

# Performance Analyzer<sup>TM</sup> v3.0

## Technical Brief

October 2007

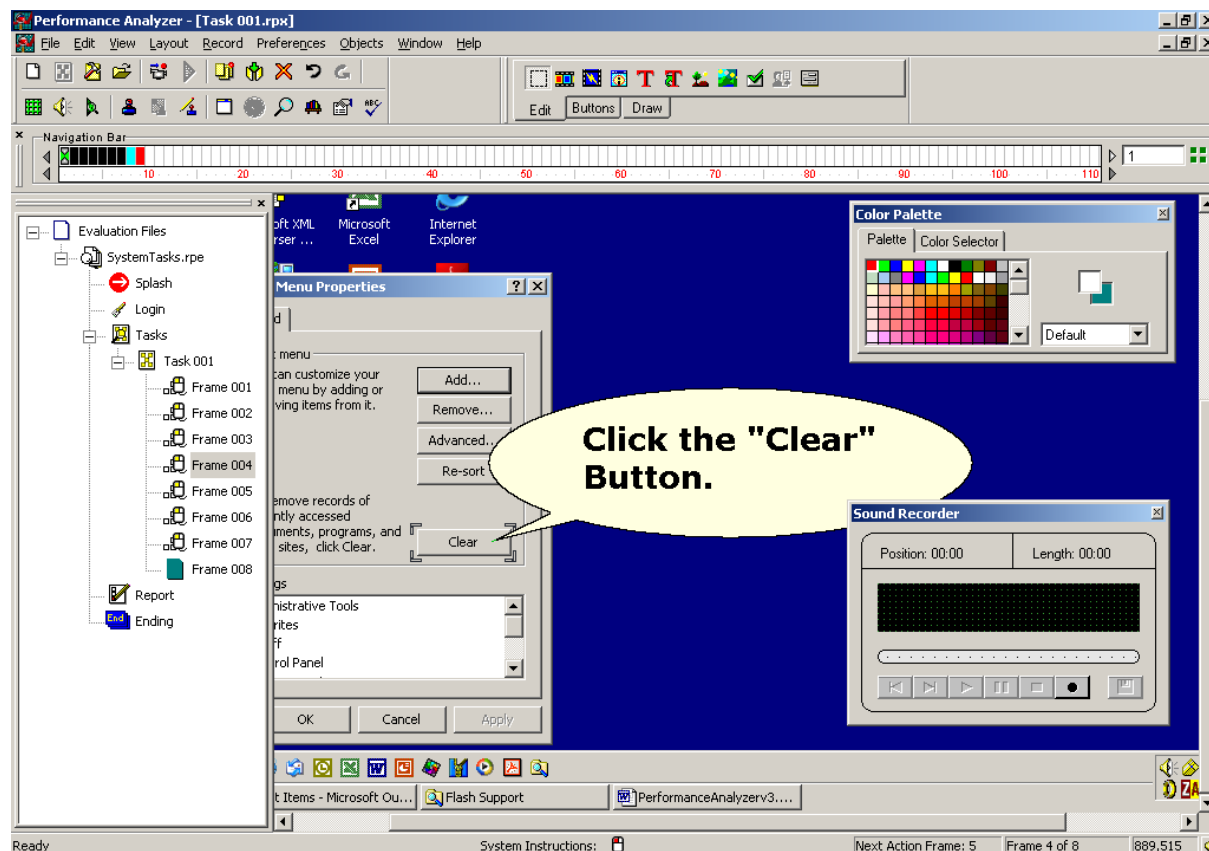
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## What is Performance Analyzer?

**Performance Analyzer v3.0** is XStream Software's 100% Programming-free Performance Assessment Authoring technology. It enables developers to create, customize, and deploy simulation-based performance assessments. These assessments present real-life, interactive software scenarios that accurately measure, score, track, and report on a user's ability to perform specific application tasks.



**Figure 1: Performance Analyzer Interface**

Using Performance Analyzer, developers may create interactive simulation-based assessments for any software application. A simulation-based assessment measures the user's ability to use a particular software application by having them perform specific tasks within a simulated software environment (as if they were working in the actual software application).

As the user progresses through the simulation-based assessment (by performing one or more software tasks each involving a series of steps), all correct and incorrect actions performed by the user (including all mouse clicks, button clicks, keystrokes, text entries, and/or highlighting actions) are scored, tracked, and reported by the system. Simulation-based assessments are therefore ideal for testing a user's hands-on knowledge of particular applications. By placing the user within a realistic, interactive software environment, the simulation-based assessment goes beyond the limits of traditional question-based testing to truly gauge the user's performance and responses in real-life situations. Simulation-based assessments thus provide accurate analyses of a software user's strengths and weaknesses, and they can quickly identify any areas that require additional training/reinforcement.

Simulation-based assessments may be easily created for any 16 or 32-bit Windows or web-based application. Performance Analyzer's capturing capability enables the developer to record live interactions (i.e., mouse clicks and keystrokes) with software applications to instantly produce a simulation-based assessment containing a sequential series of interactive software steps. In addition, the developer may also add non-recorded, content-based frames/screens to an assessment. Therefore, the developer has the flexibility to create simulation-based assessments containing only captured/recorded screens, simulation-based assessments containing only authored content screens, and simulation-based assessments containing a combination of captured screens and content screens.

Each frame/screen within a simulation-based assessment may be designated as either a step frame (representing a required step/action that will be scored and tracked during playback) or a content frame (representing a supplementary screen that does not need to be scored or tracked during playback). For each step frame, the developer may add/customize a variety of interaction objects (i.e., mouse click areas, keystrokes, text-entry fields, buttons, highlighting areas, etc.), and the developer may define how each interaction object will be scored/tracked during playback.

Simulation-based assessments created in Performance Analyzer can be customized and enhanced with a large variety of interactivity and multimedia features, including splash & login screens, built-in user report with scoring/tracking data, ending/feedback screens, images (both static and animated), text, audio, video, Flash files, recorded voice-overs and sound clips, hyperlinks and buttons, links to external files and web pages, text entry fields, colors, shapes, and a lot more.

