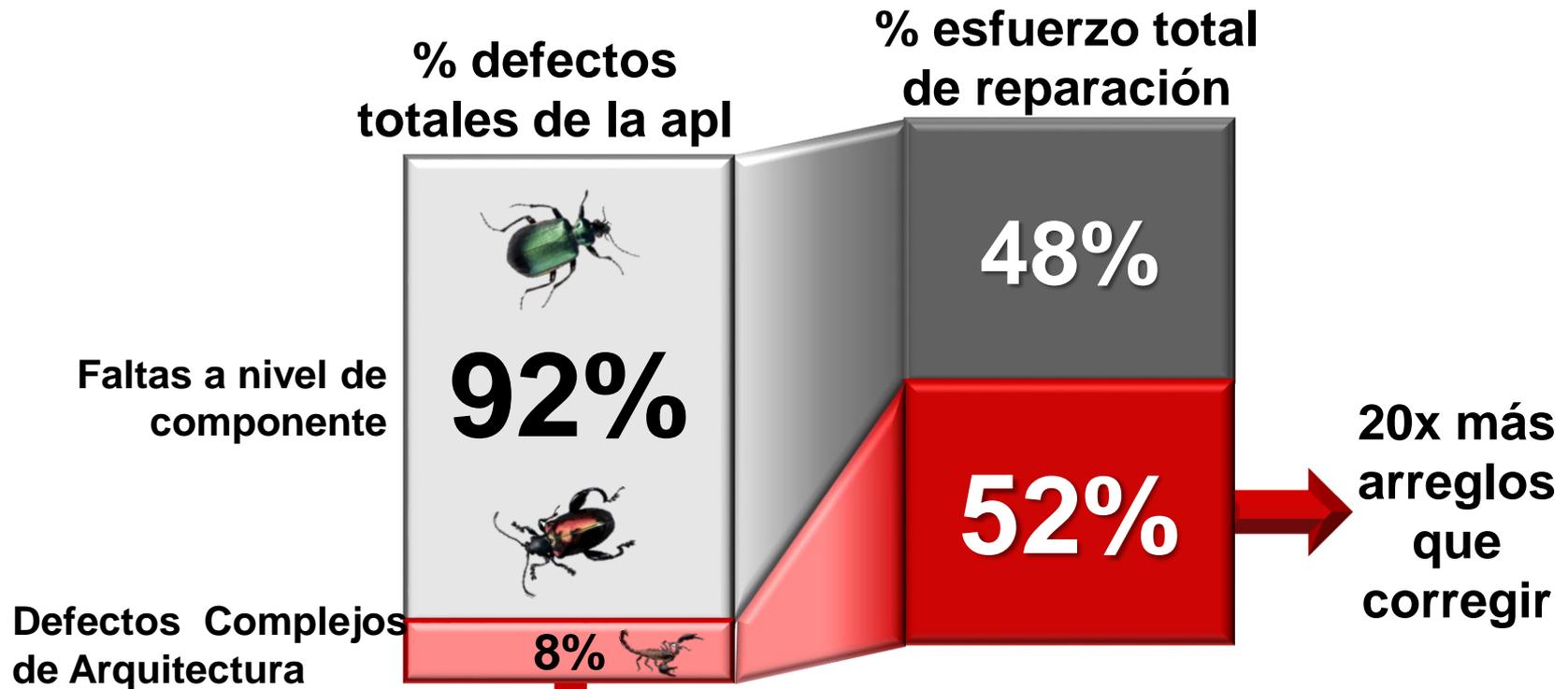
Transferibilidad

Cambiabilidad

Defectos complejos de arquitectura

Defectos Complejos de Arquitectura

Una falla estructural que involucra interacciones entre múltiples componentes que residen en diferentes estratos de la aplicación

