

Distributed Learning - Diagnostic, Advisement, and Technical
Research (DL DART) Support Services

Learning Assignment and Shareable Content Object Reference
Model (SCORM)-based Learning Content Statuses on the Army
Learning Management System (ALMS)

Provided for

The Army Distributed Learning Program

(TCM TADLP)



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Version History

Version	Revision Date	Description
1.0	15 July 2015	Initial release

Introduction

The purpose of this document is to provide an informative view of the different statuses that learning assignments linked to auto-scoring Shareable Content Object Reference Model (SCORM) 2004 3rd Edition learning content can be assigned on the Army Learning Management System (ALMS). This document provides analyses of the status hierarchy for learning assignments on the ALMS, possible status values, and the processes for assigning status values. The following topics are discussed in order throughout the remaining sections:

- The three levels of statuses around learning assignments and learning content
- The general rollup process used to arrive at a final status for a learning assignment
- In-depth analysis of the statuses at each level and their possible values
- How various status values affect the overall rollup process

Differentiating Status Levels

The ALMS uses three levels of statuses when calculating statuses of SCORM-based learning content during the rollup process. The statuses at each level have similar names although each status is different in the rollup process. For clarity, this section identifies the differences between the levels of statuses prior to in-depth analysis in the *Status Rollup Process* section. The ALMS uses three status levels for SCORM-based learning content:

- Learning assignment status
- Content attempt statuses
- Learning content statuses

The status levels exist in a hierarchy with the learning assignment status at the top calculated from the content attempt statuses. The content attempt statuses are calculated using the SCORM-based learning content statuses set during run-time. Figure 1 illustrates the relationship between all three status levels.