Once created, Performance Analyzer files may be saved and deployed in a variety of different media formats, including RPE (native file format), Flash (SWF), Executable (EXE), SCORM, and Sharable Content Objects (SCOs). Files can be deployed over the Web, over a Local Area Network (LAN) or Wide Area Network (WAN), and on CD-ROM. Performance Analyzer files can be deployed independently, and they may also be linked to simulation/course files (created with XStream's RapidBuilder technology) and question-based exams/assessments (created with XStream's RapidExam technology) to produce full end-to-end e-learning solutions. Developers can even take existing RapidBuilder simulation files and quickly convert them into simulation-based assessments.

Performance Analyzer works with XStream RapidShare™ Learning Management System (LMS), which is XStream's secure, wide-ranging and completely web-based LMS module within the XStream RapidShare hosted web environment and digital workspace. XStream RapidShare LMS works with XStream's RapidBuilder, RapidExam, Performance Analyzer, and RapidGuide technologies. The LMS includes full capabilities for registering, tracking, and reporting on learning content files created with RapidBuilder, RapidExam, Performance Analyzer, and RapidGuide. The LMS module can also schedule, track, and report on Offline Events of all types (such as instructor-led training sessions, meetings, workshops, seminars, conferences, trade shows, etc.), and it provides many other features and capabilities, including e-mail notifications, extensive reporting capabilities, self-registration capabilities, learning paths, course catalogs, prerequisite definitions, bookmarking capabilities, offline exam generation, interface customization, archiving capabilities, 508 compliance, multi-language support, optional communication and collaboration capabilities, and more.

## Key Advantages of Simulation-based Assessments

- **True Skill Testing** – A simulation-based assessment is unique because it actually tests the user's software skills rather than simply knowledge or comprehension. The user is able to demonstrate the application of skills in an environment that duplicates real-life situations. The outcome is a truer measure of both skill and knowledge level.
- **More Security** – Because simulation-based assessments are not simply constructed with questions that may be memorized and exposed, they offer a higher level of security. This helps to ensure the integrity of the assessment and increase its value and benefit.
- **Increased Levels of Interest** – In contrast to standard question-based exams, simulation-based assessments are highly engaging. They are very effective at keeping the user interested with high levels of activity and opportunities for skill demonstrations.

## Components of a Simulation-based Assessment

A simulation-based assessment created with Performance Analyzer is used to track and evaluate a user's hands-on knowledge of particular application tasks. The simulation-based assessment contains one or more tasks to be performed by the user. Each task consists of a series of steps involving interaction objects (e.g., mouse click areas, keystrokes, text-entry fields, buttons, and/or highlighting areas), which are objects on which specific actions must be performed.

As the user progresses through each task in the simulation-based assessment by performing the required steps, the various interactions (e.g., clicks, keystrokes, etc.) performed by the user are counted, tracked, and scored in order to evaluate the user's hands-on knowledge. All user interaction metrics are collected and stored as performance data, which includes all mouse clicks, keystrokes, mouse click/keystroke combinations, and keystroke combinations. In addition, the following data is also collected: each correct and incorrect attempt on each step, the total number of attempts for each step, and the time spent/taken on each step. This same data will also be recorded for each task.

A simulation-based assessment contains multiple files organized in a hierarchy. It consists of the following elements:

### **RPE File**

The .RPE file is the main evaluation file, which sits at the top of the hierarchy and incorporates the entire simulation-based assessment. It serves as the entry point and access portal for the assessment.

The .RPE file consists of a number of screens (i.e., frames). It typically consists of a **Splash** frame (displaying an introductory splash screen), **Login** frame (displaying a login screen where the end user logs in to the simulation-based assessment), **Report** frame (displaying a prefabricated performance evaluation report that the end user views after performing the .RPX tasks), and **Ending** frames (displaying final end-of-evaluation summary screens that are shown after the end user views the performance evaluation report).

## RPX Files (Tasks)

RPX files are the tasks to be performed within the simulation-based assessment. Each .RPX task file contains a collection of steps required to accomplish a particular task. Each step frame within the .RPX file contains one or more specific actions (e.g., mouse clicks, button clicks, keystrokes, text entries, and/or highlighting actions) that must be performed by the end user.

The developer may add any number of .RPX task files to an .RPE evaluation file, and each .RPX file is populated with step frames by recording the live Windows desktop, appending/inserting frames, and/or importing frames.

**NOTE:** In addition to step frames, each RPX file may contain content frames, which are non-action frames containing introductory or supplementary information. Unlike step frames, content frames are not tracked or scored by the system.

## Steps

The steps are the actual step frames within an .RPX task file. Each step frame contains one or more interaction objects on which the end user must perform actions.

## Interaction Objects

The interaction objects are action objects present on a step frame. Each step frame contains one or more interaction objects (e.g., mouse click areas, keystrokes, text-entry fields, buttons, and/or highlighting areas) on which the end user must perform actions. The end user's actions on the objects are tracked and collected as performance data in order to measure and evaluate the end user's progress through the simulation-based assessment. The data collected will include the user's correct and incorrect attempts on each step, the total number of attempts for each step, and the time spent/taken on each step.

## Features of Performance Analyzer

The advanced features of Performance Analyzer have been designed around three main concepts:

- **Power** – Developers can build professional-level assessments with unprecedented levels of interactivity and multimedia. Evaluation content does not get any better.
- **Speed** – Assessment development is ultra-fast. With no programming and easy-to-use design tools, a developer can build a complete simulation-based assessment in a matter of minutes or hours.
- **Simplicity** – Performance Analyzer allows virtually anyone to become an expert assessment developer. Because development involves nothing more complicated than drag-and-drop editing and property settings, even a non-technical user can build a detailed simulation-based assessment like a pro.

Key features of Performance Analyzer include the following:

## Drag-and-Drop Authoring

Performance Analyzer makes it easy to author and edit interactive simulation-based assessments. There is absolutely no programming or scripts involved. Developers may modify and/or enhance the simulation-based assessment using Performance Analyzer's extensive multimedia edit suite, which includes drag-and-drop object palettes (including edit objects, button objects, and draw objects), a large variety of multimedia elements/options, and a large variety of properties, options, and effects available for each object/element.

In Performance Analyzer, developers have full flexibility in determining how each and every element is placed and displayed on each screen. Each element can be moved around and defined using the mouse (drag and drop) or keyboard.

