Leveraging the benefits of DAR

SEPG Conference
March, 2011

Booz | Allen | Hamilton

Agenda

Introduction

Developing a risk based QA audit schedule using DAR

Determining the appropriate Corrective Action using DAR

Leveraging DAR in response to Measurement and Analysis results

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- **Our Mission**
  Booz Allen Hamilton partners with clients to solve their most important and complex problems, making their mission our mission and delivering results that endure

- **What We Bring**
  Expertise, objectivity, and the capabilities of exceptional people—combined with the institutional experience of helping clients succeed for more than 90 years

- **What Distinguishes Us**
  Booz Allen …
  - … combines a consultant's unique problem-solving orientation
  - … with deep technical knowledge and strong execution
  - … to help clients achieve success in their critical missions

Introduction

- **To DAR or not to DAR**
- **Recognize the true value of DAR**
  - Look beyond the technical use of DAR
  - Realize the benefits of DAR in non-technical situations
- **Non-Technical opportunities for DAR**
  - Decision made by boards such as Change Control Boards (CCBs), Engineering Review Boards (ERBs) and Engineering Process Groups (EPGs)
  - Daily project activities such as Risk Management

Introduction - 2

- **So, what are some of these less obvious opportunities and how did we identify them?**
  - Lessons Learned from SCAMPI Results
  - Project execution
- **Example opportunities for DAR**
  - Scheduling risk based QA Audits
  - Determining Corrective Actions
  - Addressing Measurement and Analysis results.

What is Decision Analysis and Resolution (DAR)?

- **Purpose**
  - The purpose of Decision Analysis and Resolution (DAR) is to analyze possible decisions using a formal evaluation process that evaluates identified alternatives against established criteria.
- **Specific Goal and Practice Summary**
  - SG 1 Evaluate Alternatives

SP 1.1	*Establish Guidelines for Decision Analysis*
SP 1.2	*Establish Evaluation Criteria*
SP 1.3	*Identify Alternative Solutions*
SP 1.4	*Select Evaluation Methods*
SP 1.5	*Evaluate Alternative Solutions*
SP 1.6	*Select Solutions*

Can DAR help in developing a schedule for performing QA Audits? Here's how:

- **Guidelines are established:**
  - When resources to participate in QA audits are constrained, use DAR process to establish schedule
- **Evaluation Criteria are established:**
  - Period of time since the last audit
  - Risk of High, Medium or Low are assigned to the following for each audit:
    - *Number of past findings identified*
    - *Number of stakeholders involved in process*
    - *Process capability as determined by SCAMPI appraisal results*
- **Alternative Solutions are identified:**
  - Different sequences of the process audits are considered for the schedule
  - Example sequences of the process audits:
    - *Initiate Project, Conduct CM/DM, Manage Requirements, Manage Project Risk… OR,*
    - *Manage Project, Build System, Conduct CM, Manage Project Risk…*

Developing a risk based QA audit schedule using DAR - 2

- **Evaluation Methods are selected:**
  - Combination of risks for each criteria results in a preliminary overall risk
  - Preliminary overall risk is influenced by number of findings and date of last audit
- **Alternative solutions are evaluated:**
  - Each process area is listed
  - Risk is listed for each criteria
  - Risks are “summed” resulting in an overall risk for each alternative
- **Solutions are selected:**
  - Audits types that are assigned with a high risk priority are audited more frequently and audit types with a low priority are audited less frequently
  - Actual priorities, which are then used to create the schedule, are determined using the table on the next slide

Developing a risk based QA audit schedule using DAR - 3

Audit Type	Process/Product	PDP Scope Areas	Total Findings	QA Audits			SCAMPI Appraisals		RS Groups	Priority*
				Audit in 2008	Audit in 2009	Audit in 2010	SCAMPI B in 2009	SCAMPI B in 2010		
Program Management	Initiate & Manage Project	• Initiate Project					L	L		L
		• Manage Project	**7**		Apr-09	**Oct-10**	M	H	H	H
		• Manage Project Risk	6	May-08	Apr-09		L	L	H	M
		• Monitor Project Security	planned			Aug-10	L	L	H	M
Support	CM/DM	• Conduct Configuration Management/ Data Management	**8**		**Jun-09**		M	H	H	H
Engineering	Requirements	• Manage Requirements	upcoming			Jul-10	L	L	L	L
		• Maintain Requirements Traceability	upcoming			Jul-10	L	M	L	M
Engineering	Design	• Build System			Oct-09		L	L	L	L
Support	Learning Management	• Perform Project Learning Management	5	Nov-08			L	L	H	L
Support	Measurement & Analysis	• Conduct Measurement and Analysis	5			Mar-10	N/A	M	H	M
Engineering	Development and Test	• Build System	9		Oct-09		M	M	L	M
Program Management	Supplier Agreement Management	• Conduct Supplier Agreement Management	closing out			Jul-10	N/A	M	L	M
Engineering	Deployment	• Deploy System				Sep-10	L	L	L	M

In this scenario, “Conduct Configuration Management/Data Management” and “Manage Project” are audited next because they have a High priority.

