

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

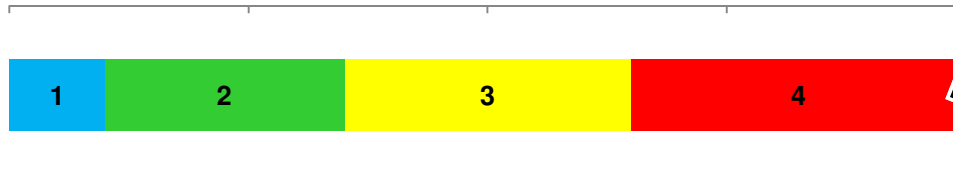
	100%	Meets or Exceeds Expectations	<i>Example</i>
	75%	Requires Minor Rework	
	50%	Requires Major Rework	
	25%	Unacceptable	



Establish Assessment Parameters

Scoring

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



Example

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

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		
	100%	75%	50%						
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									

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

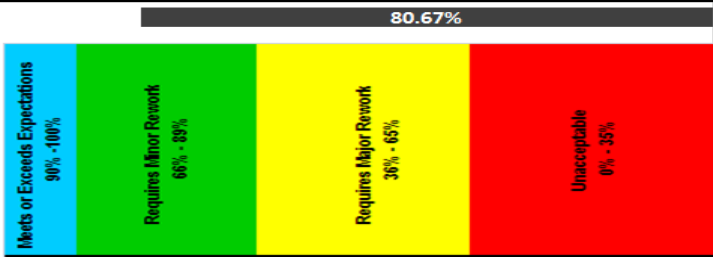
Assessment Form.xls

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								2	80.67%
Key: Assessment Ranges for the Entire Deliverable	<p>Scoring</p> <p>Meets or Exceeds Expectations 90% - 100%</p> <p>Requires Minor Rework 65% - 85%</p> <p>Requires Major Rework 35% - 65%</p> <p>Unacceptable 0% - 35%</p>								

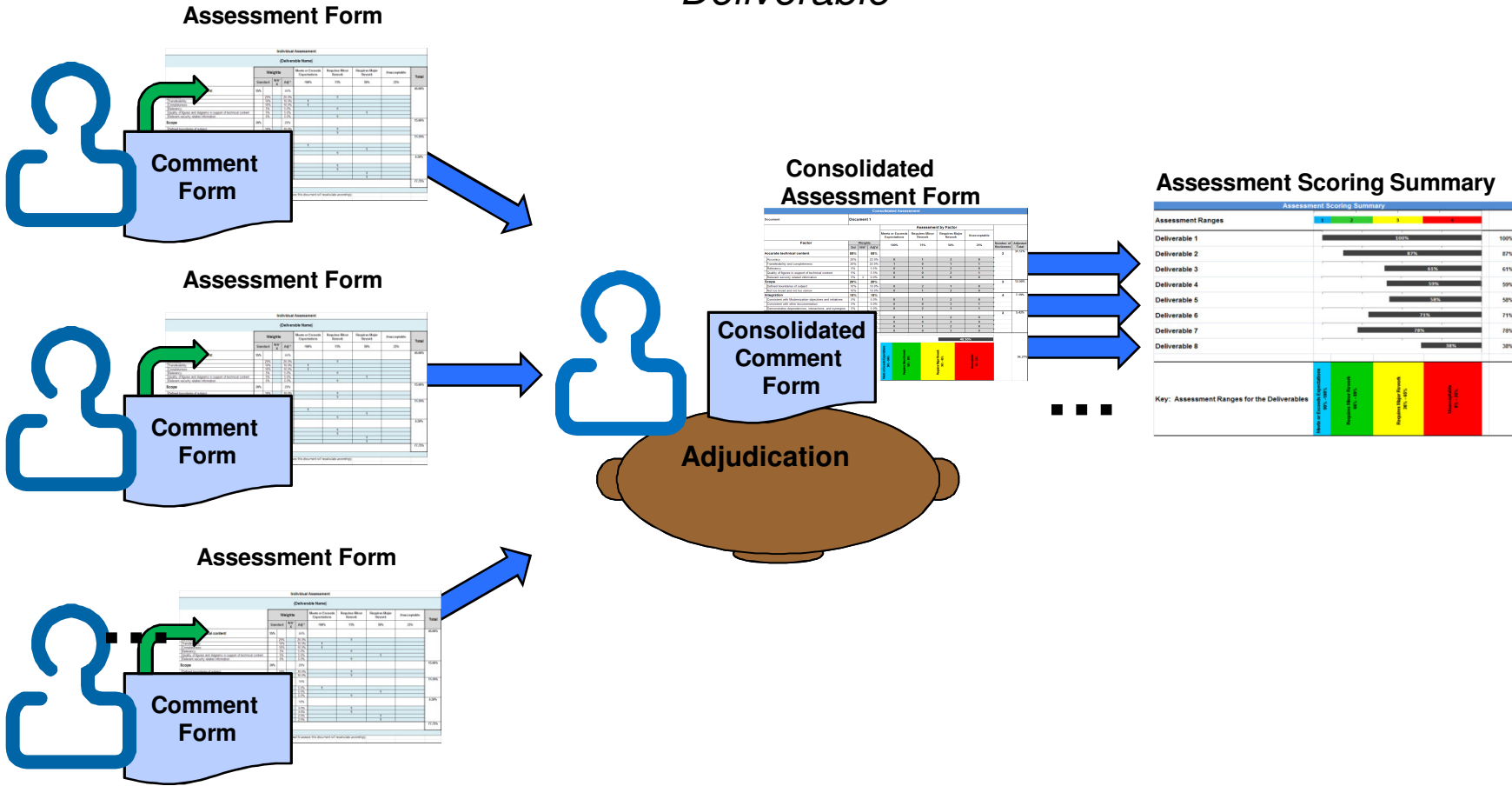
* Factor is not applicable if an "X" is entered. Standard weight is adjusted to account for factors that are not applicable.

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

