

Quantitative Quality Assessment Methodology

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Agenda

- **Background**
- **Assessment Methodology and Artifacts**
- **Demonstration**

Background

- **Methodology developed to quantify the quality of deliverables**
 - MITRE asked to assess a set of documents and provide recommendations
 - Team needed to illustrate level of quality in an unbiased manner
 - Results shared with the customer's top management
 - Customer took contract action to improve documentation based on results

- **Methodology can be used for:**
 - Documentation review
 - Code walkthroughs
 - Award fee evaluations for Technical Quality as well as Cost and Schedule performance
 - basically any review task where results need to be quantified and tallied.

Assessment Methodology

The Quantitative Quality Assessment Methodology facilitates the grading of deliverables against a set of weighted criteria to produce an aggregated score for comparing quality.

Methodology:

■ Establish Assessment Parameters

- Based on the set of deliverables to examine, define:
 - Criteria – what’s important
 - Weights – how important each criterion is
 - Scale – quantify good, bad and shades between
 - Score – numeric grade and what it means
- Update forms to support review process

■ Implement Review Process

Establish Assessment Parameters

Assessment Criteria

- **Assessment Form allows quantification of deliverable quality using weights assigned to criteria for scoring purposes**
 - Criteria are necessary to ensure the review is comprehensive
 - Weights reflect their comparative importance in the overall score

Category/ Overall Weights	Individual Weights	Criteria
Accurate Technical Content 55%	20%	Accuracy
	10%	Transferability of knowledge
	10%	Completeness
	5%	Relevancy
	5%	Quality of figures and diagrams in support of technical content
	5%	Relevant security related information
Scope 20%	10%	Defined boundaries of subject
	10%	Not too broad and not too narrow
Integration 15%	5%	Consistent with Modernization objectives and initiatives
	5%	Demonstrates dependencies, interactions, and synergies
	5%	Consistent with other documentation
Readability 10%	3%	Format
	3%	Grammar and Punctuation
	2%	Word Choice
	2%	Use of diagrams, figures, and tables to clarify concepts

Example

Establish Assessment Parameters

Rating Scale

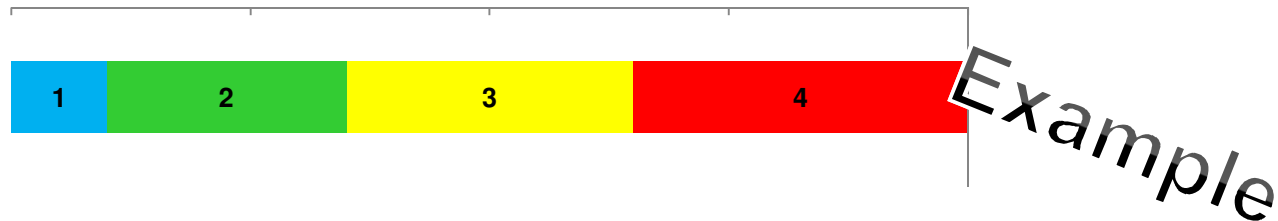
- Rating scale is used to grade the deliverable for each criterion and the weights are used to calculate the score

	100%	Meets or Exceeds Expectations	<i>Example</i>
	75%	Requires Minor Rework	
	50%	Requires Major Rework	
	25%	Unacceptable	

Establish Assessment Parameters

Scoring

- Scoring ranges can be as wide or narrow and numerous as the team feels necessary



1 90% - 100%	Acceptable
2 66% - 89%	Conditionally Acceptable
3 36% - 65%	Unsatisfactory
4 0% - 35%	Unacceptable

Establish Assessment Parameters

Update Forms

- Assessment documents are used to capture comments and quantify quality

Assessment Criteria & Weights

Rating Scale

Deliverable :

Comments:

#	Criteria	Reference Section	Comment
Critical Issues: Significant weaknesses, major deficiencies, ambiguities, faulty analysis, etc.			
1			
2			
3			
4			
Important Clarifications: Further interpretation, explanation, etc.			
5			
6			
7			
8			
Editorial Recommendations:			
9			
10			
11			
12			

¹ Assessment Categories: Accurate technical content

Individual Assessment

(Deliverable Name)

