ODC Product Profiling

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Abstract -- **ODC product profiles provide the software engineer with an insight into the execution of a development process and the resultant software reliability experienced. In essence it yields images of the product through the process as seen by the different dimensions of ODC. This paper describes how we develop an ODC product profile and illustrates it with a case study. Specific to the case study, we show: (1) Impact distribution changes that are traceable across development and customer usage. (2) How these changes are related to the testing strategy that was executed. (3) How one can alter the experience with specific changes to the development or test process.**

Introduction

Orthogonal Defect Classification (ODC) is a method that extracts semantic information from the defect stream to build a measurement system. This capability gives it the power to perform several software engineering analysis tasks faster and with greater precision. It also opens the doors to new analysis methods and tools.

Product profiling is one such method. This is where the data from an existing project, that has completed, is used to reconstruct elements of the development experience and its impact on the customer.

This presentation covers the background of how product profiles are built and used, with a couple case studies. The flow of this presentation will cover:

- Why conduct a product profile?
- What are good candidates for product profiles
- Learning from a multi-year ODC analysis
- Displaying results from a product provide
- What does the impact process tell us
- What does the trigger process tell us
- Relating Impact with customer experience
- Understanding why this particular profile exits
- Using Trigger Distributions to explain cause
- Case study: Triggers Vs. Impact
- Discussion on Test methods, and process
- Developing a Process view - as a cause factor
- Separating Product Issues versus Process Issues
- Case study Data - Example

Audience:

This paper and discussions are of most value to senior technical people and management. These studies are used to gain critical insight into the current development strategy and an assessment of its execution. This paper will interest:

- Leads and Architects
- Development managers
- Program Managment
- End user Reliability and QA.

The advantage of product profiles is that it develops an expectation of what a development process is likely to deliver. This is valuable to make predictions for future releases and also understand weaknesses of existing processes.

ODC Data

To get a bird's eye view of the analysis it is instructive to review the ODC schema from the perspective of what the attributes measure and where the data is extracted from. Figure 1 shows us the ODC attributes and their relationships relative to the change or defect life cycle and how we use them for analysis.

"Find-Time" data - ODC Impact and Trigger are extracted from the Issues lists. "Fix-Time" data - ODC Type, Qualifier, Source and Age, are extracted from the Activity lists.

ODC Impact measures the nature of customer pain, while the severity of the defect captures the degree of the pain. This information is available from the "find time" data when a failure is experienced and communicated to the service team.

ODC Trigger is the catalyst that made a defect surface. The 21 possible values of the trigger provide a measurement on the testing space. This information is captured from the "find time" data when the failure is reported.

ODC Type tells us what was fixed, and is available during the "fix time" of the defect - usually noted by the developer making the code or design change.

ODC Source tells us where the code came from - in-house, out sourced, etc.

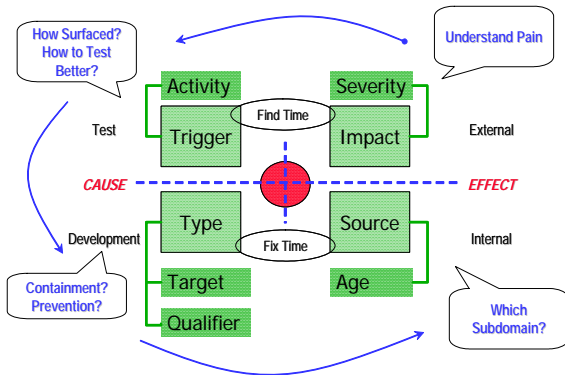Cause Attributes: Triggers and Types are measurements on Testing and Development hence are considered

Figure 1.

ODC data helps builds a cause-effect relationship to understand process dynamics. The analysis flows from understanding customer pain to how defects are surfaced and finally to what the faults are and where they are located.

belonging to the cause side of a process cause-effect model.

Effect Attributes: Impact measures customer pain, and the Source examines what part of the legacy the code came from, hence the two are considered belonging to the effect side of the equation.

Data Examples

Distributions across Releases helps us understand customer usage and trend lines. The two charts in Figure 2. below illustrate an example of what one might study.

References

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[2] *"Test and Development Process Retrospective - A case study using ODC Triggers",* Ram Chillarege and Kothanda Ram Prasad, Proceedings International Conference on Dependable Systems and Networks, IEEE, 2002

[3] *"Improving Software Testing using ODC - Three Case Studies",* M. Buther, M. Murino, T. Kratcher, IBM Systems Journal, Vol 41, No. 1, 2002.
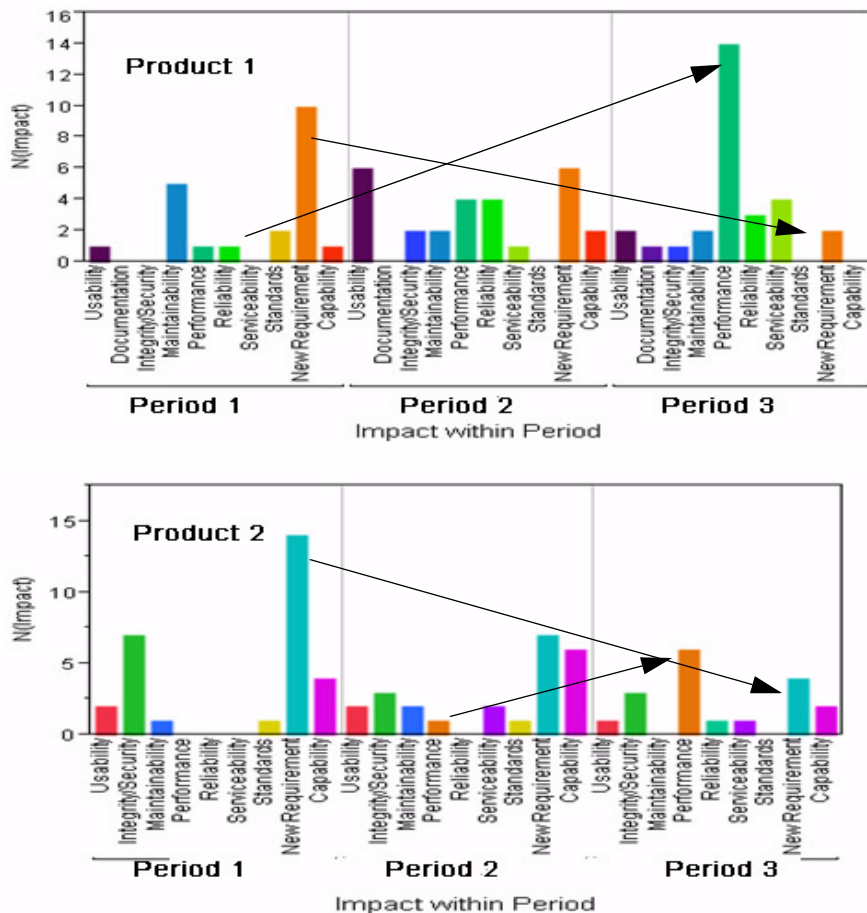
Figure 2.

Comparing products and their impact distribution changes by period. A "period" can refer to a product release, or phases from specific stages of development. And, this does not have to belong to a waterfall model, as is often mis-represented. Thus, these patterns are visible in iterative development processes too. In this example, they are from related products that serve the same market segment. Thus, they reflect the differences in the nature of the product themselves, or their development processes.

These examples are for illustration. The presentation will have examples that will illustrate the different product profiles across a few related dimensions, thereby helping us gain a firm understanding of the dynamics at play.