

## Risk Based Assurance & Acceptance

*What does the term Risk Based Assurance & Acceptance mean and how does it differ from traditional delivery approaches?*

Risk Based Assurance & Acceptance (RBAA) involves focusing all members of the delivery team and every activity involved in the delivery process on the product risks (derived from the business risks).

Risk is driven from business impact (how much will this hurt if it goes wrong?), but the trigger of these business risks is often a fault in the delivered product. In order to address the risk to the correct degree (mitigation) the analysis of risk must include the likelihood factor for the risk occurring (how likely is it that there will be a fault in this part of the system).

Through risk identification and analysis the risk information is processed and consolidated in order to make it meaningful to each member of the project delivery team. All parties are aware of the risks and how they are impacted, from requirements capture, through the architectural design and development activities as well as the testing function.

The risk information is used to produce a risk profile for the system, which allows each party to understand the risk hierarchy within their area and focus the correct amount of effort on producing the item and measuring it. This process allows an understanding of the relative importance of all system artefacts produced throughout the delivery process. The system risk profile can be represented diagrammatically and is a re-usable artefact making impact analysis for subsequent product releases easier to quantify in terms of product risk.

*Why adopt the Risk Based Assurance & Acceptance approach?*

You may presently have a mature and effective test function within your organisation and already be applying a risk based testing approach, but are the benefits measurable? Can you demonstrate the value add of the test function? Do you still have an unacceptable number of high severity faults in

the live environment? Are your customers happy and do they feel appropriately involved in the delivery process?

### *A standard structured Test Approach advantages and issues:*

A standard structured system testing approach focuses on the system requirements and functional design documentation in order to ensure that the correct system is delivered. Good practices such as Verification and Validation activities ensure that the layers of system design documentation are correct and that the requirements will be fully met.

Test case traceability back to individual requirements is maintained allowing requirements coverage to be measured and the reporting of test results to be related to the test conditions within the requirements.

The problem with this approach is that requirements that are complete, correct, and concise and not open to misinterpretation, are notoriously difficult to produce. In mature testing organisations research has shown that up to 50% of live issues can be traced directly back to flawed requirements (50% reported by *Freimut et al, 2000*, 51% "requirements related" reported by *Vinter et al, 1998*). Requirements often capture only what is wanted at a functional level and do not include a complete set of non-functional requirements or failure conditions.

When faced with an unhappy customer the IT projects using the structured approach resort to the defensive mantra "We delivered against the requirements, you got what you asked for!" but the customer is still unhappy!

Often the requirements and system documentation will change dramatically between releases, resulting in a major overhaul of the test material, which can be an expensive and time consuming activity.

## Test effort distribution and execution order for A standard structured testing approach

	Effort	Schedule
Item 1	2	1
Item 2	2	2
Item 3	2	3
Item 4	2	4
Item 5	2	5
Item 6	2	6
Item 7	2	7
Item 8	2	8
Item 9	2	9
Item 10	2	10
Item 11	2	11
Item 12	2	12
Item 13	2	13
Item 14	2	14
Item 15	2	15
<b>Total</b>	<b>30</b>	



Often there will be a level of prioritisation applied to the requirements and the tests will follow this rating and will be scheduled and executed on the basis of 'most Important tests first'. Often the test team in isolation using their experience and knowledge of the systems defines the execution order.