	Weights			Meets or Exceeds Expectations	Requires Minor Rework	Requires Major Rework	Unacceptable	Total
	Standard	N/A*	Adj'd**					
Accurate technical content	55%		55%					45.00%
Accuracy	20%		20%		1			
Transferability	10%		10%	1				
Completeness	10%		10%	1				
Relevancy	5%		5%		1			
Quality of figures and diagrams in support of technical content	5%		5%			1		
Relevant security related information	5%		5%				1	
Scope	20%		20%					
Defined boundaries of subject	10%		10%			1		
Not too broad and not too narrow	10%		10%			1		
Integration	15%		15%					
Consistent with Modernization objectives and initiatives	5%		5%	1				
Consistent with other documentation	5%		5%			1		
Demonstrates dependencies, interactions, and synergies	5%		5%		1			
Readability	10%		10%					
Grammar and Punctuation	3%		3%		1			
Word Choice	3%		3%		1			
Format	2%		2%			1		
Use of diagrams, figures, and tables to clarify concepts	2%		2%			1		
Total assessment								

Reviewer: _____

* If factor is not applicable to this document, enter X in this column and the weights used to assess this document will recalculate accordingly.
** Weight is adjusted to account for factors that are not applicable.

Consolidated Assessment

(Deliverable Name)

Factor	Weights			Assessment by Factor				Number of Reviewers	Adjusted Total								
	Std	N/A*	Adj'd	Meets or Exceeds Expectations	Requires Minor Rework	Requires Major Rework	Unacceptable										
Accurate technical content	55%		55%					2	45.25%								
Accuracy	20%		20%	1	1	0	0										
Transferability	10%		10%	1	1	0	0										
Completeness	10%		10%	2	0	0	0										
Relevancy	5%		5%	0	2	0	0										
Quality of figures in support of technical content	5%		5%	0	0	2	0										
Relevant security related information	5%		5%	0	2	0	0										
Scope	20%		20%					2	16.25%								
Defined boundaries of subject	10%		10%	0	2	0	0										
Not too broad and not too narrow	10%		10%	1	1	0	0										
Integration	15%		15%					2	11.25%								
Consistent with Modernization objectives and initiatives	5%		5%	1	1	0	0										
Consistent with other documentation	5%		5%	0	1	1	0										
Demonstrates dependencies, interactions, and synergies	5%		5%	0	2	0	0										
Readability	10%		10%					3	6.92%								
Grammar and Punctuation	3%		3%	1	2	0	0										
Word Choice	3%		3%	0	3	0	0										
Format	2%		2%	0	1	2	0										
Use of diagrams, figures, and tables to clarify concepts	2%		2%	0	0	3	0										
Assessment Plot	80.67%																
Key: Assessment Ranges for the Entire Deliverable	<table border="1"> <tr> <td>Meets or Exceeds Expectations</td> <td>90% - 100%</td> </tr> <tr> <td>Requires Minor Rework</td> <td>80% - 90%</td> </tr> <tr> <td>Requires Major Rework</td> <td>70% - 80%</td> </tr> <tr> <td>Unacceptable</td> <td>60% - 70%</td> </tr> </table>									Meets or Exceeds Expectations	90% - 100%	Requires Minor Rework	80% - 90%	Requires Major Rework	70% - 80%	Unacceptable	60% - 70%
Meets or Exceeds Expectations	90% - 100%																
Requires Minor Rework	80% - 90%																
Requires Major Rework	70% - 80%																
Unacceptable	60% - 70%																

* Factor is not applicable if an "X" is entered. Standard weight is adjusted to account for factors that are not applicable.

Scoring

Comment Form

Comment_Assessment_Factors_v2.doc

- **Criteria column ties comments to Assessment Form categories**

Comment Form			
Deliverable :			
Comments by:			
#	Criteria ¹	Reference Section	Comment
Critical Issues: Significant weaknesses, major deficiencies, ambiguities, faulty analysis, etc.			
1.			
2.			
3.			
4.			
Important Clarifications: Further interpretation, explanation or expansion, corrective revisions, detailed discussions, etc.			
5.			
6.			
7.			
8.			
Editorial Recommendations: Minor administrative/editorial corrections, etc.			
9.			
10.			
11.			
12.			

¹ **Assessment Categories: Accurate technical content (A), Scope (S), Integration (I), Readability (R)**