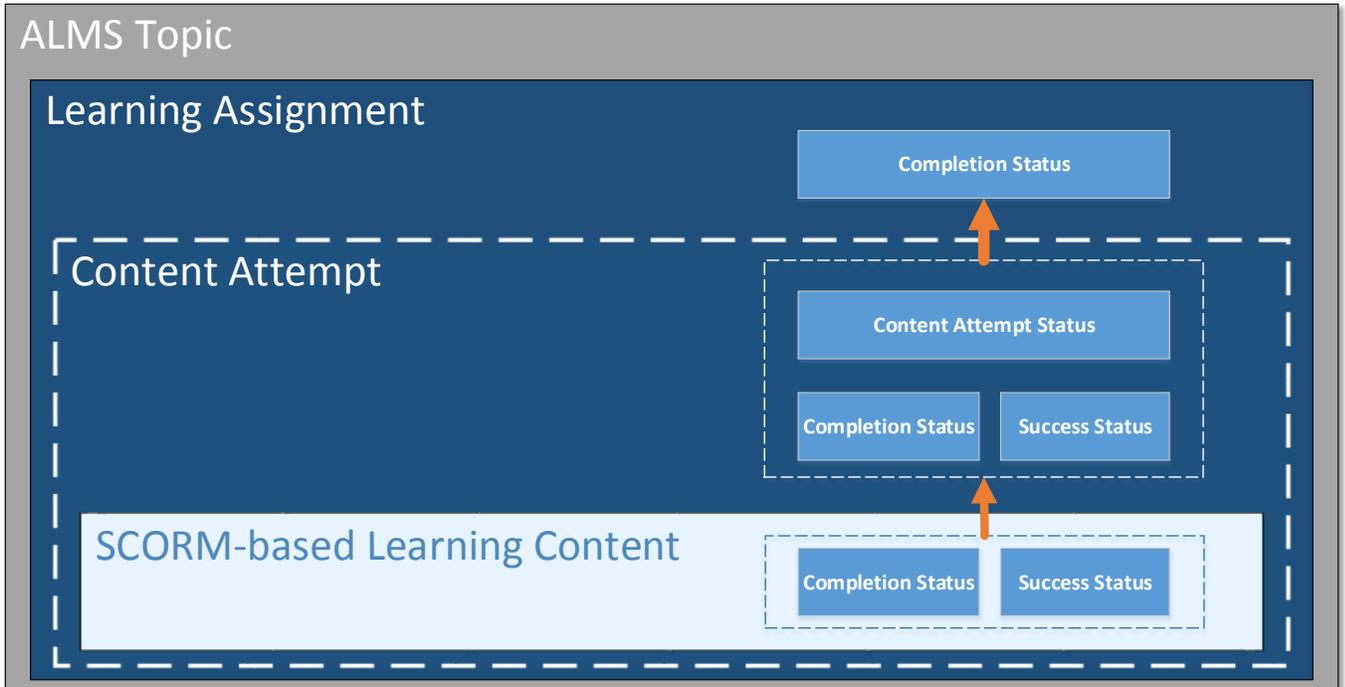


Figure 1: The status hierarchy for a learning assignment with SCORM-based content on the ALMS

Learning Assignment Statuses

The learning assignment status is synonymous with the *Completion Status* shown in the *Learning Assignments* view for a topic on the ALMS. The status of a learning assignment indicates the top-most status used for determining the state of learning content used to give learners completion credit. Figure 2 shows the status of a learning assignment under the *Completion Status* table heading.

Learning Assignments					Print Export Modify Table	
Module	Assignment Type	Requirement	Details	Completion Status	Completed On	Actions
Assessment	Training Content	Required	Attempts Allowed: Unlimited	Not Evaluated		<input type="button" value="Launch"/> more actions

Figure 2: Learning assignment completion status

A learning assignment can have one of three values for its completion status. Table 1 lists the potential statuses for a learning assignment.

Table 1: Learning Assignment Status Values

Status Name	Potential Values
Completion Status	<p>Not Evaluated</p> <p>No final determination as to whether the learner receives credit or not, which results in transfer to the learner’s transcripts.</p>
	<p>Successful</p> <p>A final determination that the learner will receive credit for the learning assignment.</p>
	<p>Unsuccessful</p> <p>A final determination that the learner will not receive credit for the learning assignment.</p>

Accessing the Results View

The status assigned to a learning assignment derives from multiple status values it receives from the learning content itself. The *Results* view shows a detailed set of statuses for both a content attempt and the learning content. The *Results* view is accessed by selecting the *more actions* and *View Results by Lesson* actions for a learning assignment, then selecting the *View* action. Figure 2 shows the location of these actions.