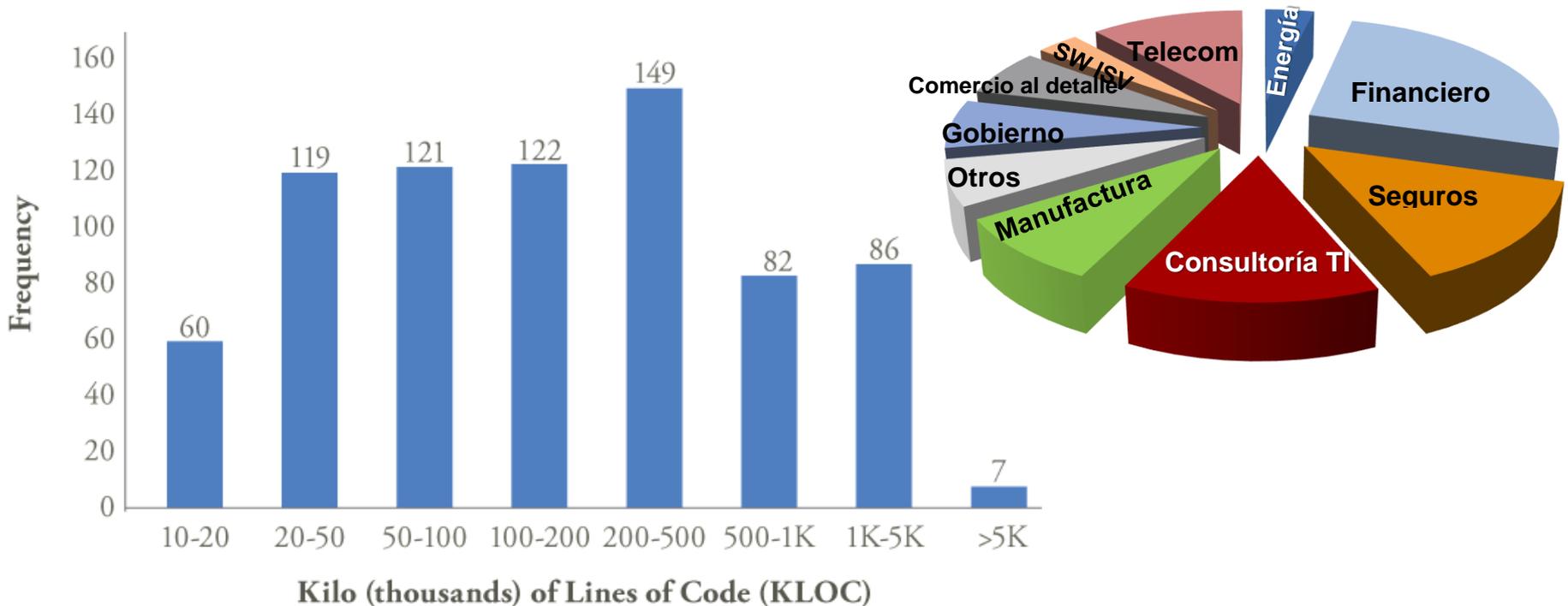


80% de los defectos complejos de arquitectura se relacionan con un **Hotspot de Arquitectura**—un componente mal diseñado que causa problemas

Los *hotspots* de arquitectura suministran una ruta para remediar los peores riesgos, el retrabajo y los generadores de costos

Repositorio Appmarq

- **Repositorio líder de la industria en calidad estructural**
- **745 Aplicaciones**
 - 160 Compañías, 14 Países
 - 321,259,160 Líneas de Código; 59,511,706 Incumplimientos



Estimación de Deuda Técnica

FOCUS TECHNICAL DEBT

Estimating the Principal of an Application's Technical Debt

Bill Curtis, Jay Sappidi, and Alexandra Szykanski, CAST Software

“A formula with adjustable parameters can help in estimating the principal of technical debt from structural quality data.”



STEVE MCCONNELL DESCRIBED technical debt as including both intentional and unintentional violations of good architectural and coding practices—an expansion of Ward Cunningham's original focus on intentional decisions to release suboptimal code to achieve objectives such as faster delivery.² By choosing debt as a metaphor, Cunningham engaged a set of financial concepts that can help executives think about software quality in business terms. Although the concept of technical debt incorporates entities such as principal, interest, liabilities, and

opportunity costs, this article explores only the estimation of its principal. **The Technical Debt Metaphor** In embracing McConnell's approach as the most comprehensive for communicating the costs and risks of poor structural quality, we use the following definitions for constructs estimated in this article.
 • *Should-fix violations* are violations of good architectural or coding practice (hereafter referred to

... of the ... on of ... for ... ing ... T ... in ... be ... res ... Te ... in ... fix ... pai ... For ... to be ... mean ... trans ...

... underlying TD-principal via techniques such as static analysis of the software's nonfunctional, structural characteristics.³ Violations of structural quality are often difficult to detect through standard testing but are frequent causes of severe operational problems.^{4,5} Facing limited application budgets, IT organizations will never fix all violations in an application. Technical debt estimates ought to only include should-fix violations in production code. Nonetheless, the amount of should-fix problems sometimes exceeds the budget available for remediation. Consequently, IT management must estimate the amount of technical debt in its applications and then adjust the

