



Assessment Technology, Inc

Benchmark Assessment in Standards-Based Education

**Galileo K-12 Online
Educational Management System**



Introduction

- **Benchmark Assessments in Standards-Based Education**
 - Assessment Technology, Incorporated supports benchmark assessment and its implementation in standards-based education through the Galileo Educational Management System (EMS) implemented with Galileo K-12 Online



Benchmark Assessments

- **Standards-Based Assessment**
 - Characteristics
 - Psychometrics



Benchmark Assessments

- **Characteristics**
 - A benchmark test is a locally customized, district-wide assessment designed to measure the achievement of standards.
 - The fundamental purpose of benchmark assessment is to provide information that can be used to guide instruction.
 - The central intended consequence associated with benchmark assessment is the provision of learning opportunities to promote standards mastery.
 - Benchmark assessments take place in the context of a teaching, assessment, intervention cycle that is typically implemented multiple times during the school year.
 - Repetitions of the cycle provide an increasing body of information about student learning.



Benchmark Assessments

- Psychometrics
 - IRT Analyses
 - Validity
 - Reliability



Benchmark Assessments

- Psychometrics
 - IRT Analyses
 - Item Discrimination
 - Item Difficulty
 - Guessing



Benchmark Assessments

- Psychometrics
 - Validity
 - Standards-based reform initiatives being implemented in states across nation are designed to enable local educational agencies to pursue common goals reflected in state standards.
 - Statewide tests provide a measure of the achievement of goals reflected in state standards.
 - Benchmark tests used to guide instruction provide measures of the achievement of goals reflected in state standards.
 - It is essential that there be commonality in what is measured on benchmark tests and the statewide tests to insure that benchmark measures are assessing capabilities reflected in the statewide test.



Benchmark Assessments

- Psychometrics-continued
 - Validity
 - Significant correlations between a statewide test and benchmark tests provide evidence of the validity of the benchmark tests.
 - Since benchmark tests and the statewide test serve different purposes, the correlations should not be so high that the tests can be interpreted as parallel forms of the same test.



Benchmark Assessments

- **Reliability**
 - If benchmark tests are to serve the purposes for which they are intended, they must be reliable.
 - Benchmark tests are designed to correlate with other measures of student proficiency including statewide assessments.
 - A test that lacks reliability does not correlate well even with itself.



Benchmark Assessments

- **Scoring**

- Observed Test Scores
- Criterion-Referenced Scores
- Ability Scores
- Norm-Referenced Scores
- Developmental Scores
- Benchmark Score Categories Reflecting Standards Mastery



Benchmark Assessments

- **Risk Assessment**

- When a relationship has been established between performance on one or more benchmark assessments and performance on a statewide test, benchmark results can be used to assess the level of risk that a given student will not meet state standards as measured by the statewide test.
- In order to conduct a risk assessment, cut points equated to those for the statewide test must be established.



Benchmark Assessments

- Risks of not Meeting State Standards Given Varying Patterns of Benchmark Standards Mastery

District Risk Assessments - 5th Grade Math						
Assessments	Benchmark Mastery Patterns			Number of Students	AIMS Test	
	1	2	3		Met	Not Met
Risk Assessment 1						
Benchmark 1	Met			417	0.94	0.06
	Not Met			44	0.41	0.59
Risk Assessment 2						
Benchmarks 1,2	Met	Met		395	0.96	0.04
	Met	Not Met		22	0.59	0.41
	Not Met	Met		21	0.57	0.43
	Not Met	Not Met		23	0.26	0.74
Risk Assessment 3						
Benchmark 1,2,3	Met	Met	Met	375	0.98	0.02
	Met	Met	Not Met	20	0.50	0.50
	Met	Not Met	Met	14	0.79	0.21
	Met	Not Met	Not Met	8	0.25	0.75
	Not Met	Met	Met	13	0.77	0.23
	Not Met	Met	Not Met	8	0.25	0.75
	Not Met	Not Met	Met	5	0.80	0.20
	Not Met	Not Met	Not Met	18	0.11	0.89



Benchmark Assessments

- **Standards Mastery**

- An implicit assumption of the risk assessment approach is that classifications based on statewide test performance have no measurement error.
- When multiple tests are available, it is possible to estimate the measurement error associated with mastery classification using latent-class models.



Benchmark Assessments

- Mastery Classification based on Benchmark and AIMS Assessments.