Individual Reviewer's Assessment Form

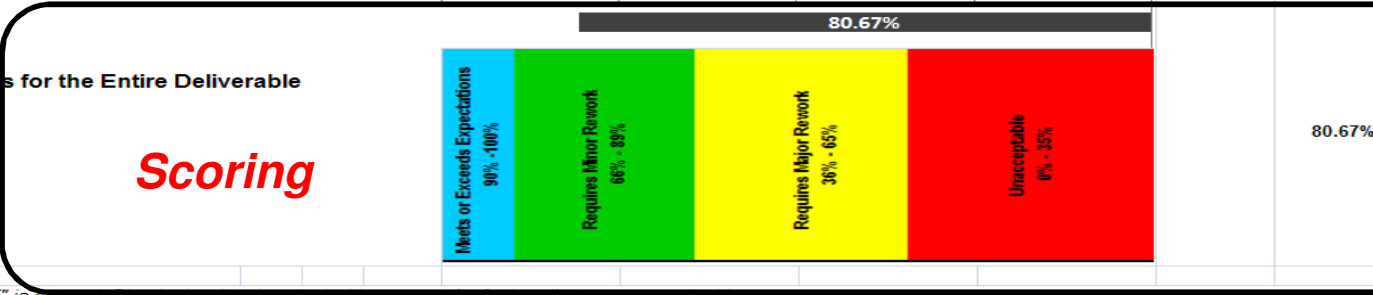
Assessment Form.xls

Individual Assessment					<i>Rating Scale</i>				Total
{Deliverable Name}									
<i>Assessment Criteria</i>	<i>Weights</i>			Meets or Exceeds Expectations	Requires Minor Rework	Requires Major Rework	Unacceptable	45.00%	
	Standard	N/A* X	Adj**	100%	75%	50%	25%		
Accurate technical content	55%		55%					45.00%	
Accuracy		20%	20.0%		1				
Transferability		10%	10.0%	1					
Completeness		10%	10.0%	1					
Relevancy		5%	5.0%		1				
Quality of figures and diagrams in support of technical content		5%	5.0%			1			
Relevant security related information		5%	5.0%		1				
Scope	20%		20%					15.00%	
Defined boundaries of subject		10%	10.0%		1				
Not too broad and not too narrow		10%	10.0%		1				
Integration	15%		15%					11.25%	
Consistent with Modernization objectives and initiatives		5%	5.0%	1					
Consistent with other documentation		5%	5.0%			1			
Demonstrates dependencies, interactions, and synergies		5%	5.0%		1				
Readability	10%		10%					6.50%	
Grammar and Punctuation		3%	3.0%		1				
Word Choice		3%	3.0%		1				
Format		2%	2.0%			1			
Use of diagrams, figures, and tables to clarify concepts		2%	2.0%			1			
Total assessment								77.75%	
Reviewer: _____									

* If factor is not applicable to this document, enter X in this column and the weights used to assess this document will recalculate accordingly.
 ** Weight is adjusted to account for factors that are not applicable

Consolidated Assessment Form

Summary Assessment Form.xls

Consolidated Assessment									
{Deliverable Name}									
Factor	Weights			Assessment by Factor				Number of Reviewers	Adjusted Total
	Std	N/A*	Adj'd	Meets or Exceeds Expectations	Requires Minor Rework	Requires Major Rework	Unacceptable		
				100%	75%	50%	25%		
Accurate technical content	55%		55%					2	46.25%
Accuracy	20%		20.0%	1	1	0	0		
Transferability	10%		10.0%	1	1	0	0		
Completeness	10%		10.0%	2	0	0	0		
Relevancy	5%		5.0%	0	2	0	0		
Quality of figures in support of technical content	5%		5.0%	0	0	2	0		
Relevant security related information	5%		5.0%	0	2	0	0		
Scope	20%		20%					2	16.25%
Defined boundaries of subject	10%		10.0%	0	2	0	0		
Not too broad and not too narrow	10%		10.0%	1	1	0	0		
Integration	15%		15%					2	11.25%
Consistent with Modernization objectives and initiatives	5%		5.0%	1	1	0	0		
Consistent with other documentation	5%		5.0%	0	1	1	0		
Demonstrates dependencies, interactions, and synergies	5%		5.0%	0	2	0	0		
Readability	10%		10%					3	6.92%
Grammar and Punctuation	3%		3.0%	1	2	0	0		
Word Choice	3%		3.0%	0	3	0	0		
Format	2%		2.0%	0	1	2	0		
Use of diagrams, figures, and tables to clarify concepts	2%		2.0%	0	0	3	0		
Assessment Plot									80.67%
Key: Assessment Ranges for the Entire Deliverable									
Scoring									