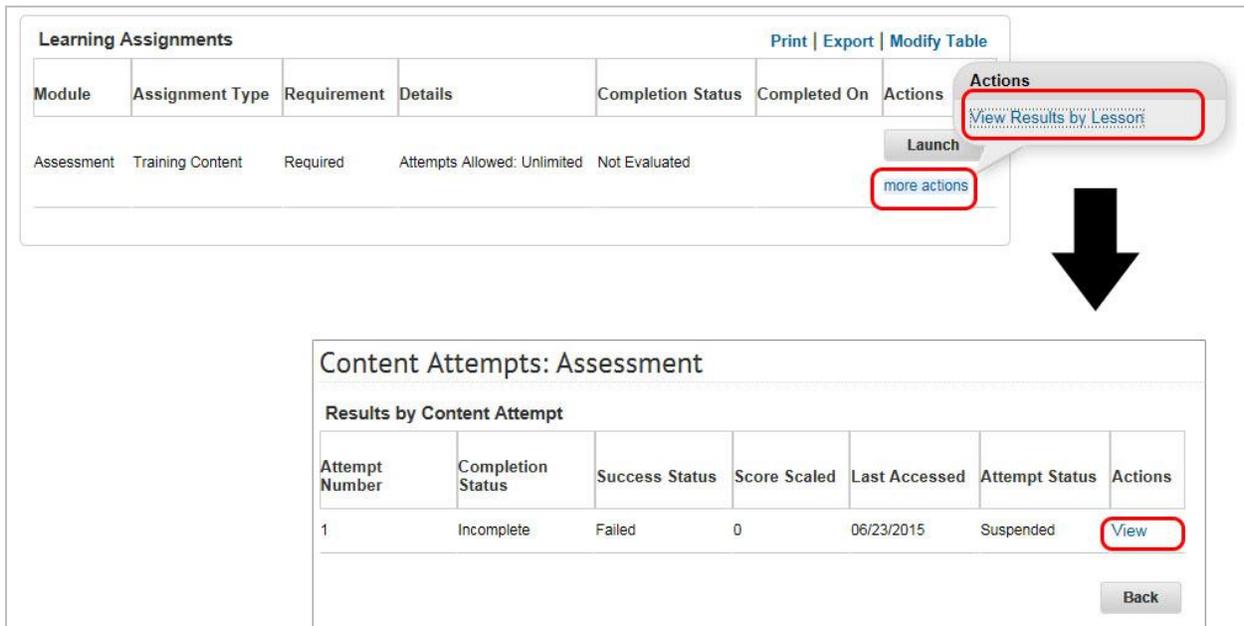


Figure 3: Accessing the Results view for a learning assignment

NOTE: The three statuses for a content attempt are also visible in the *Content Attempts* view. However, viewing content attempt statuses in the *Results* view will provide a complete set of information including learning content statuses.

Content Attempt Statuses

The statuses for a content attempt are located at the top of the *Results* view under the *Attempt Data* heading. Content attempt statuses represent the state of an individual attempt on the learning content. Content attempt statuses are derived from statuses by the learning content. Figure 4 shows the location of content attempt statuses in the *Results* view.

Results: Assessment > Attempt 1							
Attempt Data							
Content Attempt Status	Suspended						
Completion Status	Incomplete						
Success Status	Failed						
Scaled Score	0						
Results By Lesson							
Lesson	Completion Status	Success Status	Total Attempts	Last Accessed	Time Spent	Scaled Score	Scaled Passing Score
Self-Assessment	Incomplete	Failed	1	06/23/2015	00:01:00	0	1

Figure 4: Content attempt statuses in the *Results* view

NOTE: This table highlights the status fields and the scaled score field is purposefully omitted because it is a contributing element to the actual status values.

A content attempt has three statuses: Content Attempt Status, Completion Status, and Success Status. Each of the statuses can have one of multiple potential values, which are calculated using statuses sent by the learning content. Table 2 lists the potential values for each status of a content attempt.

Table 2: Content Attempt Status Values

Status Name	Potential Values
Content Attempt Status	<p>Abandoned</p> <p>The content attempt is terminated and may not be resumed. No tracking data is held by the LMS.</p>
	<p>Active</p> <p>The content attempt is currently in-progress</p>
	<p>Completed</p> <p>The content attempt is finished and will be evaluated by the LMS.</p>
	<p>Suspended</p> <p>The content attempt and its tracking data are suspended with the intent that the learner will resume the attempt at a later time.</p>
	<p>Unattempted</p> <p>The content attempt is yet to be started by the learner.</p>
Completion Status	<p>Completed</p> <p>A completion status value of “completed” exists at the top of the learning content activity tree.</p>
	<p>Incomplete</p> <p>A completion status value of “incomplete” exists at the top of the learning content activity tree.</p>
	<p>Unknown</p> <p>No completion status value exists at the top of the learning content activity tree.</p>
Success Status	<p>Passed</p> <p>A success status value of “passed” exists at the top of the learning content activity tree.</p>
	<p>Failed</p> <p>A success status value of “failed” exists at the top of the learning content activity tree.</p>
	<p>Unknown</p> <p>No success status value exists at the top of the</p>

Learning Content Statuses

Learning content statuses are shown within the *Results by Lessons* table in the *Results* view. The statuses in the table represent statuses set directly by the learning content during run-time. Figure 4 shows the location of content statuses in the *Results* view.

Results: Assessment > Attempt 1

Attempt Data

Content Attempt Status	Suspended
Completion Status	Incomplete
Success Status	Failed
Scaled Score	0

Results By Lesson

Lesson	Completion Status	Success Status	Total Attempts	Last Accessed	Time Spent	Scaled Score	Scaled Passing Score
Self-Assessment	Incomplete	Failed	1	06/23/2015	00:01:00	0	1

Figure 5: Learning content statuses in the *Results* view

NOTE: Only status fields are highlighted in the table above, other fields such as scaled score are purposefully omitted because they are contributing elements to the actual status values rather than the statuses being discussed.