## Powerful Compression

One of Performance Analyzer's core strengths is its powerful proprietary compression algorithms.

- A recorded sound clip has a compression of approximately 97%. This is similar to MPEG Layer 3.
- Objects from the Edit, Button, and Draw palettes achieve a compression rate of approximately 80%. This allows for richly authored frames without the worry of greatly increased file size.
- A typical Windows application, such Microsoft Word, will be captured and compressed at a rate of approximately 100:1. This assumes that the session is recorded at 800x600 with 256 colors.

## Step and Content Frames

An .RPX task file can contain two (2) types of frames:

- **Step Frames** – Step frames represent the actual steps that the end user must perform to accomplish the task. On each Step frame, one or more interactions (i.e., mouse clicks, button clicks, keystrokes, text entries, and/or highlighting actions) performed by the end user are automatically tracked and scored by the system.
- **Content Frames** – Content frames are supplementary frames that do not have tracking capability and thus are not used for calculating the final score. The distinction between Step frames and Content frames enables the developer to define which frames will be tracked/scored and which frames will not be tracked/scored.

**NOTE:** The Step and Content frames within each .RPX task file may be enhanced and customized using the suite of multimedia objects and tools provided with Performance Analyzer.

Performance Analyzer provides various methods for adding Step and Content frames to an .RPX task file:

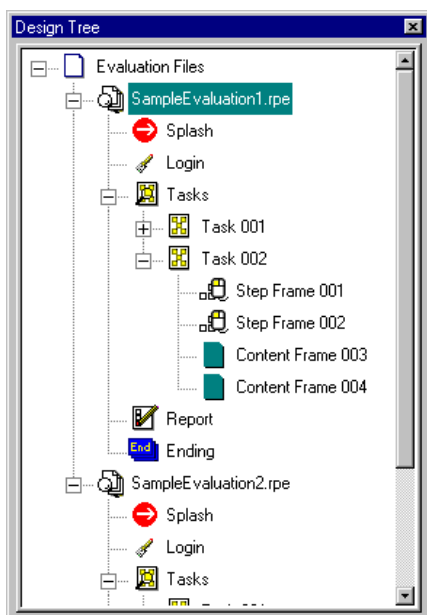
- **Recording the Live Windows Desktop** – Simulation-based assessments may be easily created for any 16 or 32-bit Windows or web-based application. Performance Analyzer's capturing capability enables the developer to record live interactions (i.e., mouse clicks and keystrokes) with software applications to instantly produce a simulation-based assessment containing a series of interactive software steps. Each mouse click and keystroke action performed during recording is automatically generated as an individual Step frame.

**NOTE:** Prior to recording, Performance Analyzer enables developers to specify various capture settings, which control how much of the desktop area will be captured (i.e., the entire desktop, a selected screen area, or only active windows).

- **Appending/Inserting Frames** – The developer may append/insert new (non-recorded) frames into a task file as Step frames or Content frames.
- **Altering Frame Types** – The developer has complete flexibility to quickly convert any Step frame into a Content frame (so that it is no longer scored/tracked during playback) or convert any Content frame into a Step frame (so that it will be scored/tracked during playback).
- **Importing External Step/Content Frames** – The developer may import Step/Content frames from other task files (thus enabling the developer to reuse Step/Content frames among different task files).
- **Importing RapidBuilder Files** – The developer may import frames from any RapidBuilder simulation file into a task file as Step/Content frames. A RapidBuilder file can thus be quickly converted into a simulation-based assessment.

## Design Tree

The **Design Tree** organizes and maps out all the frames, tasks, and steps contained in each currently opened simulation-based assessment (.RPE) file. The developer may easily browse the tree to view and keep track of the different components of each .RPE file.



**Figure 2: Design Tree**

As shown in the **Design Tree**, each new .RPE file contains the following default elements:

- **Splash Frame** – This is the first frame in the assessment. It is typically used to display an opening splash screen, which may contain such information as the title of the assessment, the name of the company or educational institution, logos, and other graphics, an introduction or overview message, etc.