TABLE 2

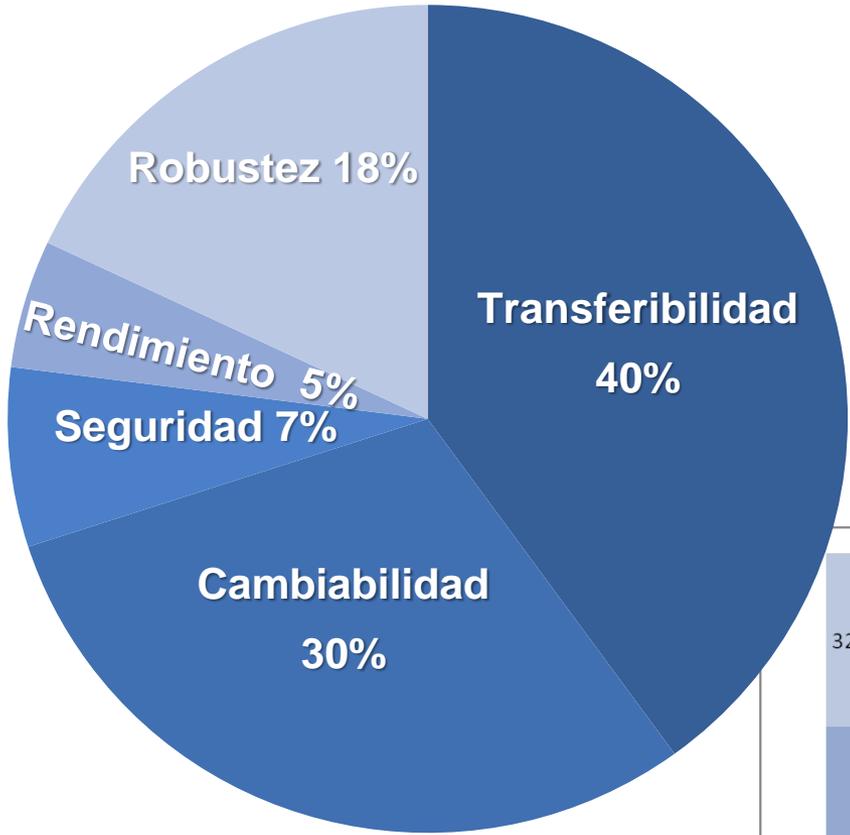
Estimated US dollars per LOC of TD-principal by language.*

	Mean			Median			Minimum			25th & 75th quartiles			Maximum		
	Est.1	Est.2	Est.3	Est.1	Est.2	Est.3	Est.1	Est.2	Est.3	Est.1	Est.2	Est.3	Est.1	Est.2	Est.3
All apps (n = 700)**	3.61	10.26	15.62	2.79	7.94	11.77	0.06	0.01	0.21	1.13	3.49	5.91	38.08	132.74	278.00
.NET (n = 63)	3.09	12.29	28.34	2.37	10.20	22.32	0.96	0.49	1.18	0.94	2.36	3.02	16.52	73.00	176.63
SAP-ABAP (n = 72)	0.43	1.90	4.29	0.41	1.73	3.79	0.05	0.20	0.41	0.27	1.20	2.47	1.42	6.99	16.31
C (n = 44)	2.62	7.65	17.12	2.18	6.46	14.62	0.02	0.01	0.33	0.82	2.92	4.36	12.82	31.89	75.64
C++ (n = 30)	4.33	12.96	26.77	2.41	7.82	14.52	0.02	0.01	0.06	1.55	4.51	8.80	38.08	132.91	278.00
Java EE (n = 474)	5.42	14.60	19.82	5.13	13.66	16.18	0.07	0.23	0.50	2.40	8.19	11.94	49.72	253.02	608.68
Oracle Forms (n = 45)	4.57	21.16	49.52	1.12	3.87	7.58	0.49	1.13	1.19	0.99	3.24	5.82	30.23	181.88	366.66
Visual Basic (n = 16)	2.92	9.83	18.91	2.58	8.37	15.29	0.68	2.77	4.01	1.16	3.45	6.10	12.14	45.01	98.59