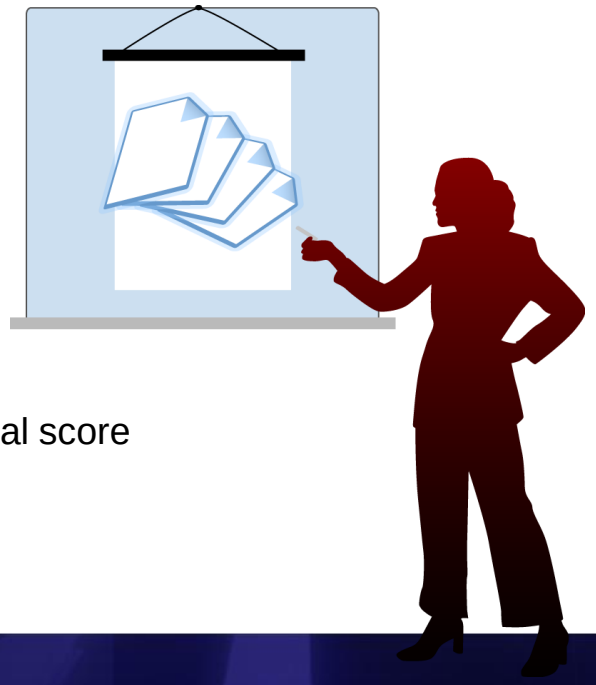
** The Priority indicates the ordering of the audits for the schedule.*

Can DAR help in determining an appropriate Corrective Action? Here's one way:

- **Guidelines are established:**
  - Use DAR if one or more of the following are true when defining corrective actions to address an issue:
    - *Issue is high risk*
    - *Issue significantly affects the ability to achieve key project objectives or business goals*
    - *Issue will cause a major delay to the schedule*
    - *Issue will cause unwarranted changes to work products under control*
- **Evaluation Criteria are established:**
  - A numerical value is assigned to the following:
    - *Technical limitations*
    - *Risk*
    - *Costs*
    - *Environmental impact*
    - *Security*

Using DAR to determine an appropriate Corrective Action - 2

- **Alternative Solutions are identified:**
  - Resources to address the issue(s) are identified
  - Potential time durations are identified
- **Evaluation Methods are selected:**
  - Select evaluation level for each criteria, e.g., 1 to 5 with 1 being the highest level
  - Assign the level to each alternative for each criteria
- **Alternative solutions are evaluated:**
  - Alternatives are listed
  - Level is listed for each criteria for each alternative
  - Levels are “summed” resulting in an overall score for each alternative
- **Solutions are selected:**
  - The tool results in a total score for each attribute
  - Determine the ranking of the alternatives based on the total score



Using DAR to determine an appropriate Corrective Action – 3

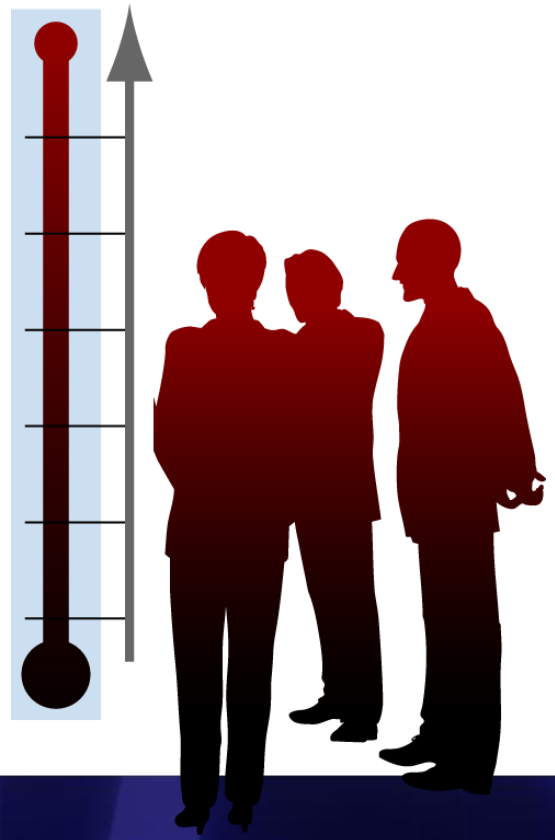
Resource	Timeline to address issue	Technical Limitations	Risk	Costs	Environmental Impact	Security	Total Score	Rank*
Project Management	Less than one month	1	5	1	2	5	14	2
Project Management	More than one month	3	4	4	2	4	17	5
Technical Lead	Less than one month	2	3	1	5	2	13	1
Technical Lead	More than one month	2	5	2	3	4	16	4
Lead Analyst	Less than one month	3	5	1	4	2	15	3
Lead Analyst	More than one month	4	4	3	3	2	16	4
Test Lead	Less than one month	5	1	2	3	3	14	2
Test Lead	More than one month	5	5	5	2	1	18	6

In this scenario, the Technical Lead will address the corrective action and the due date will be within a month.