Learning content has two statuses: Completion Status and Success Status. Both status values are set directly by the learning content during run-time. Table 3 lists the potential values for each status of learning content.

Table 3: Learning Content Status Values

Status Name	Potential Values
Completion Status	<p>Completed</p> <p>A <code>cmi.completion_status</code> value of “completed” set by the learning content</p>
	<p>Incomplete</p> <p>A <code>cmi.completion_status</code> value of “incomplete” set by the learning content</p>
	<p>Unknown</p> <p>No <code>cmi.completion_status</code> value set by the learning content</p>
Success Status	<p>Passed</p> <p>A <code>cmi.success_status</code> value of “passed” set by the learning content</p>
	<p>Failed</p> <p>A <code>cmi.success_status</code> value of “failed” set by the learning content</p>
	<p>Unknown</p> <p>No <code>cmi.success_status</code> set by the learning content</p>

Further Reading

Refer to the following documents for further information about conditions and statuses that contribute to rollup statuses applied to Learning Assignment objects:

- *SCORM 2004 3rd Edition Run-Time Environment (RTE)* (released 16 November 2006 by Advanced Distributed Learning)
- *SCORM 2004 3rd Edition Sequencing and Navigation (SN)* (released 16 November 2006 by Advanced Distributed Learning)
- *Strict and Relaxed Shareable Content Object Reference Model (SCORM) Content Settings on the Army Learning Management System (ALMS) Research Report* (released 03 April 2015 by DL DART Team, TCM TADLP)

Status Rollup Process

This section explains how the statuses at each level are evaluated and interact with one another to arrive at a final status for a learning assignment beginning with the statuses sent by the learning content.

General Rollup Process

The status of a learning assignment on the ALMS is determined by the statuses the learning content sets at the bottom of the status hierarchy. Learning content statuses and SCORM navigation requests at run-time are used to evaluate the statuses for a content attempt. The statuses a content attempt are assigned are ultimately used to evaluate the overall status for a learning assignment. Figure 6 shows the general process by which a learning assignment receives a status.