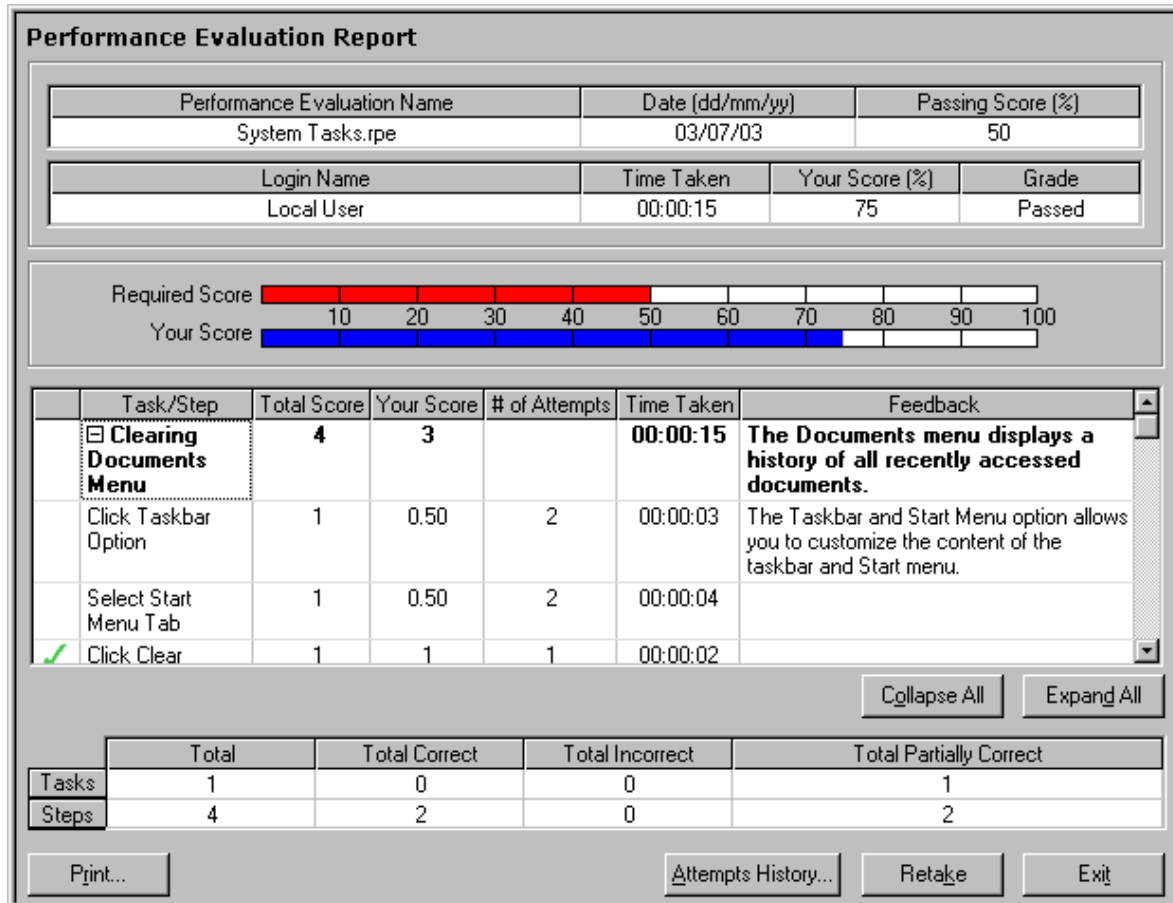
- **Login Frame** – This is the second frame in the assessment. It is typically used to display a login screen for authenticating end users of the assessment. At runtime, an end user will enter a valid login ID and password in the login fields in order to gain access to the assessment. Depending on which access mode has been set for the assessment, the login fields will function differently:
  - In **Standalone** access mode, the assessment is not registered in the web-based **XStream RapidShare LMS**. It is not necessary to include a login screen in the assessment. However, if a login screen is present in the assessment, the end user is required to enter “superuser” as the user name and password in order to gain access to the assessment.
  - In **LAN** or **Web** access mode, the assessment must be registered in the web-based **XStream RapidShare LMS** in order to be managed and tracked. A login screen must be present in the assessment so that end users (who have been assigned to the assessment by an administrator) can access the assessment by entering a valid user name and password. The login fields will automatically link to **XStream RapidShare LMS** in order to check the entries against the information in the database and authenticate the user.
- **Tasks** – The tasks are the individual .RPX files (each containing a series of Steps and Content frames) added to the .RPE file. By default, each new .RPE file contains one blank .RPX file. The developer may add any number of .RPX task files to an .RPE file in order to divide the assessment into a series of individual tasks that will be performed by the end user (once he/she has logged in to the .RPE file).
- **Report Frame** – This is the third frame in the assessment. It is used to display the prefabricated, ready-made performance evaluation report, which is displayed to the end user after he/she has progressed through all of the .RPX tasks. This customizable report may display such performance data as scoring information, the amount of time the end user took to perform all of the steps, feedback information for each step, and other details.
- **Ending Frames** – These are the final frames in the assessment. They are used to display the final conclusion/exit screens (containing post-assessment summaries, feedback, and/or additional information). The ending frames are presented to the end user after he/she performs all the tasks and views the evaluation report (if it exists). Although no default ending frames are included within a new .RPE file, the developer may add as many ending frames as desired.

**NOTE:** The Splash, Login, Report, and Ending Frames in the .RPE file, and the Step and Content frames within each .RPX task file, may be enhanced and customized using the suite of multimedia objects and tools provided with Performance Analyzer.

## Evaluation Report

For each evaluation (.RPE) file, the developer may include a prefabricated **Performance Evaluation** report. During playback of the simulation-based assessment, this runtime report will be automatically displayed to the end user once he/she has completed all of the tasks present in the assessment.

**NOTE:** Although the **Performance Evaluation** report is included in the .RPE file by default, the developer has the option to remove the report by deleting the report frame (either temporarily or permanently).



**Figure 3: Performance Evaluation Report**

The **Performance Evaluation** report includes such data as the end user's final score and grade, the total amount of time taken to complete the assessment, a Feedback Table (showing the score achieved, number of attempts, time taken, and feedback for each task and step within the assessment), and a Summary Table (displaying various pieces of statistical information about the tasks and steps)

The report may also include an **"Attempts History"** button (which generates a report outlining the history of all previous attempts on the assessment), a **"Print"** button (for printing the report), a **"Retake"** button (for retaking the assessment), and an **"Exit"** button (for proceeding to the Ending frames or exiting the assessment).

The developer may customize the report by altering its title as well as showing or hiding various components of the report.

**NOTE:** In addition to Performance Analyzer's user-level performance evaluation report, system administrators using the web-based XStream RapidShare LMS may generate a large variety of administrator-level reports on registered assessments.

## **Alternate Paths (Branching) Capability**

Performance Analyzer supports alternate paths capability. Developers have the flexibility to create non-linear assessments with adaptive branching.

For each task within an assessment, multiple paths/scenarios for completing the task may be defined. Based on the action (i.e., mouse click, button click, key press, text entry, or highlighting action) that the user performs on a given frame within a task file, the user may move forward to the next frame, return back to the previous frame, navigate to another frame somewhere else in the task file, or jump to the next task file in the assessment. Therefore users can revisit previously completed steps, jump ahead to subsequent steps or tasks, or navigate to other screens with context-specific feedback/content. This powerful capability enables developers to create complex branching scenarios in which assessments can "adapt," presenting certain steps, content screens, or tasks to participants based on the actions they perform.

## **SCORM Compliance**

Performance Analyzer is a SCORM-compliant technology. It enables developers to save assessments as SCORM 2004, v1.2, or v1.1-compliant courses containing Sharable Content Objects (SCOs), which are reusable lessons/learning units that may be imported and used within any SCORM course.

Saved SCORM courses may be registered and deployed through the web-based XStream RapidShare Learning Management System (LMS) or any third-party SCORM-compliant LMS for comprehensive tracking and reporting.

## **508 Compliance**

Performance Analyzer is a 508-compliant software technology, meaning that it incorporates certain accessibility features required to make it readily accessible to all users, including users with disabilities.

Section 508 of the U.S Rehabilitation Act requires that departments and agencies of the U.S government develop, procure, maintain, or use electronic and information technology that enables users with disabilities to access and use information/data in a way that is comparable to that of all other users. Accordingly, in order to comply with the technical requirements of Section 508, a particular software technology must enable users to customize display, keyboard, mouse, and sound settings to meet their individual needs.