Benchmark-AIMS Mastery Classification for Fifth-Grade Math

Test 1 Standards	Test 2 Standards	AIMS Standards	Counts	Mastery Classification	Modal Probability	Classification Error
Not Met	Not Met	Not Met	217	Non-Mastery	0.9981	0.0019
Met	Not Met	Not Met	49	Non-Mastery	0.9459	0.0541
Not Met	Met	Not Met	48	Non-Mastery	0.8886	0.1114
Met	Met	Not Met	43	Mastery	0.7873	0.2127
Not Met	Not Met	Met	28	Non-Mastery	0.8424	0.1576
Met	Not Met	Met	33	Mastery	0.8467	0.1533
Not Met	Met	Met	61	Mastery	0.9237	0.0763
Met	Met	Met	357	Mastery	0.9972	0.0028



Benchmark Assessments

- Latent-Class Estimation of Classification Accuracy.

Grade	Subject	Percent Correctly Allocated	Number of Students
3rd	Math	97.66	805.70
	Reading	97.04	761.78
5th	Math	96.09	803.31
	Reading	96.38	791.25
8th	Math	95.03	708.91
	Reading	94.11	886.50
10th	Reading	95.40	514.18



Benchmark Assessments

- **Implications**

- Reducing the impact of a single test on high-stakes decisions
- Increasing curricular validity
- Increasing timely access to assessment information that counts
- Increasing the accuracy of classification decisions



Benchmark Assessments

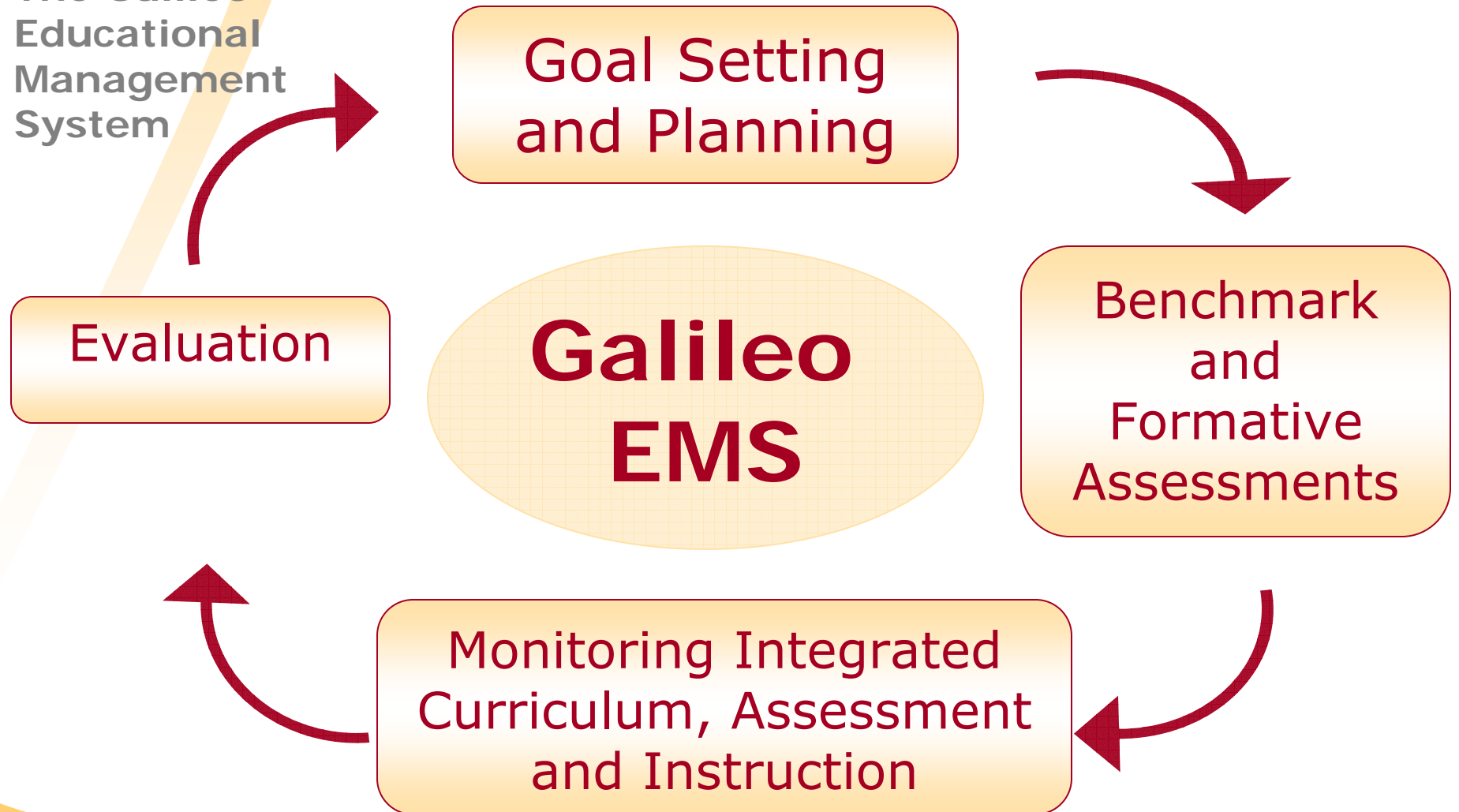
- **Meeting Educational Challenges in the Twenty-First Century**