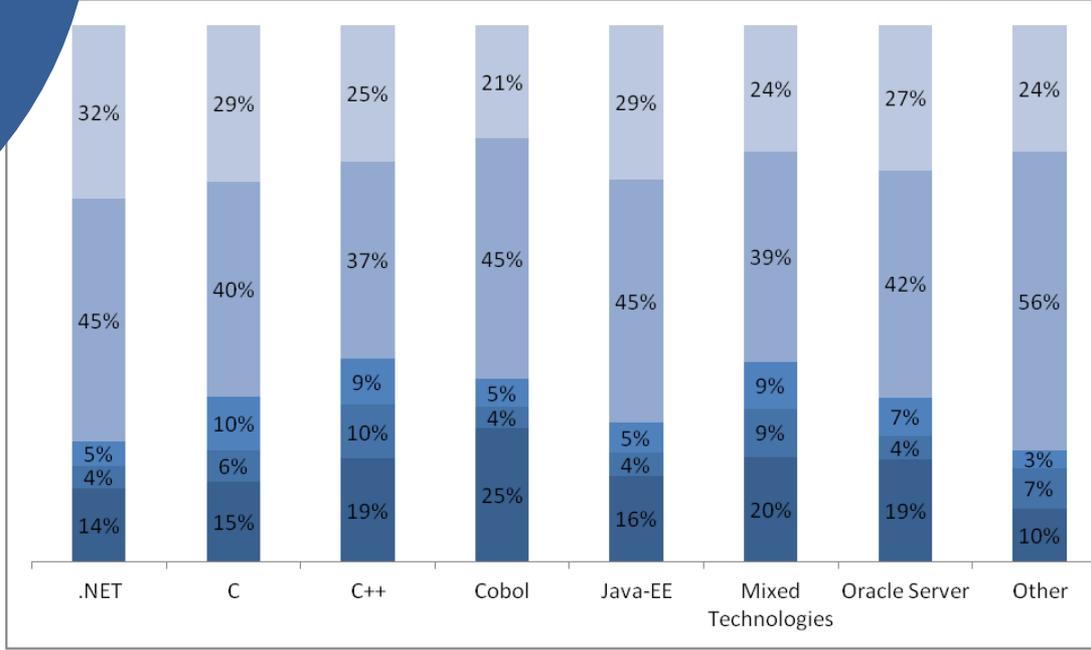
Estimado Conservador: \$3.61 por LOC

“Aun cuando se mide con una formula conservadora, el monto de deuda técnica en la mayoría de las aplicaciones comerciales es enorme.... Los estimados de [deuda técnica] pueden ser una herramienta poderosa para ayudar a la administración a comprender y controlar los costos y riesgos de TI.”

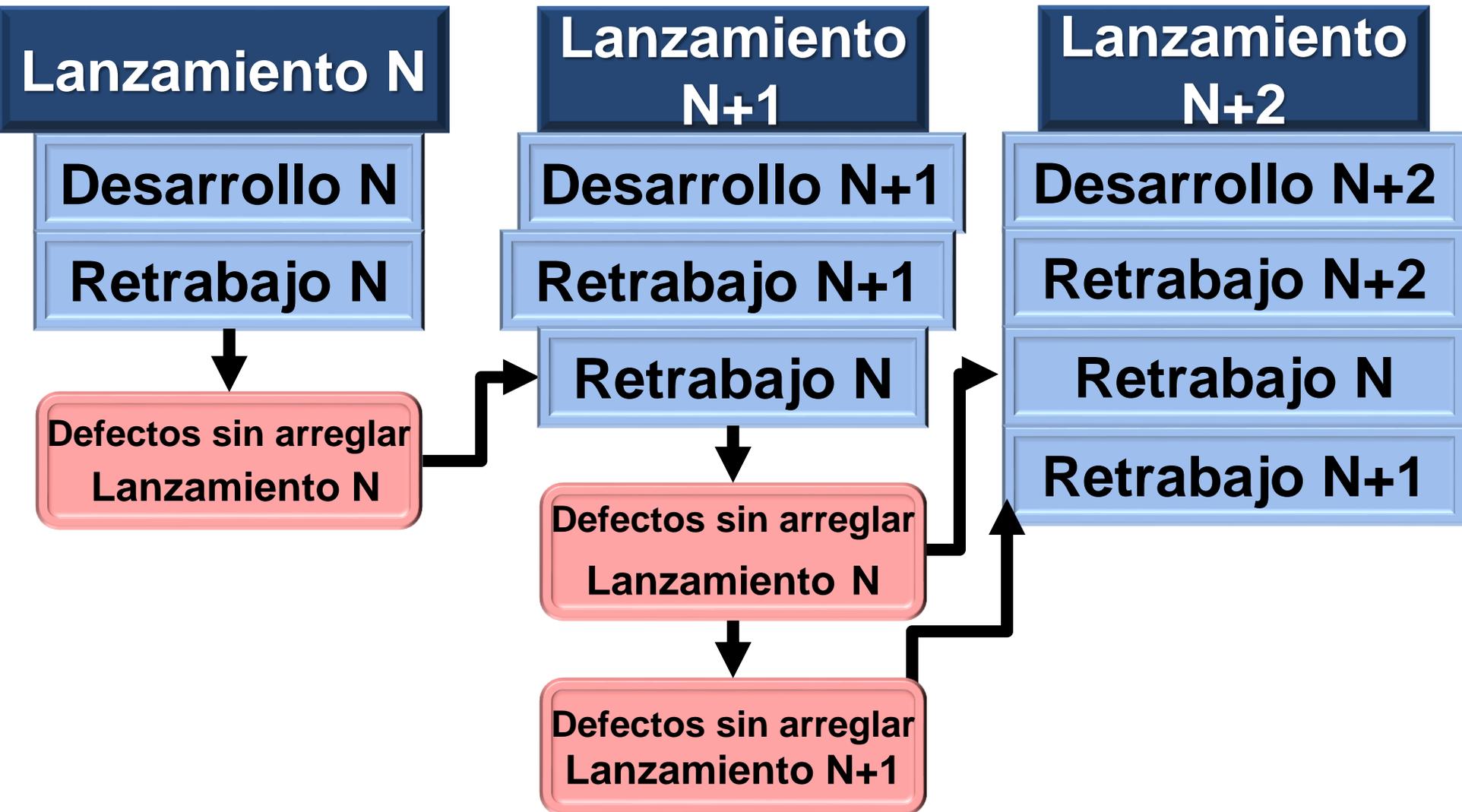
Deuda Técnica por atributo de calidad de software