The universal accessibility obtained through 508 compliancy is a significant advantage because it makes the technology more user friendly and enables more users within an organization to take advantage of the technology.

The 508-compliant technology of Performance Analyzer supports the use of keyboard equivalents for all mouse actions. The various Performance Analyzer objects, dialog boxes, buttons, pop-up menus, and other features may be accessed and manipulated using designated keyboard keys or key combinations (instead of using the "point and click" functionality of the mouse device). These keyboard equivalents provide an alternative for visually impaired users or physically disabled users who may not be able to utilize the mouse device.

## Language Customization

While creating Performance Analyzer files, developers may need to create files for users who speak a language other than English. Performance Analyzer includes extensive language customization capabilities.

### Import/Export Text

Performance Analyzer enables the developer to export the text from selected frames/objects in the current Performance Analyzer file to an XML file for the purpose of language translation. The translated text may later be imported from the XML file back into the Performance Analyzer file in order to replace the original text. Thus the developer can easily create multiple versions of the same Performance Analyzer file in different languages.

### Playback Language Customization

Although the developer may author the Performance Analyzer file in any desired language, there is still the question of Performance Analyzer's built-in, system-related text strings (including error/information messages, objects with built-in text, playback bar tool tips and other built-in player text that cannot be edited by the developer), which are displayed during playback of Performance Analyzer files. Because the built-in Performance Analyzer text strings are displayed in English by default, end users who are unfamiliar with the English language may not understand them. Therefore, the developer requires the capability of applying a different language to the built-in text strings within a given Performance Analyzer file.

To accommodate the need for different languages, Performance Analyzer includes a **Playback Language Selector**, which enables developers to translate Performance Analyzer's default English-language text strings into any desired language. The translated text strings are saved to a language file, which may then be imported into Performance Analyzer and applied to any file. During playback of the file, the selected, translated text strings (which were applied from the language file and stored in the Performance Analyzer file) are displayed as appropriate.

## Navigation Bar

The **Navigation Bar** allows the developer to edit and navigate through the frames (i.e., the individual screens) of an .RPE or .RPX file during the editing stage. Frame editing can be performed, including selecting, cutting, copying, pasting, deleting and undeleting frames. The **Navigation Bar** makes it simple to manage all the frames in a file with a few clicks of the mouse or presses of keyboard keys.

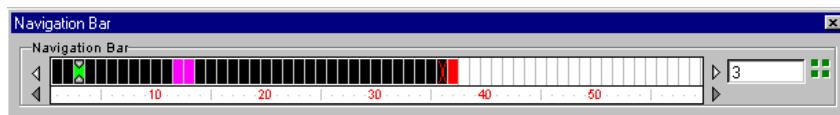


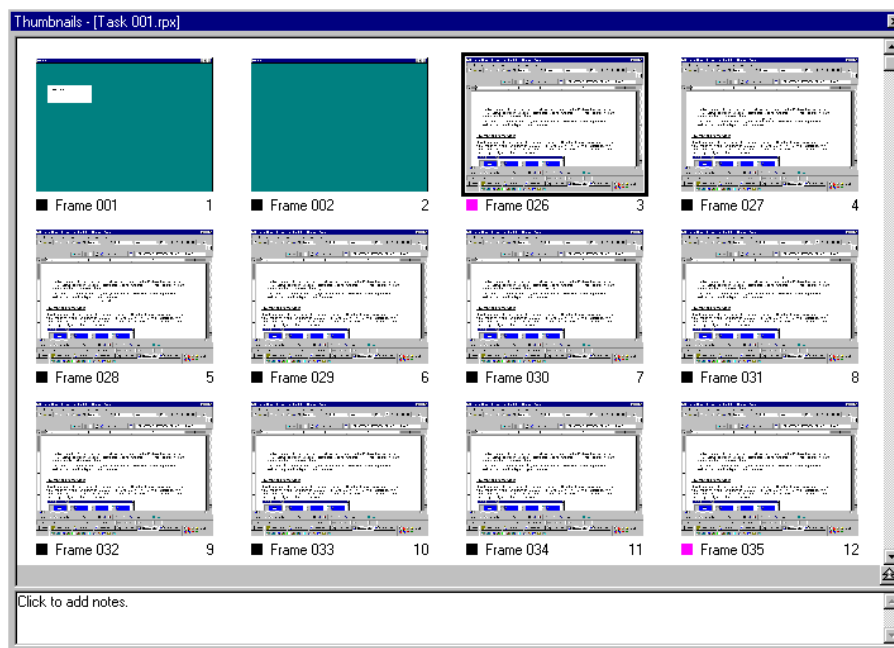
Figure 4: Navigation Bar

- The **Navigation Bar** features a **Frame Bar** containing colored rectangles that represent all the frames in the current file.
- There are multiple methods of navigating frames, including clicking a rectangle representing the desired frame, clicking the arrow buttons or the horizontal slider on the **Navigation Bar**, typing a frame number in the Go To box and pressing <ENTER>, or using the keyboard by pressing <CTRL> + Left Arrow or Right Arrow.

- The **Navigation Bar** features selector nodes that can be clicked and dragged to select a range of frames. The keyboard can also be used for this task by pressing <ALT> + Left Arrow or Right Arrow. Once frames are selected, they can be cut, copied, pasted, deleted and undeleted.
- When a frame is deleted, it is marked with a red “X” on the **Navigation Bar** rather than being immediately deleted from the file. This allows the developer the option of undeleting the marked frame if he/she desires. If the developer wishes to delete the frame permanently, Performance Analyzer has an option for purging deleted frames.
- Captured mouse clicks and keystrokes may be disabled on a selected range of frames on the **Navigation Bar**.
- The developer may also customize the look of the **Navigation Bar** by changing the default colors and size of the rectangles within the **Frame Bar**.

## Thumbnail Frame View

Performance Analyzer enables the developer to access thumbnail images of all the frames (or a selected range of frames) in a task file. The developer may view all or part of the task file at a glance by quickly scrolling through the thumbnails.



**Figure 5: Thumbnail Frame View**

Frame thumbnails provide an alternate means of frame navigation and may be used to browse and edit frames in the same way as the **Navigation Bar**.

