Automating Software Quality Measurement with Standards

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Why Automate?
Complexity

Technology Stack

1. Unit Level
   - Code style & layout
   - Expression complexity
   - Code documentation
   - Class or program design
   - Basic coding standards
   - Developer level

2. Technology Level
   - Single language/technology layer
   - Intra-technology architecture
   - Intra-layer dependencies
   - Inter-program invocation
   - Security vulnerabilities
   - Development team level

3. System Level
   - Integration quality
   - Architectural compliance
   - Risk propagation
   - Application security
   - Resiliency checks
   - Transaction integrity
   - Function point
   - Effort estimation

- Data access control
- SDK versioning
- Calibration across technologies
- IT organization level
Velocity

Product Backlog → Sprint Backlog → Sprint → Working increment of the software

- 24 hours
- 30 days
Automated Complex Toolchains

- Design of the software and configuration
- Coding including code quality and performance
- Software build and build performance
- Release candidate

- Acceptance testing
- Regression testing
- Security and vulnerability analysis
- Performance
- Configuration testing

- Production metrics, objects and feedback
- Requirements
- Business metrics
- Update release metrics
- Release plan, timing and business case
- Security policy and requirement

- Infrastructure storage, database and network provisioning and configuring
- Application provision and configuration

- Approval/preapprovals
- Package configuration
- Triggered releases
- Release staging and holding

- Performance of IT infrastructure
- End-user response and experience
- Production metrics and statistics
- Application monitoring

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CISQ Automates What Matters
SOFTWARE MEASUREMENT STANDARDS DOCUMENTED

STRUCTURAL QUALITY

- **Security**: Measures the most exploited security weaknesses in software including the CWE/Sans Institute Top 25 Most Dangerous Security Errors and OWASP Top 10
- **Reliability**: Measures weaknesses impacting the availability, fault tolerance, and recoverability of software
- **Performance Efficiency**: Measures weaknesses impacting response time and utilization of processor, memory, and other resources
- **Maintainability**: Measures weaknesses impacting the comprehensibility, changeability, testability, and scalability of software

TECHNICAL DEBT

- A measure of **corrective maintenance effort** due to violations (weaknesses) remaining in a software application, i.e., *what’s it going to cost to fix the critical weaknesses in this code?*

SOFTWARE SIZING

- **Automated Function Points**: Measures the functional size of software
- **Automated Enhancement Points**: Measures changes in the size of both functional and non-functional code during a release in one measure
CISQ Supplements ISO 25000 with Automation

This figure illustrates the eight software quality characteristics defined in ISO 25010. The four characteristics highlighted in blue were selected for automated measurement by CISQ.
Measures Relate to Results and Behaviors
Adoption of Agile and DevOps

Use standards to measure improvement in code quality and development productivity
The Shift to Outcome-based Contracts

LOWEST VALUE / HIGHEST COST PRESSURE

Input-based contract
- T&M
- Fixed capacity
- Hybrid

Output-based contract
- Sizing-based (Function Points)
- Tickets
- Velocity
- Quality

Outcome-based contract
- Service delivered
- Impact on business
- Satisfaction

OUTCOME-BASED CONTRACTS ARE GROWING RAPIDLY

1 in 2 are shifting to outcome-based contracts
57% of CIOs & CTOs find outcome based contracts most effective

Sources: Deloitte 2014 Global Outsourcing and Insourcing Survey, Forbes Insights

SIGNIFICANT CHANGES IN THE SERVICES ENGAGEMENT MODEL IN THE NEXT 5 YEARS

| Source: ISG December 2016 The Three Waves in the Evolution of the Engineering Services Outsourcing Industry |

<table>
<thead>
<tr>
<th>Delivery Model</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Offshore: 80%, Onsite: 20%</td>
<td>Offshore: 60%, Onsite, Nearshore: 40%</td>
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<table>
<thead>
<tr>
<th>Business Model</th>
<th>2015</th>
<th>2020</th>
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<tbody>
<tr>
<td>T&amp;M, Staff Augmentation: 70%</td>
<td>T&amp;M, Staff Augmentation: 50%</td>
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<tr>
<td>Fixed, Outcome Based: 30%</td>
<td>Fixed, Outcome Based, Risk Reward: 50%</td>
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<table>
<thead>
<tr>
<th>Key Drivers</th>
<th>2015</th>
<th>2020</th>
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<tbody>
<tr>
<td>Cost, Scale, Skills</td>
<td>Operational Excellence</td>
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<tr>
<td>Contractual Innovation, SLA/KPI driven</td>
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### Call for Scorecards

<table>
<thead>
<tr>
<th>Outsourcer</th>
<th>CISQ-86</th>
<th>Reliability</th>
<th>Performance Efficiency</th>
<th>Security</th>
<th>Maintainability</th>
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<tbody>
<tr>
<td>VENDOR 1</td>
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<td>3.16</td>
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### Monitor Performance Over Time

**TECHNICAL CODE QUALITY**

![Bar chart showing technical code quality performance over time for different vendors.]

**QUALITY**

![Bar chart showing quality performance over time for different vendors.]

**COST EFFECTIVENESS**

![Bar chart showing cost effectiveness performance over time for different vendors.]

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Adoption allows Autonomy & Accountability
Focus on Culture and Behavior

- Don’t expect everyone to like automation, some people just like doing it the hard way
- Incentivize the behavior you want for the individual and team
- Avoid as much as possible the Top-Down approach
Link Automation to Autonomy

- Develop the correct skills
- Obtain commitment from the team
- Certify the environment
- Set KPIs and Targets
- Show and share results
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Thank You

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