Benchmark assessment and standards-based education are new concepts developed to meet the challenges of a new age. They are two among many innovations designed to promote learning necessary for the continuing development of an effective citizenry capable of shaping the global community in which we all live in beneficial ways. In a world that changes as rapidly as the one in which we now live, it is reasonable to assume that the concepts of benchmark assessment and standards-based education will themselves change quickly. Yet, the need of instruction that is goal directed and educational management that adapts in effective ways to maximize the likelihood that goals are met will not change. What we can expect and, indeed, what we are currently witnessing is a rapid evolution of human commitment and innovative technology designed to support goal-directed, data-driven instruction. Benchmark assessment and standards-based education are a part of this evolution.



Benchmark Assessments Using Galileo K-12 Online

The Galileo
Educational
Management
System





Benchmark Assessments Using Galileo K-12 Online

- **Assessment Capabilities**
 - Plan benchmarks aligned to state standards
 - Build formative tests quickly
 - Administer tests online or offline
 - Utilize secure benchmark and formative item banks
- **Scoring and Reporting Features**
 - Automate test scoring with fast online data aggregation
 - Access real-time data, at any point in time, at multiple levels
 - Link district assessments to state standards through multi-test reports
 - Filter on NCLB variables to gain further insight
- **Curriculum Planning Aligned to Standards**
 - Link assessments to classroom teaching
 - Map assignments and lesson plans
- **Additional System Features**
 - Import data easily with user-friendly tools
 - Obtain professional development on-site or online
 - Enhance communication through the Student/Parent Center



Benchmark Assessments Using Galileo K-12 Online

- **ATI District Partnership Goals**
 - To provide the district with a fully integrated online system that accommodates district curriculum and assessment goals, educational plans, and accountability initiatives
 - To form an effective partnership with the district to help ensure that district needs and input are addressed through ATI technology
 - To provide the district with data-driven decision-making reporting tools that assist all district stakeholders in promoting student learning



Benchmark Assessments Using Galileo K-12 Online

- **Item Parameters Report**
- **Item Analysis Report**
- **Developmental Profile Report**
- **Aggregate Multi-Test Report**
- **Risk Assessment Report**



Benchmark Assessments Using Galileo K-12 Online

- **Item Parameters Report**
 - Provides a breakdown of the difficulty, sensitivity, and guessing parameter per question

Item Parameters Report

Test: Geometry Test 1

	Discrimination	Difficulty	Guessing
1. MHS-S4C1-01. Identify the attributes of special triangles. (isosceles, equilateral, right)	0.86	-1.08	0.13
2. MHS-S4C1-02. Identify the hierarchy of quadrilaterals.	0.62	-0.02	0.13
3. MHS-S4C1-06. Solve problems related to complementary, supplementary, or congruent angle concepts.	0.65	-1.14	0.13
4. MHS-S4C1-09. Solve problems using the triangle inequality property.	0.42	1.29	0.15
5. MHS-S4C1-11. Determine when triangles are congruent by applying SSS, ASA, AAS or SAS.	2.47	2.46	0.26
6. MHS-S4C1-13. Construct a triangle congruent to a given triangle.	1.09	-1.27	0.12
7. MHS-S4C3-01. Graph a quadratic equation with lead coefficient equal to one.	0.8	0.98	0.12
8. MHS-S4C3-02. Graph a linear equation in two variables.	1.14	0.34	0.21
9. MHS-S4C3-05. Determine the midpoint between two points	0.75	-0.36	0.13



Benchmark Assessments Using Galileo K-12 Online

- Item Analysis Report
 - Detailed Item Analysis Report

Setup Assessment Curriculum Grades Student/Family Staff Reports

All Reports | Student Sets

Item Analysis

District: Unified School District
School:
Class:

Home | Settings | Password | Tech Support |

Test: 5th Grade Math Test 3
Total Students: 508

1) **M05-S1C3-04. Estimate and measure for area and perimeter.**

Percentile Rank	A	B	✓ C	D	Not Answered
80 - 100	0.39%	---	21.06%	---	---
60 - 79	2.56%	0.39%	17.72%	0.20%	---
40 - 59	3.35%	0.39%	15.55%	0.39%	---
20 - 39	3.15%	0.98%	13.98%	0.39%	---
0 - 19	6.50%	0.59%	11.02%	1.38%	---
Total	15.95%	2.35%	79.33%	2.36%	0.00%