For each thumbnail, the developer may also enter notations. This can be especially useful within files developed over an extended period of time or by multiple developers.

## Frames

A simulation-based assessment (.RPE) file and its associated task (.RPX) files created with Performance Analyzer are each composed of a series of screens known as frames. In addition to captured frames within an .RPX file, the developer can insert/append blank frames as well as import frames from other .RPE files, .RPX files, and .RBX files (created with RapidBuilder). The developer can make various adjustments and enhancements to a frame, including the following:

- Frames may be referenced by number or name. For example, instead of typing “16” as a frame reference, the developer may enter the name of the frame (e.g., “intro1” or “main menu”).
- A sound file may be attached to a frame. The following sound file formats are supported: ASF, .AU, .MP2, .MP3, and .WAV.
- Captured user actions (e.g., mouse clicks or keystrokes) on a captured frame can be enabled or disabled.
- Special blurring, fading, and dissolving effects may be applied when transitioning from one frame to another during playback. The developer can select from various available effects, including wiping, blinding, pushing, and sliding, as well as the speed of the transition effect (slow, medium, or fast).

## Advanced Edit Objects

Performance Analyzer features a suite of multimedia edit objects that are used to create and enhance simulation-based assessment content:

### Video Stage

The **Video Stage** is a scaleable window through which the developer can import and play linked or embedded video files. As a visually appealing, multimedia alternative to text and graphics, the **Video Stage** can be added to any simulation-based assessment file to help keep the end user interested and engaged.

- Multi-file support gives the developer the greatest possible range of video files to choose from. The **Video Stage** supports ASF, .AVI, .MOV, .MPEG, and .MPG video files.
- Video files can be played in both Performance Analyzer and RapidPlayer. This allows the developer to preview and test the video file during the editing stage. It is not necessary to compile and run the entire simulation-based assessment file in order to play the video file.
- The **Video Stage** can be configured to play a specified portion of a larger video file. Since a video file is composed of frames, the developer may specify one frame as the in point (the frame where playback will begin) and another frame as the out point (the frame where playback will end). By specifying different in point and out point ranges within a single large video file, the developer can reduce the number of files that must be linked or embedded.

### Flash Stage

The **Flash Stage** is a scaleable window through which the developer can import and play linked or embedded Flash (.SWF) files. It includes all of the same capabilities as the **Video Stage**.

## Instruction Box and Text Field

The **Instruction Box** and **Text Field** are both used to display text in a file. The **Instruction Box** is a resizable window that displays text, while the **Text Field** allows the developer to add text directly to frames. The **Instruction Box** is designed to display extraneous text (such as text-based instructions or technical information), which is not part of the frame content. It is ideal for displaying how-to instructions or steps for tutorials and training materials. The **Text Field** is ideal for displaying any type of text in all areas of a file.

- Any text in a **Text Field** or **Instruction Box** can be made into an interactive link or “hotword”. When clicked during runtime, a hotword can display a user-defined message in a pop-up window, load a message from an external file and display it in a pop-up window, or run an external .RBX or .EXM file.
- Performance Analyzer includes an industry-standard **Format Bar** with options for customizing the appearance (i.e., font, style, size, color, bold, italic, etc.) of selected text in a **Text Field** or **Instruction Box**.
- Selected text within a **Text Field** or **Instruction Box** may be cut/copied and pasted within the object and also cut/copied and pasted from one **Text Field/Instruction Box** to another **Text Field/Instruction Box**. Text may also be dragged from one **Text Field/Instruction Box** and dropped in to another **Text Field/Instruction Box** on the frame.
- In addition to text, images may be displayed within **Text Fields** and **Instruction Boxes** as inline graphics.
- The **Text Field** and **Instruction Box** both include a text search engine that allows the developer to locate specific text during the editing stage.
- An **Instruction Box** can be spread over a given number of succeeding frames rather than having to add the same **Instruction Box** to each individual frame. This ability to spread over frames allows the same **Instruction Box** to constantly appear on screen during playback, which is ideal for consulting instructions while performing a procedure.
- Text in a **Text Field** can be displayed on screen with exploding or dissolving effects at runtime. This is a visually appealing feature that will enhance the overall appearance and sophistication of the evaluation.

## Rotated Text Field

The **Rotated Text Field** is a special **Text Field** object that the developer may rotate on a central axis by clicking and dragging its corner selection nodes. This enables text to be displayed on the frame with different degrees of rotation.

## Image

The **Image** component allows the developer to assign a custom image file to be displayed on a frame or as the background image of an appended/inserted frame. An image can be aligned, stretched, and positioned in a frame. Performance Analyzer supports .BMP, .GIF, .JPG, and .PNG image files.

- The developer may rotate an **Image** object on a central axis by clicking and dragging its corner selection nodes. This enables the image to be displayed on the frame with different degrees of rotation.

## **Animated GIF**

The **Animated GIF** component allows the developer to assign an animated .GIF image file to be displayed on a frame. The animated .GIF image can be aligned, stretched, and positioned in a frame.

## **Validation Field**

The **Validation Field** is an active field that validates text typed by the end user. Once the end user enters the text and presses a designated action key, the entered text is compared to existing validation strings and/or keywords that have been specified by the developer during editing. If there is a match, the entered text is validated as correct, and any designated events are initiated. If there is no match, the entered text is validated as incorrect (meaning any specified error message is displayed).

- The developer may set the **Validation Field** for either string validation or paragraph validation. For string validation, the developer may specify one or more text strings and then associate one or more action keys with each text string. For paragraph validation, the developer may specify one or more keywords and assign an action key. When the end user enters a paragraph of text and then presses the action key, the entered text will be compared against the list of keywords. If all the keywords are present in the entered text, it will be validated as correct and the specified event(s) will be initiated.
- As an alternative to an action key, a **Hyperlink** button may be configured to validate text entered by the end user.
- A validation error message is an event that will display a configured message. For example, “Please follow the given instructions” can show if the user does not type in ‘notepad’ followed by the <ENTER> action key.
- The developer can specify several other types of events to occur following text string validation, including displaying a message or displaying an image.
- A validation text string can be configured to be case-sensitive.
- A **Validation Field** can be configured so that it automatically expands as text is inputted at runtime. This can be useful for purposes of convincing evaluation and design layout (e.g., creating a evaluation that renames a file similar to Windows Explorer).