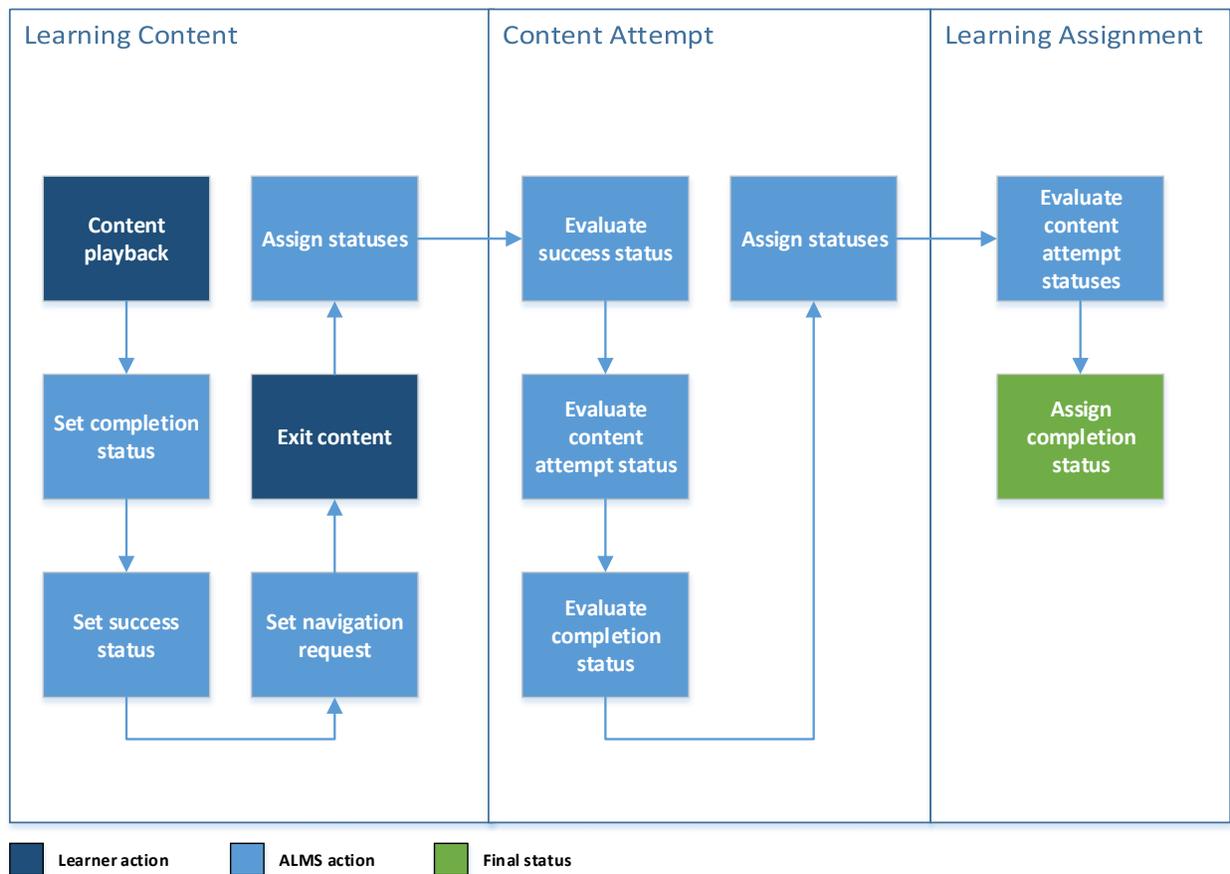


Figure 6: General learning assignment status rollup process

Learning Content Status Evaluation

Learning content sets statuses during run-time that are the basis for the status hierarchy. Completion status, success status, and the navigation request are set values for SCORM data model elements from which the content attempt and learning assignment statuses are derived. While the navigation request is not an explicit status, it is used to evaluate the content attempt status value at the content attempt

level. Learning content statuses fall within the learning content level of the status hierarchy, as shown in Figure 7.