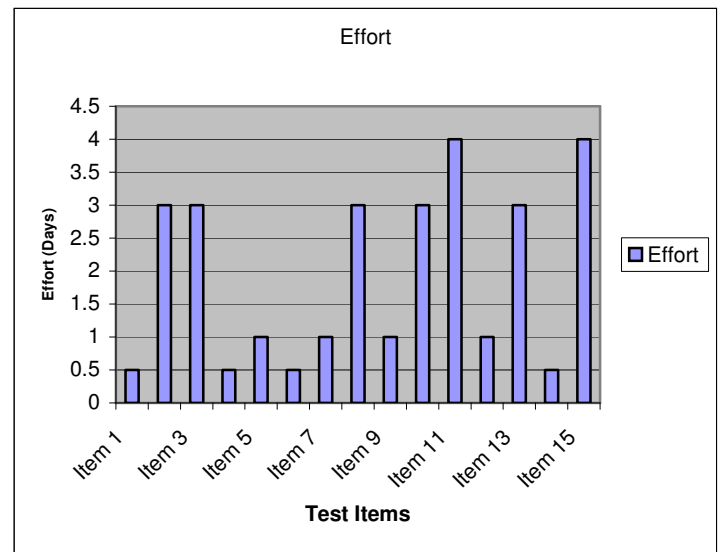
### Standard Risk Based Testing Approach advantages and issues:

If done poorly this amounts to little more than an exercise in test case prioritisation, or is used as an excuse to de-scope the testing of large "relatively unimportant" parts of the system functionality.

If done well, Risk Based Testing (RBT) allows the test function to expend relatively more effort on the parts of the system that are higher business risk. These 'higher risk' items are also scheduled for testing as early as possible in the lifecycle.

## Test effort distribution and execution order for A Risk Based Assurance & Acceptance approach

Priority		Effort	Schedule
L	Item 1	0.5	12
H	Item 2	3.0	3
H	Item 3	3.0	4
L	Item 4	0.5	13
M	Item 5	1.0	8
L	Item 6	0.5	14
M	Item 7	1.0	9
H	Item 8	3.0	5
M	Item 9	1.0	10
H	Item 10	3.0	6
C	Item 11	4.0	2
M	Item 12	1.0	11
H	Item 13	3.0	7
L	Item 14	0.5	15
C	Item 15	4.0	1
<b>Total</b>		<b>29</b>	



The RBT approach is applied to each release and helps to focus the late lifecycle test execution phases (System test and Acceptance Test) on the identified business risks.

The issues with RBT are that it generally considers business impact of the risks only, it produces tests related to specific risks for execution late in the lifecycle when the problems cost more to fix and the risk information does not get propagated through to the early test stages for review or the technical testing phases within the development area.

### **What is involved in Risk Based Assurance & Acceptance?**

The initial approach is similar to standard RBT in that business risks are identified, analysed and prioritised based on the business impact, in the normal fashion. As the lower level system architectural documentation is

developed the risk information is used to designate the appropriate level of review to be applied to these lower level system artefacts.

As the component specifications are produced the overall system architecture is mapped out showing the physical relationship between components, functions and processes. The risks themselves are then allocated to system components giving the business impact of failure at component level. The system technical details are gathered and used to predict the likelihood of failure for each component. Multiplying the likelihood by the impact, the risk exposure for each system component is calculated. This gives a risk hierarchy for system components and the ability to calculate the exposure hierarchy for the system functions.

Measurement activities throughout the lifecycle can now focus directly on the high risk parts of the delivered system from review of the system design artefacts, through developer testing, functional system testing and business process testing.

This initial mapping and calculation activity produces a system risk profile which can be represented diagrammatically or in tabular form. This profile is updated and adjusted based on actual defects found in test and experienced in the live environment

### **How can your organisation migrate to A Risk Based Assurance & Acceptance strategy?**

The RBAA approach is complimentary to any development lifecycle from very structured approaches (such as V-Model) through to the more dynamic rapid development methodologies (such as RAD).

Adopting this approach will not be a major upheaval in the way in which you deliver at present, rather a process wrapper that will sit above your existing working practices and focus on risk.

Risk workshops can be separate activities or included as a step within your existing requirements planning and design meetings. The technical information can be gathered as part of the design and development activity.



## The Assurance and Testing Specialists

Essentially, a Risk Based Assurance & Acceptance Approach will drive out the business risks and reduce the chance of systems or applications not fulfilling the operational needs of the business.

A risk based approach to defining test coverage is complementary to CMM/TMM and TPI Process improvement models.

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