## **Login Field**

The **Login Field** object is used to add Login Name and Password validation fields to a simulation-based assessment (.RPE) file in order to create a login screen. In a simulation-based assessment file, a maximum of two (2) **Login Field** objects may be added (i.e., one for the login name and one for the password). When the .RPE file is played, the end user must enter a login name and password in the fields in order to be authenticated and gain access to the simulation-based assessment.

Depending on which access mode has been set for the .RPE file, the **Login Fields** will function differently:

- In **Standalone** access mode, the simulation-based assessment is not registered in the web-based **XStream RapidShare LMS**. It is not necessary to include a login screen in the simulation-based assessment. However, if a login screen is present in the evaluation, the end user is required to enter “superuser” as the user name and password in order to gain access to the evaluation.

- In **LAN** or **Web** access mode, the simulation-based assessment must be registered in the web-based **XStream RapidShare LMS** in order to be managed and tracked. A login screen must be present in the simulation-based assessment so that end users (who have been assigned to the simulation-based assessment by an administrator) can access the simulation-based assessment by entering a valid user name and password. The login fields will automatically link to **XStream RapidShare LMS** in order to check the entries against the information in the database and authenticate the user.

### **Highlighter**

The **Highlighter** object is used to simulate highlighting actions during assessment playback. These highlighting actions include text highlighting, cell highlighting (e.g., to simulate selecting multiple cells in a spreadsheet), or area highlighting (e.g., to simulate drawing an object/shape on the screen). The highlighting actions performed by the user (as part of the assessment) can be tracked, scored, and reported by the system.

### **Hyperlink**

The **Hyperlink** object allows the creation of different types of interactive links and validation buttons in the file.

- A **Hyperlink** may be configured to link to an external .RBX or .EXM file. It may also be configured to initiate any one of the following actions:
  - Linking to web pages and external files/applications. (Links to web pages and other external files can expand the reach and usefulness of the simulation-based assessment. End users can link to a company web site for more information, and links to executable files can provide access to demonstrations made using another program).
  - Playing a designated video file or sound file, or displaying a designated text message or image file. (Validation buttons for displaying images/messages or running sound/video allow the end user to exercise more manual control over the content of the simulation-based assessment).
  - Exiting playback of the current file.
  - Validating text entered in a **Validation Field**.

### **Draw Objects and Tools**

Performance Analyzer features a suite of multimedia draw objects and tools, which allow the developer to enhance frames with different lines, shapes, and custom art. They are as follows:

- **Line** objects can be used to connect text fields, point to frame features, create tables and diagrams, and more. A line can be styled as an arrow, and its size, color and width can be adjusted. It can also be displayed in different styles, including Solid, Dash and Dot.
- **Round Rectangle**, **Rectangle**, and **Ellipse** objects can be used to create tables or visually enhance a captured or inserted frame. The size, color, border style, and border width of these objects can be adjusted. They can also be set to Opaque or Transparent, and they can be filled with a solid color, diagonal lines, vertical lines, horizontal lines, and more.
- The **Fill Color** tool allows the developer to select any color from the **Color Palette** and use it to color draw objects or inserted/appended frames.

- The **Color Selector** allows the developer to select any color from an inserted image or captured frame and save it as a color in the **Color Palette**. This color can then be applied to any shape object.
- The **Pencil** tool allows the developer to draw free-form lines on a frame. The color of the lines can be adjusted.
- The **Air Brush** tool allows the developer to draw free-form lines with an airbrush effect. The color of the spray can be adjusted, and different coverage levels can be selected.
- The **Paint Brush** tool allows the developer to draw free-form lines with different levels of thickness and different styles. The color of the strokes can be adjusted. Different brush shapes (rounded, squared, ribbon up, ribbon down) as well as different levels of stroke thickness can be selected.
- The **Polyline** tool allows the developer to draw straight lines with angles. The color and thickness of the line can be adjusted.
- The **Polygon** tool allows the developer to draw a polygon (any shape with 3 or more straight line segments). The fill color and line thickness can be adjusted.

## Exporting to Other Media Formats

In addition to native .RPE format, a Performance Analyzer file may be saved and deployed in various media formats, including the following:

- **Flash (SWF)** – Flash files may be played in browsers without loading a separate plugin.
- **Executable (EXE)** – A Performance Analyzer file may be merged with the RapidPlayer runtime player, thereby creating a self-executing .EXE file. The .EXE file may then be distributed to end users without having to provide the RapidPlayer application separately (since it is included within the self-executing .EXE file).
- **SCORM 2004, v1.2, and v1.1 Courses**
- **Sharable Content Objects (SCOs)**

## Resource Editor

The **Resource Editor** is Performance Analyzer's central repository of linked or embedded media files, including audio, video, images, Flash, icons, and cursors. It is used to retrieve and manage media files and associate them with specific objects and frames.

- The **Resource Editor** organizes files by extension into 8 main resource types:
  - **Images** – BMP, .GIF, .JPG, and .PNG image files.
  - **Video** – ASF, .AVI, .MOV, .MPEG, and .MPG video files.
  - **Audio** – ASF, .AU, .MP2, .MP3, and .WAV audio files.
  - **Icons** – ICO icon files.
  - **Cursors** – CUR cursor files.

- **Flash Files** – SWF files.
- **Default Icons** – A group of 54 default icons provided with Performance Analyzer. They may be used to replace the default square brace icon representing a captured mouse click.
- **Default Cursors** – A group of 8 default cursors provided with Performance Analyzer. They may be used to replace the regular system mouse pointer on selected frames during playback.
- The **Resource Editor** manages all resources as components of resource (.RSE) files. It maintains a default Performance Analyzer resource (.RSE) file containing all imported file links. It also maintains a separate resource (.RSE) file for each opened .RPE file and .RPX file. (This .RSE file will be opened in the **Resource Editor** whenever the corresponding .RPE file is opened, and it will contain all imported file links assigned to objects and frames within the .RPE file and its associated .RPX files).
- The developer can replace or rename any selected resource link, and any selected resource link can be permanently removed from the **Resource Editor** (but not from the disk).
- A **Preview** window allows the developer to see what a selected image, cursor, or icon file looks like before adding it to an object or frame.
- For each resource link, the developer may specify one or more keywords to serve as tags for searching purposes. During a search of the **Resource Editor**, the developer will enter a keyword, and all resource links with keywords that match the entered keyword will be displayed.