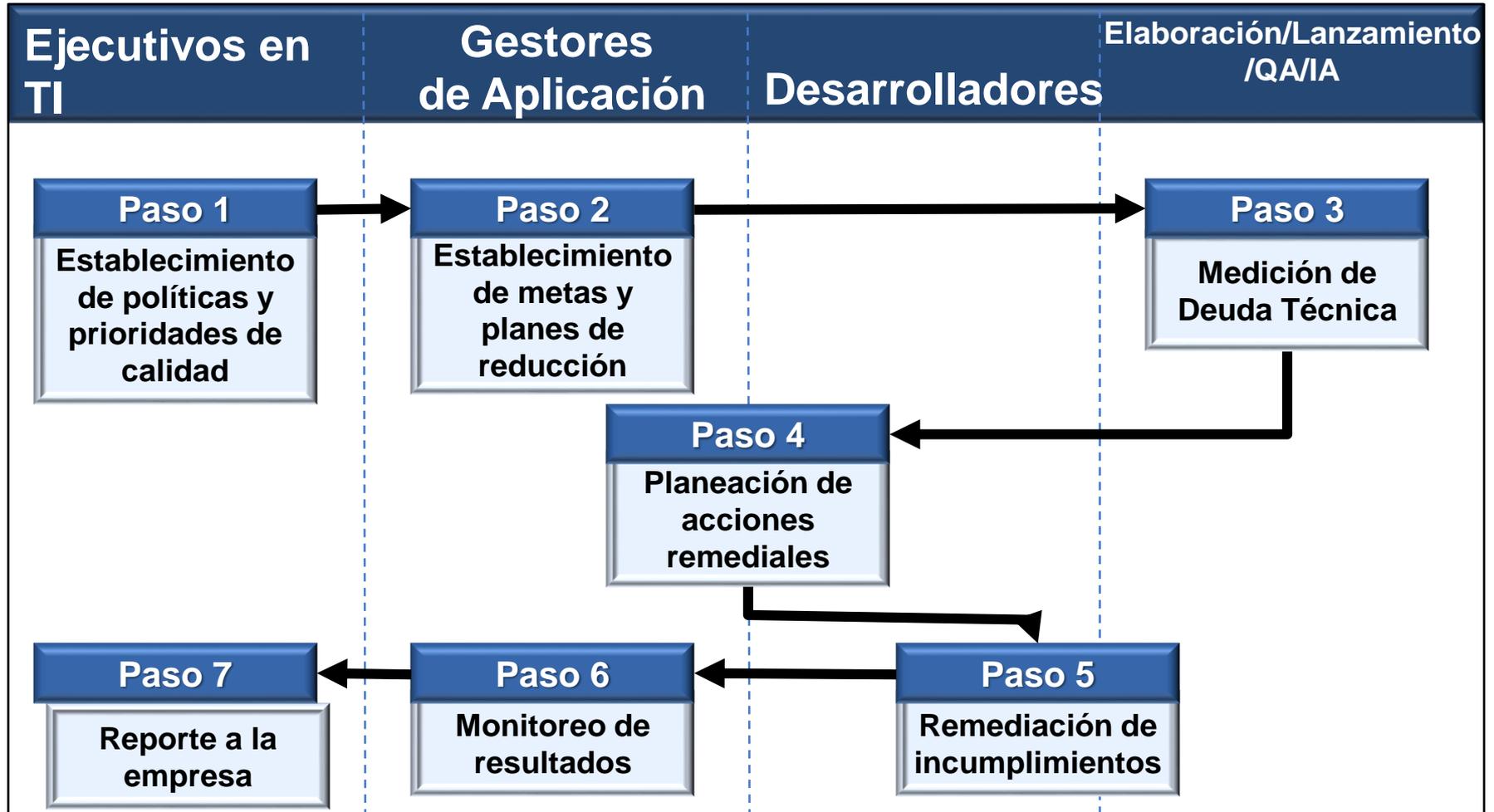
- **70% de Deuda Técnica se da en Costos TI (Transferibilidad, Cambiabilidad)**
- **30% de Deuda Técnica se da en Riesgo Comercial (Robustez, Rendimiento, Seguridad)**
- **Generalmente las proporciones son consistentes entre las diferentes tecnologías**