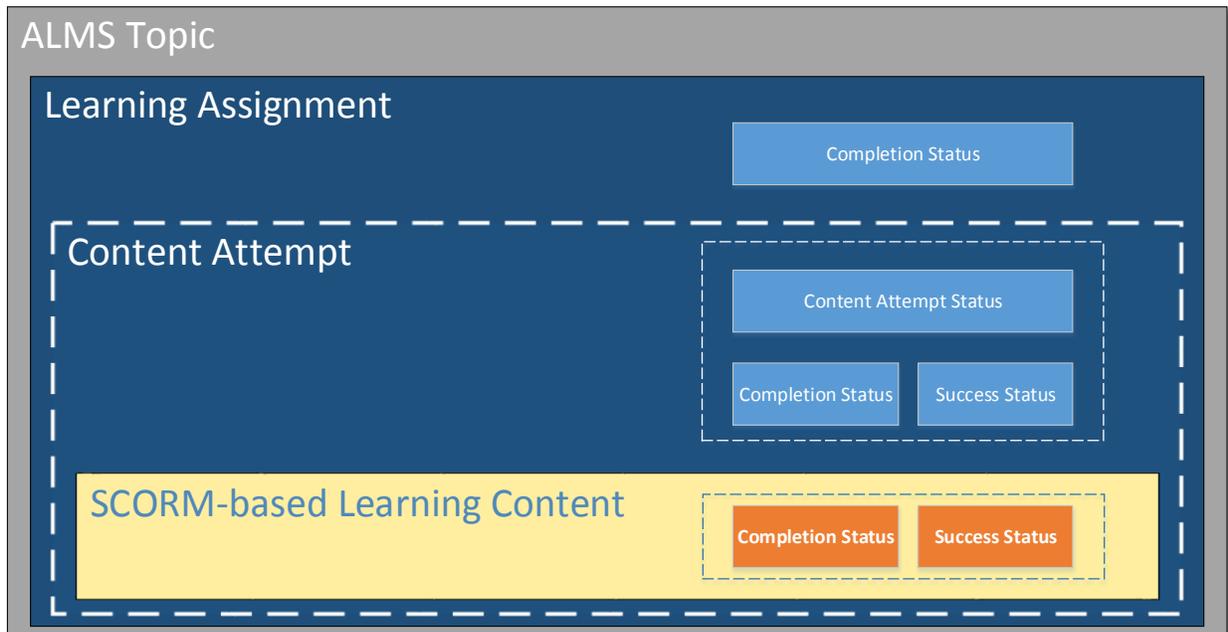


Figure 7: Learning content statuses highlighted in the status hierarchy

The rest of this section discusses how the ALMS records the statuses for learning content.

Completion Status

The completion status for a learning content activity is determined after the learner exits the content and a navigation action occurs. The recorded success status (previously shown in Table 3) is a result of one of the run-time events described in Table 4.

Table 4: Run-time Events Effecting Learning Content Completion Status

Event Description	Resulting Value
A “completed” value for the <code>cmi.completion_status</code> data model element is explicitly set by the content.	Completed
Rollup rules are explicitly set in the SCORM manifest to send a “completed” primary objective completion status for the activity.	Completed
An “incomplete” value for the <code>cmi.completion_status</code> data model element is explicitly set by the content.	Incomplete
Rollup rules explicitly are set in the SCORM manifest to send an “incomplete” primary objective completion status for the activity.	Incomplete
No completion status is set by the content or SCORM rollup rules.	Unknown

Success Status

The success status for a learning content activity is determined after the learner exits the content and a navigation action occurs. The recorded success status (previously shown in Table 3) is a result of one of the run-time events described in Table 5.

Table 5: Run-time Events Effecting Learning Content Success Status

Event Description	Resulting Value
A “passed” value for the <code>cmi.success_status</code> data model element is explicitly set by the content.	Passed
Rollup rules explicitly are set in the SCORM manifest to send a “passed” primary objective success status for the activity.	Passed
A “failed” value for the <code>cmi.success_status</code> data model element is explicitly set by the content.	Failed
Rollup rules explicitly set in the SCORM manifest to send a “failed” primary objective success status for the activity.	Failed
No success status is set by the content or SCORM rollup rules.	Unknown

Navigation Request

A navigation request and resulting navigation action, whether initiated by the learning content or the ALMS itself, are required to trigger the process, which updates and evaluates statuses throughout the hierarchy. Navigation requests are set by the `adl.nav.request` data model element when set by learning content, and have a direct effect on the content attempt status of a content attempt. The next section discusses the effects of navigation actions on the content attempt status.

Content Attempt Status Evaluation

Content attempt status values are determined using the statuses of learning content. Learning content completion and success statuses are rolled up to the top of the SCORM activity tree through either automatic or manual rollup processes. Content attempt statuses fall within the content attempt level of the hierarchy, as shown in Figure 8.