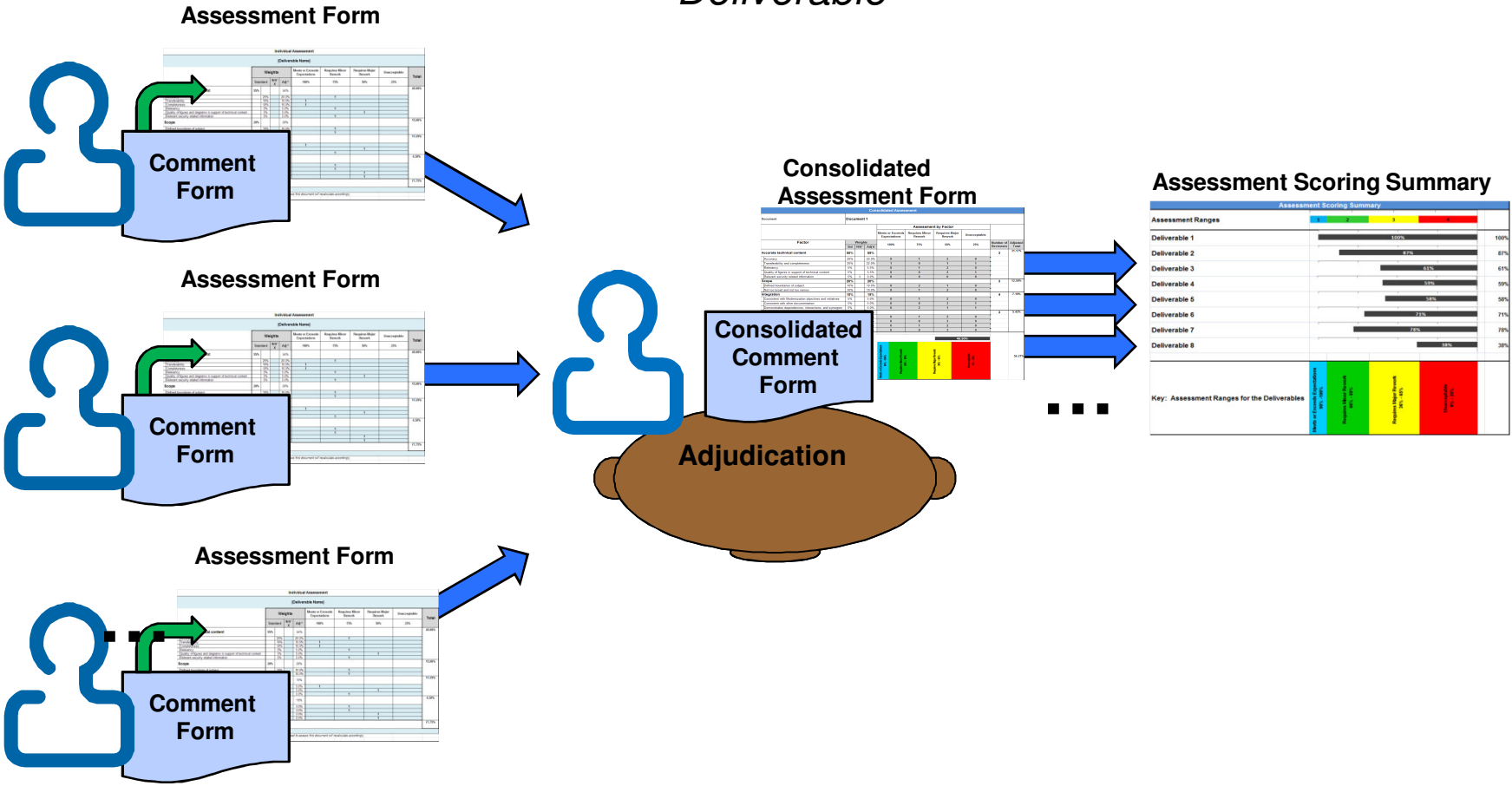
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Implement Review Process

Individual Reviews of Deliverable

Team Lead Consolidation & Adjudication for Deliverable

Aggregation of Results for Group of Deliverables



Implement Review Process

- **Individual team members (at least 2 per document):**
 - Record comments regarding the deliverable on the Comment Form
 - Using Assessment Form, quantify assessment for each criterion based on comments

NOTE: Not all reviewers need to assess all categories of criteria

- Deliverable score automatically calculated using ratings and criteria weights
- **Team lead:**
 - Collects and consolidates scoring and comments
 - Adjudicates comments and scoring with members
 - Prepares Assessment Scoring Summary

Assessment Scoring Summary

Summary Assessment Form.xls

Assessment Scoring Summary				
Assessment Ranges	1	2	3	4
Deliverable 1	100%			100%
Deliverable 2	87%			87%
Deliverable 3	61%			61%
Deliverable 4	59%			59%
Deliverable 5	58%			58%
Deliverable 6	71%			71%
Deliverable 7	78%			78%
Deliverable 8	38%			38%
Key: Assessment Ranges for the Deliverables	Meets or Exceeds Expectations 90% - 100%	Requires Minor Rework 66% - 89%	Requires Major Rework 36% - 65%	Unacceptable 0% - 35%



Potential Enhancements

■ Automation

- Forms
- Entry on-line
- Graphics

■ Deeper assessments

- By category of criteria
- Individual criteria

Demonstration