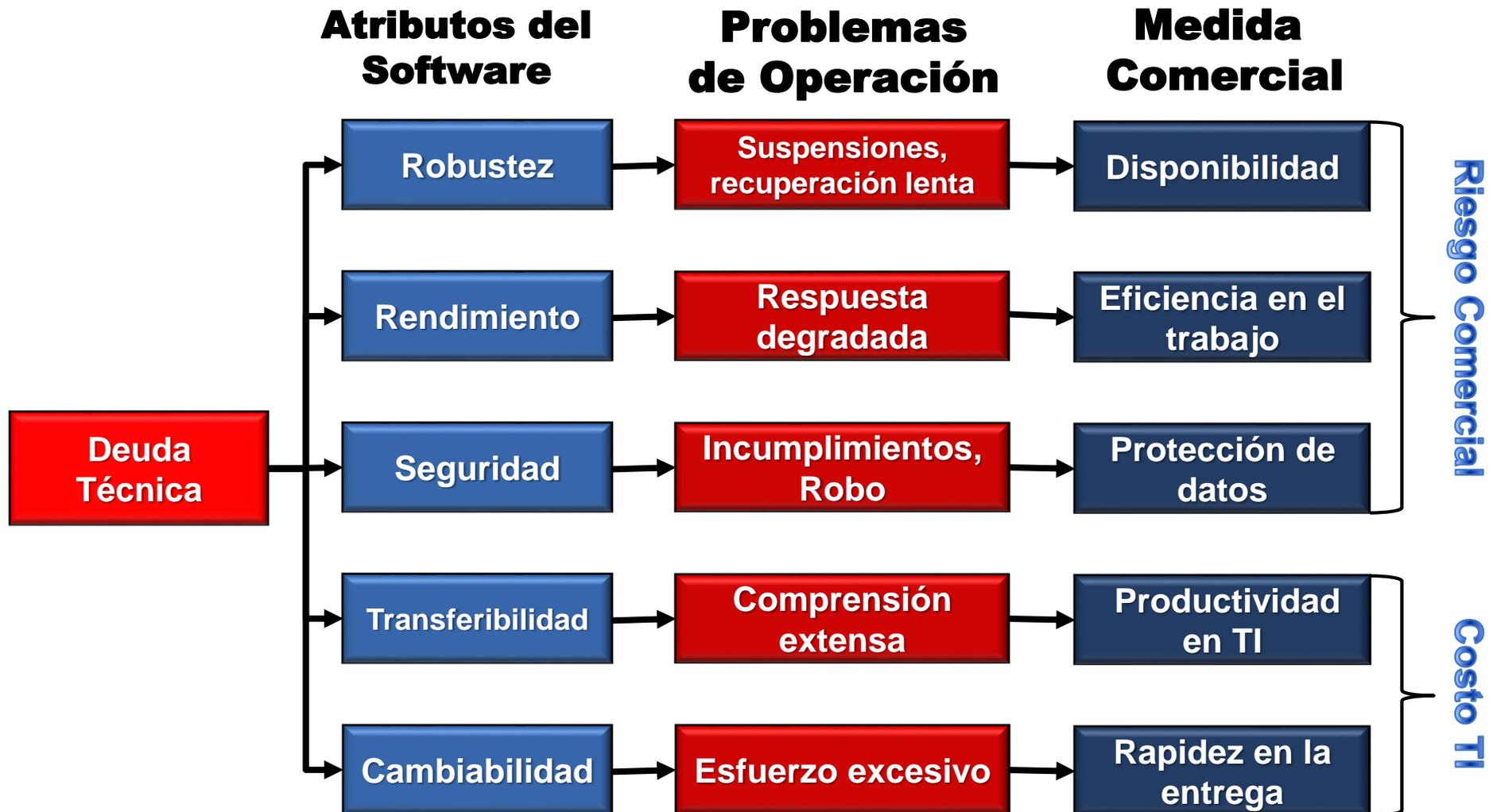
Deuda Técnica = Arrastre del retrabajo



Administración de la Deuda Técnica para Administrar la productividad



Traducir Deuda Técnica a Medidas Comerciales



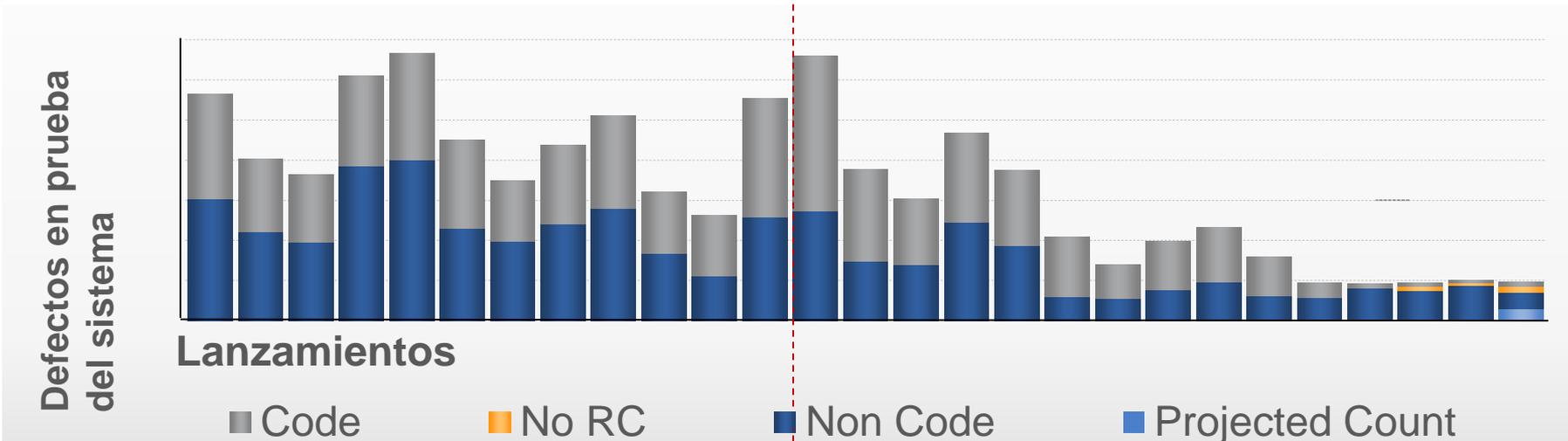
Manejo de la Calidad Estructural en Telecom