2) **M05-S1C3-04. Estimate and measure for area and perimeter.**

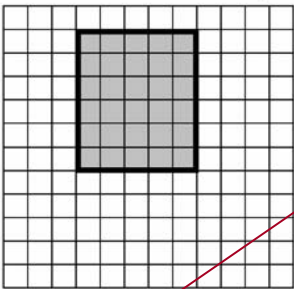
Percentile Rank	A	✓ B	C	D	Not Answered
80 - 100	2.56%	17.91%	0.79%	0.20%	---
60 - 79	5.71%	13.19%	1.38%	0.59%	---
40 - 59	5.51%	11.61%	2.17%	0.39%	---
...	---



Benchmark Assessments Using Galileo K-12 Online

- Item Analysis Report
 - Detailed Item Analysis Report – Question Information

Measure the area and perimeter of the shaded figure.



A) Area = 30 sq. units, Perimeter = 22 units
B) Area = 20 sq. units, Perimeter = 30 units
C) Area = 30 sq. units, Perimeter = 30 units
D) Area = 20 sq. units, Perimeter = 20 units

Setup Assessment Curriculum Grades Student/Family

All Reports | Student Sets

Item Analysis District: Unit
School:
Class:
Home | S

Test: 5th Grade Math Test 3
Total Students: 508

1) M05-S1C3-04. Estimate and measure for area and perimeter.

Percentile Rank	A	B	✓ C	D	Not Answered
90 - 100	0.29%	---	21.06%	---	---
80 - 79	2.56%	0.39%	17.72%	0.20%	---
40 - 59	3.35%	0.39%	15.55%	0.39%	---
20 - 39	3.15%	0.98%	13.98%	0.39%	---
0 - 19	6.50%	0.59%	11.02%	1.38%	---
Total	15.95%	2.35%	79.33%	2.36%	0.00%

2) M05-S1C3-04. Estimate and measure for area and perimeter.

Percentile Rank	A	✓ B	C	D	Not Answered
90 - 100	2.56%	17.01%	0.79%	0.20%	---
80 - 79	5.71%	13.19%	1.38%	0.59%	---
40 - 59	5.31%	11.61%	2.17%	0.39%	---
20 - 39	6.15%	10.04%	0.79%	1.57%	---
0 - 19	7.28%	9.25%	1.18%	1.77%	---
Total	27.16%	62.00%	6.31%	4.52%	0.00%

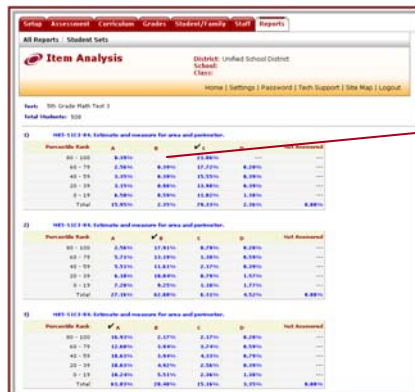
3) M05-S1C3-04. Estimate and measure for area and perimeter.

Percentile Rank	✓ A	B	C	D	Not Answered
90 - 100	16.93%	2.17%	2.17%	0.20%	---
80 - 79	12.60%	3.94%	3.74%	0.59%	---
40 - 59	10.63%	3.94%	4.33%	0.79%	---
20 - 39	10.63%	4.92%	2.56%	0.39%	---
0 - 19	10.24%	5.51%	2.36%	1.38%	---
Total	61.03%	26.48%	15.16%	3.35%	0.00%



Benchmark Assessments Using Galileo K-12 Online

- Item Analysis Report
 - Detailed Item Analysis Report - Student Information



Item Analysis

Test: 5th Grade Math Test 3

Total Students: 38

Student Answer: A

Performance Objective: M05-S1C3-04. Estimate and measure for area and perimeter.

Use the browser's Back button to return to the previous level.

Student Name	Percentile Rank (0% - 100%)	Raw Score (65 possible pts.)
Student A	97.83%	62.00
Student B	97.83%	62.00
Student C	94.69%	61.00
Student D	90.55%	60.00
Student E	90.55%	60.00
Student F	86.81%	59.00
Student G	86.81%	59.00



Benchmark Assessments Using Galileo K-12 Online

- **Development Profile Report**
 - Shows the count of students at each performance standard for a test.