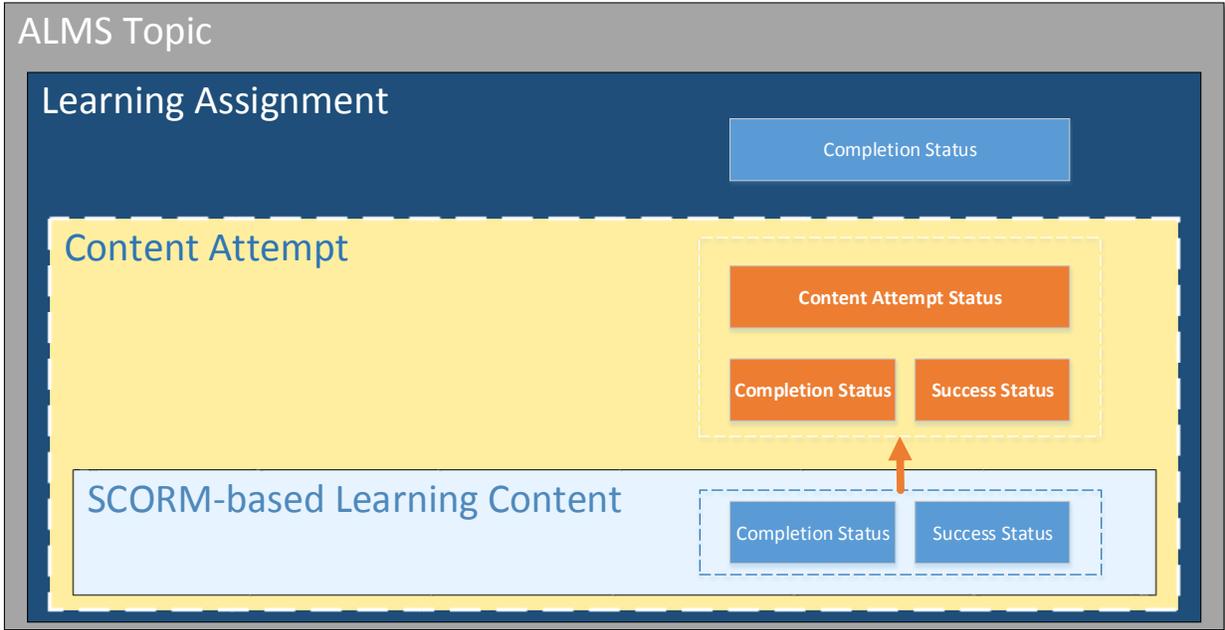


Figure 8: Content attempt statuses highlighted in the status hierarchy

Content Attempt Status

The content attempt status for a content attempt is assigned based on a combination of the completion status rolled up to the top of the learning content activity tree and the navigation request sent from the learning content. The content attempt status represents the current state of an attempt, and the recorded status (previously shown in Table 2) is a result one of the run-time events described in Table 6.

Table 6: Run-time Events Effecting a Content Attempt's Content Attempt Status

Event Description	Resulting Value
The learner has not yet launched the learning content.	Unattempted
The learner has launched the content and an attempt is current in-progress.	Active
A navigation request other than "suspendAll" or "abandonAll" occurs and all items on the activity tree are completed.	Completed
A navigation action of "suspendAll" occurs and affects the entire activity tree.	Suspended
A navigation action of "abandonAll" occurs and affects the entire activity tree.	Abandoned

Completion Status

The completion status for a content attempt is assigned based on the completion status rolled up to the top of the learning content activity tree. The recorded content attempt completion status (previously shown in Table 2) is a result of one of the run-time events described in Table 7.

Table 7: Run-time Events Effecting a Content Attempt's Completion Status

Event Description	Resulting Value
A "Completed" value is rolled up to the top of the learning content activity tree.	Completed
An "Incomplete" value is rolled up to the top of the learning content activity tree.	Incomplete
No completion status has been rolled up to the top of the learning content activity tree.	Unknown

Success Status

The success status for a content attempt is assigned based on the success status rolled up to the top of the learning content activity tree. The recorded content attempt success status (previously shown in Table 2) is a result of one of the run-time events described in Table 8.

Table 8: Run-time Events Effecting a Content Attempt's Completion Status

Event Description	Resulting Value
A "Passed" value is rolled up to the top of the learning content activity tree.	Passed
A "Failed" value is rolled up to the top of the learning content activity tree.	Failed
No success status has been rolled up to the top of the learning content activity tree.	Unknown

Learning Assignment Status Evaluation

The overall status for a learning assignment is determined using data sent from the learning content to the content attempt. The learning assignment status is evaluated based on the content attempt and success statuses of the content attempt. Learning assignment statuses fall within the learning assignment level of the hierarchy, as shown in Figure 9.