Impacto medido en un ambiente pesado de mejoramiento complejo

ESTUDIO DEL CLIENTE DURANTE 24 MESES

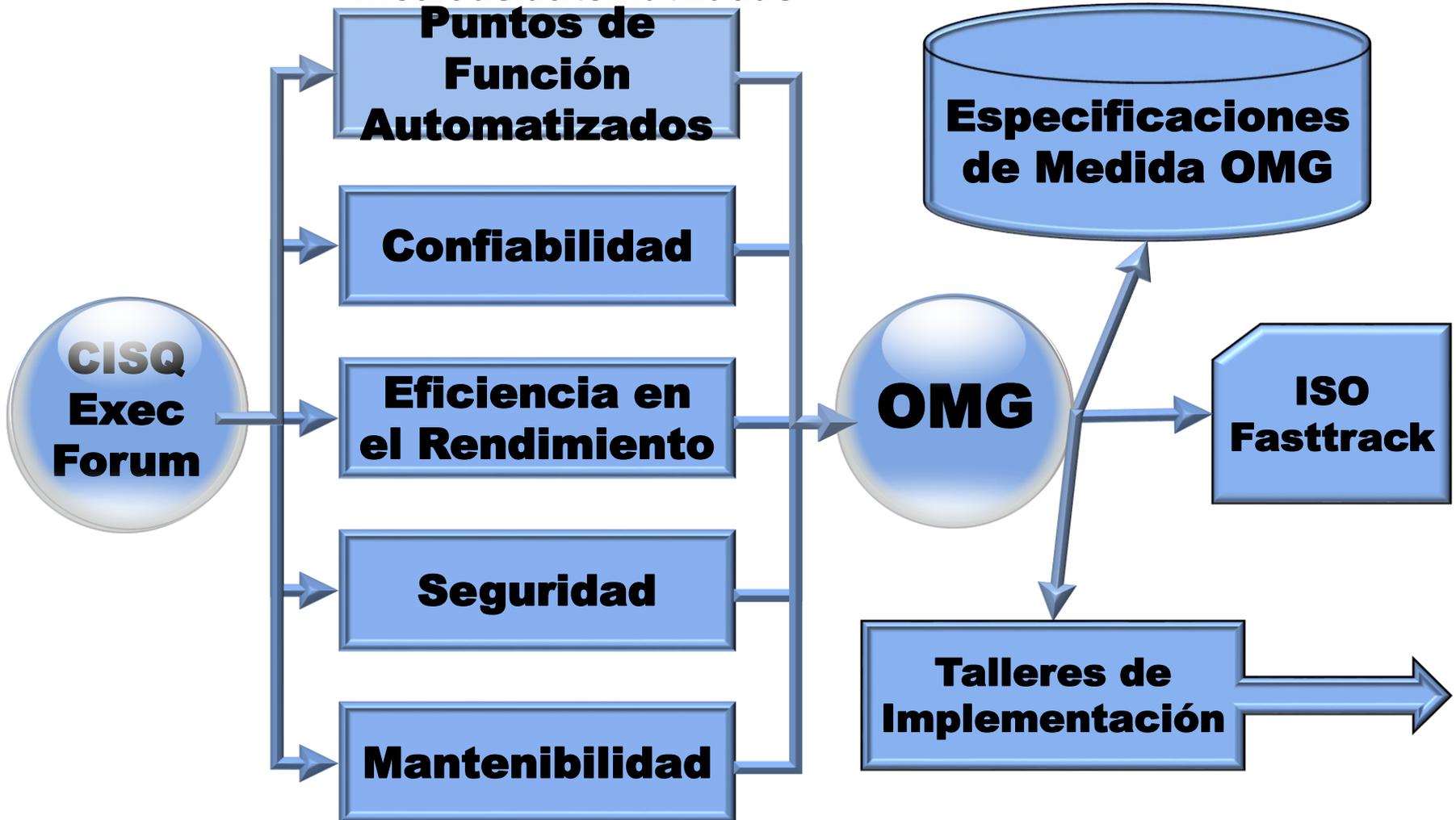


Punto Inicial Análisis CAST



Consortio para IT Software Quality (CISQ)

*Especificaciones CISQ para
medidas automatizadas*



CISQ — Membresía gratis — www.it-cisq.org

The screenshot shows the CISQ website homepage. At the top, there is a navigation bar with links for "Quality Report Podcasts", "CISQ FAQs", and "Contact Us". Below this is a search bar and links for "Member Page" and "Member Logout". The main header features the CISQ logo (Consortium for IT Software Quality), the OMG logo (Object Management Group), and the Software Engineering Institute Carnegie Mellon logo. A secondary navigation bar includes "Home", "CISQ Blog", "Quality Report Podcasts", "Members-Only Portal", "Why CISQ?", "CISQ Founders", and "Press Coverage".

The main content area is titled "Consortium for IT Software Quality" and includes a paragraph: "The Consortium for IT Software Quality (CISQ) is an IT industry leadership group comprised of IT executives from the Global 2000, system integrators, outsourced service providers, and software technology vendors committed to introduce a computable metrics standard for measuring software quality & size. CISQ is a neutral, open forum in which customers and suppliers of IT application software can develop an industry-wide agenda of actions for improving IT application quality and reduce cost and risk." To the right of this text is a "Become a CISQ:" section with a woman's image and three buttons: "Member", "Sponsor", and "CISQ Downloads". Further right are three more buttons: "CISQ Downloads", "Members-Only Portal", and "CISQ Meetings".

Below the main content are three columns:

- Latest Tweets:** Two tweets are shown. The first is from @it_cisq: "Important! Rate Correctly the Importance Of Problems..." with a link to a blog post. The second is from @it_cisq: "Wiki: Software Quality Assurance..." with a link to a blog post. Below the tweets is a "Discussion on LinkedIn" button and icons for "Blog" and "Video".
- CISQ Blog:** Two blog posts are featured. The first is "It's the Product, Stupid!" with a "read more" link. The second is "The Director's Blog" with a "read more" link.
- Member Comments:** A comment from "MD North America" (Major Global IT Services Vendor) is displayed, stating: "Every client we work with has a different understanding of 'quality' in application development and maintenance. We need a way to have consistent and objective dialog about this important issue across the industry."

The footer contains copyright information: "Copyright © 2012, CISQ. All Rights Reserved. Consortium for IT Software Quality". It also includes "Get Social" links for Twitter, LinkedIn, and Facebook, and a list of navigation links: "Home", "Members-Only Portal", "Why CISQ?", "G2000 IT Executives", "Systems Integrators", "ISV Executives", "CISQ Objectives", "CISQ Membership", "CISQ Founders", "Press Coverage", "Quality Report Podcasts", and "CISQ FAQs".