** The lower score is the higher Rank*

Can DAR be leveraged to respond to Measurement and Analysis results? Sure, how about this:

- **Guidelines are established:**
  - Set a threshold for the measure. If the measure exceeds the threshold, then apply DAR
  - For example, if monthly defect leakage rate exceeded threshold by 3% for 2 months, apply DAR
- **Evaluation Criteria are established:**
  - Cost (e.g., budget constraint)
  - Technical limitations (e.g., unfamiliar with testing tools)
  - Environment limitations (e.g., unfamiliar with testing environment)
- **Alternative Solutions are identified:**
  - Replace junior resources with mid-level testers
  - Pair junior testing resources with senior testing resources



Leveraging DAR in response to Measurement and Analysis results - 2

- **Evaluation Methods are selected:**
  - Select evaluation level for each criteria, e.g., 1 (best), 3 (medium) or 5 (worst)
  - Assign the level to each alternative for each criteria
- **Alternative solutions are evaluated:**
  - Alternatives are listed
  - Level is listed for each criteria for each alternative
  - Levels are “summed” resulting in an overall score for each alternative
- **Solutions are selected:**
  - The tool results in a total score for each attribute
  - Determine the ranking of the alternatives based on the total score

Leveraging DAR in response to Measurement and Analysis results - 3

Alternative	Cost	Technical Limitations	Environment Limitations	Total Score	Rank*
Replace junior resources with mid-level testers	3	3	1	7	2
Pair junior testing resource with senior testing resources	1	3	1	5	1

In this scenario, the junior resources are paired with senior testers.

** The lower score is the best Rank*

Another Idea to leverage DAR for addressing Measurement and Analysis results: Requirements Volatility

- **Guidelines are established:**
  - Set a threshold for the measure. For example, set a threshold for the number of requirements changes (added, modified, deleted) made in a release
  - If Requirements volatility hits threshold for 3 or more months, use DAR to determine solution
- **Evaluation Criteria are established:**
  - Costs
  - Restriction of number of requirements that change
  - Effectiveness of Requirements Development
  - Completeness of requirements
- **Alternative Solutions are identified:**
  - Process change for CCB
  - Process change for requirements development process
  - Resource change
  - Training
- **Evaluation Methods are selected:**
  - Select evaluation level for each criteria, e.g., Numerical 1-10
  - Assign the level to each alternative for each criteria

Another Idea to leverage DAR for addressing Measurement and Analysis results: Requirements Volatility - 2

- **Alternative solutions are evaluated:**
  - Use the same techniques as discussed previously
- **Solutions are selected:**
  - The tool results in a ranking of the alternatives based as shown previously

Alternative	Cost	Restrict Requirement Changes, i.e., added, modified, deleted	Effectiveness of Requirements Development	Completeness of requirements	Total Score	Rank*
Process change for CCB	8	10	8	8	34	1
Process change for requirements development process	3	4	1	5	13	3
Resource change	1	4	3	4	12	4
Training	3	3	5	3	14	2

In this scenario, the CCB process needs to be reviewed and modified.

** The higher score is the higher Rank*

Another idea to leverage DAR: Using DAR to determine if an improvement opportunity should be implemented

- **Guidelines are established:**
  - When an improvement opportunity positively affects the ability to achieve key project objectives or business goals
  - Idea proposed to implement automated testing for a financial application
- **Evaluation Criteria are established:**
  - Cost
  - Reduced risk of defects from regression errors
  - Return on investment
- **Alternative Solutions are identified:**
  - Continue manual testing
  - Implement automation testing

Using DAR to determine if automated testing should be implemented - 2

- **Evaluation Methods are selected:**
  - Savings per test is calculated based on the following formula:

    Cost of manual testing minus costs to create/maintain/execute automation scripts

  - Cumulative Savings is calculated as:

    Cumulative cost for manual testing minus cumulative costs for automated testing
- **Alternative solutions are evaluated:**
  - Apply the formulas for each release
  - Assumption made that all regression test scripts are executed for every release
- **Solutions are selected:**
  - Review break even point versus number of planned releases

Using DAR to determine if automated testing should be implemented - 3

Test	Savings per Test (in dollars)	Cumulative Savings (in dollars)
Initial Test – including cost to create initial automated test scripts	(8250)	(8250)
2nd Test	2650	(5600)
3rd Test	2650	(2950)
4th Test	2650	(300)
5th Test	2650	2350
6th Test	2650	5000
7th Test	2650	7650
8th Test	2650	10300
9th Test	2650	12950
10th Test	2650	15600
11th Test	2650	18250

In this scenario, if 5 or more releases are planned for the application then automation testing is recommended.

Summary

- **Organizations tend to focus on the execution of DAR for technical solution based decisions.**
- **The opportunity to utilize DAR and realize its benefits goes beyond the scope of technical solutions and can be used for a multitude of non-technical situations**
- **Examples of these non-technical decisions might include, but are not limited to, scheduling QA audits, addressing corrective actions and addressing results of measurement activities.**

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