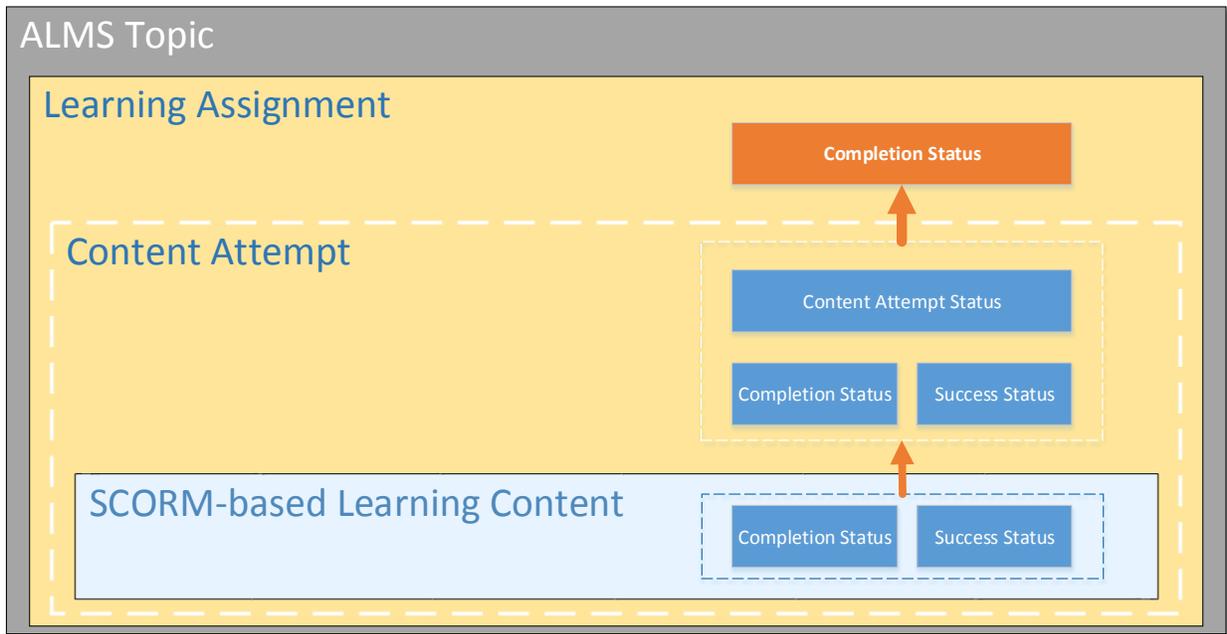


Figure 9: Learning assignment status highlighted in the status hierarchy

Completion Status

The completion status for a learning assignment represents the overall final state of the learning assignment used to grant a learner credit. An evaluated status (e.g., “Successful” or “Unsuccessful”) is required for the learning assignment to move to the learner’s transcript. The recorded status (previously shown in Table 1) is a result of one of the run-time events described in Table 9.

Table 9: Run-time Events Effecting Content Attempt Completion Status

Event Description	Resulting Value
The learner has not yet began a content attempt.	Not Evaluated
The current content attempt is suspended.	Not Evaluated
The current content attempt has a content attempt status of “Completed” and a success status of “Passed”.	Successful
The content attempt scaled score matches or exceeds the ALMS mastery score manually assigned to the learning assignment.	Successful
The current content attempt has a content attempt status of “Completed” and a success status of “Failed”.	Unsuccessful
The content attempt scaled score is below ALMS mastery score manually assigned to the learning assignment.	Unsuccessful

NOTE: Manually-configured options for learning assignments, such as mastery score, override the rollup process between content attempt and learning assignment.

Summary

The rollup process from learning content to learning assignment is a complex multi-layered process, which involves multiple steps of logic and similarly named components with varyingly dissimilar roles in the status hierarchy. The goal of this document is to provide the reader with an understanding of how auto-scoring SCORM 2004 3rd Edition distributed learning content operates within the ALMS environment, and the processes involved in evaluating and recording learner results. After reading this document, the learner should have a general understanding of the following concepts:

- The status hierarchy for a learning assignment with SCORM-based learning content on the ALMS
- The system-side considerations for evaluating statuses at each level of the status hierarchy
- The various situations which result in specific status values assigned at each level of the status hierarchy

The SCORM 2004 3rd Edition documentation listed in the *Further Reading* section in the first part of this document can provide further information on specific requirements of both SCORM 2004 3rd Edition content and the run-time environments on which content plays.