Development Profile			District: The Unified School District Year: 2004 - 2005 School: Elementary School Class: none
			Settings Password Help Tech Support Site Map Logout
Class: [All Classes] (6 students have taken all tests listed below.)			View Report
Results From: → 3rd Grade Reading and Literature Test 1			
Meets Standard	Approaches Standard	Falls Below Standard	Standards
			S1 C3 DECODE WORDS, USING KNOWLEDGE OF PHONICS, SYLLABICATION AND WORD PARTS
4	2	0	PO 5. Recognize high frequency words and irregular sight words.
			S1 C4 ACQUIRE AND USE NEW VOCABULARY IN RELEVANT CONTEXTS
0	3	3	PO 1. Use knowledge of prefixes (e.g., un-, re-, in-, dis-) to determine the meaning of words.
3	2	1	PO 2. Use knowledge of suffixes (e.g., -ful, -ly, -less) to determine the meaning of words.
3	1	2	PO 5. Determine the meaning of compound words, using knowledge of individual words (e.g., lunchtime, daydream, everyday).
			S1 C6 EMPLOY STRATEGIES TO COMPREHEND TEXT
2	2	2	PO 1. Predict events and actions, based upon prior knowledge and text features.
3	1	2	PO 2. Compare a prediction about an action or event to what actually occurred within a text.
			S2 C1 IDENTIFY, ANALYZE AND APPLY KNOWLEDGE OF THE STRUCTURES AND ELEMENTS OF LITERATURE
3	2	1	PO 3. Sequence a series of events in a literary selection.
			S3 C1 IDENTIFY, ANALYZE AND APPLY KNOWLEDGE OF THE PURPOSE, STRUCTURES, AND ELEMENTS OF EXPOSITORY TEXT
2	2	2	PO 1. Identify the main idea and supporting details in expository text.
1	1	4	PO 2. Locate facts in response to questions about expository text.
5	0	1	PO 4. Use a variety of sources (e.g., trade books, encyclopedias, magazines, atlases, almanacs, electronic source, textbooks) to answer specific questions, and/or gather information. (Connected to Research Stand in Writing)





Benchmark Assessments Using Galileo K-12 Online

- **Aggregate Multi-Test Report**
 - Displays the count and percent of students at each risk level.

Aggregate Multi-Test Report

District: The Unified School District
Year: 2004 - 2005
School: Elementary School
Class: none

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[View Detail](#) [View Report](#)

Elementary School

Test Sequence	3rd Grade Math Test 1 (Score Range: 497 - 994)	3rd Grade Math Test 2 (Score Range: 450 - 1006)
1	751	775
2	751	824

This table shows the count and percentage of students at each risk level.


	High Risk	Moderate Risk	Low Risk	On Course (minimal risk)
Number of Students (10)	0	1	3	6
Percentage	0.00 %	10.00 %	30.00 %	60.00 %



Benchmark Assessments Using Galileo K-12 Online

• Risk Assessment Report

- Can be generated at the district or school level.
- Can show how many students fall into each risk.
- Can provide specific student and risk category information.

 **Risk Assessment Report**

District: The Unified School District
Year: 2004 - 2005
School: Elementary School
Class: none

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School: Elementary School
(10 students have taken all tests listed below.)

Results From: → 3rd Grade Math Test 1
→ 3rd Grade Math Test 2

You can click a class to view the detail for each student or click the count to view the detail for each student at the corresponding risk level. Use the browser's Back button to return to the previous level.


View Students	High Risk	Moderate Risk	Low Risk	On Course (minimal risk)
Barbara Smith's 3rd Grade Class (5)	0	0	1	4
	0.00 %	0.00 %	20.00 %	80.00 %
Ms. Santiago's 3rd Grade Class (5)	0	1	2	2
	0.00 %	20.00 %	40.00 %	40.00 %



Benchmark Assessments Using Galileo K-12 Online

- **Risk Assessment Report**

- View detail information for each student.
- View detail information for each risk category.

 **Risk Assessment Report**

District: The Unified School District
Year: 2004 - 2005
School: Elementary School
Class: none

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Class: Barbara Smith's 3rd Grade Class
(5 students have taken all tests listed below.)

Results From: → 3rd Grade Math Test 1
→ 3rd Grade Math Test 2

Use the browser's Back button to return to the previous level.

	High Risk	Moderate Risk	Low Risk	On Course (minimal risk)
Forbes, Julie	--	--	--	✓
Garrett, Samantha	--	--	✓	--
Gonzalez, Joseph	--	--	--	✓
Hill, Brandon	--	--	--	✓
Wood, Timothy	--	--	--	✓



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