## Sound Support

Performance Analyzer enables the developer to enhance simulation-based assessment content with a wide variety of sound:

### Sound Linked to a Frame

The developer may link a sound file (ASF, .AU, .MP2, .MP3, or .WAV) to any individual screen in an .RPE or .RPX file. The sound file will play when the screen is entered during playback.

### Sound Linked to a Hyperlink

The developer may link one or more sound files (ASF, .AU, .MP2, .MP3, or .WAV) to a **Hyperlink** button in an .RPE or .RPX file. Each sound file will play when the **Hyperlink** is clicked in a certain way by the end user during playback.

### Sound Recorder

Performance Analyzer's **Sound Recorder** allows the developer to record sound from any available sound device. A sound clip can be recorded on any frame within an .RPE or .RPX file, and the recorded sound will play automatically once the file is run.

- After recording sound during the editing stage, the developer can immediately play back the recorded clip to hear how it sounds.

- Sound can be recorded from any sound device present on the developer's system, including CD Player and Microphone. The developer may record his/her own voice-overs for guided practice instructions.
- A sound clip recorded on a frame may also be saved to disk as an audio file. Once the developer has recorded sound from an available sound device, he/she may click the **Save** button to open a **Save As** dialog box. From this dialog box the developer may save the sound clip as a .WAV or .ASF audio file. The saved audio file may then be imported to Performance Analyzer's **Resource Editor** and used for other frames and objects.

## **Background Sound**

The developer may assign a linked sound file (ASF, .AU, .MP2, .MP3, or .WAV) to run in the background during playback of the .RPE or .RPX file. The sound may be looped a set number of times or played in a continuous loop, and it may also be faded in and out over a set time (e.g., 2 seconds).

## **Colors**

Performance Analyzer enables the developer to apply advanced color settings to files.

### **Color Palette**

The **Color Palette** provides a palette of 256 default colors, and it also includes facilities for defining and adding custom colors. It is used in conjunction with the **Fill Color** tool to set the foreground color and background color of appended/inserted frames and **Draw** objects.

The **Color Palette** includes two different palettes:

- **Default** – Displays the standard 256-color palette. In addition, custom colors may be appended to the end of the default color palette. New colors will be saved between sessions.
- **Custom** – Displays custom color palettes created and saved by the developer. A custom color palette may be created by customizing colors on the **Color Selector** tab and then dropping them into place on the custom color palette. The custom color palette may then be saved as a .CLR palette file, which may be loaded to the palette at any time.

### **Gradient Fills**

The developer may apply a gradient fill to the background of appended/inserted frames. A gradient fill is a combination of any 2 colors that are gradually blended together in one of 8 different styles.

## **Other Features**

### **System Instructions Editor**

The **System Instructions Editor** provides facilities for editing/removing captured mouse clicks and captured keystrokes from a recorded .RPX task file during the editing stage. An existing mouse click may be changed to another type of mouse click, and an existing keystroke may be changed to another type of keystroke. In addition, the developer may eliminate a captured mouse click or keystroke from a frame so that the frame no longer contains captured user action.

## Animation

The developer may add various types of animation to an .RPE or .RPX file:

- **Frame transition effects** – Special blurring, fading, and dissolving effects may be applied when transitioning from one screen to another during playback.
- **Object slide-outs** – Objects may be configured to animate (or slide) on to the screen with a specified visual effect.
- **Image animation on buttons** – Multiple images may be cycled on **Hyperlink** objects to create custom image animations.

## Attempt/Hint Messages

Attempt and hint messages may be created to provide extra guidance to the end user as he/she performs specific actions during playback. Multiple attempt/hint messages may be configured to display for each of the end user's subsequent attempts to perform a particular action on a frame or enter text in a **Validation Field**.

## Spell Checker

Performance Analyzer includes a standard **Spell Checker**, which enables the developer to scan screens and objects in order to detect and correct spelling errors.

## Hot Key Customization

Performance Analyzer enables the developer to customize the hot keys (i.e., shortcut keys) that will be used to start, stop, and pause/resume desktop capturing.

Hot key customization is particularly useful in a situation where one of the default Performance Analyzer hot keys is the same as a key combination used within the application that needs to be captured. For example, if the application uses **ALT + X** for a command, then the default **ALT + X** hot key (used to stop desktop capturing) needs to be changed to another key combination, such as **ALT + Q**. Once this is done, the **ALT + X** key combination can be used during desktop capturing without stopping the capturing process. (It will instead be captured as a validation key).

## Screen Templates

Performance Analyzer provides extensive capabilities for customizing and using screen/frame templates.

The built-in Template Editor provides a large number of pre-designed templates (i.e., background screens, text screens, navigational elements, and more). These professionally designed screens provide a quick starting point for developers to create assessment content.

Developers may create their own custom templates (containing any type of object/element that is available in Performance Analyzer) and share them across multiple developers and files.

The developer also has the capability to save any frame from any Performance Analyzer file as a template and then use it across many different files. Essentially, any frame (containing a variety of reusable objects with pre-set properties and events) can become a template.

## Single Sign-on

Performance Analyzer supports single sign-on capability. This is a mechanism whereby a single action of user authentication/authorization on a file can permit the user to access other assigned files through hyperlinks without having to repeat the process of authentication on the linked files.

If single sign-on is enabled for a Performance Analyzer file, it means that the end user's login credentials (i.e., login ID and password) will be automatically sent to any assigned RapidBuilder or RapidExam file that is launched from the assigned Performance Analyzer file at runtime. The end user (who has already logged in to the simulation-based assessment) does not have to repeat the login process for assigned projects/courses or exams launched from the simulation-based assessment.

## New v3.0 Features

The following new features are included in Performance Analyzer v3.0:

- **Customizing Score and Penalty Values at Multiple Levels** – For an assessment, the developer may specify any score value (from 0 to 9999) at the global level, and this specified score value can then be changed for individual tasks, steps, and objects within the assessment. Similarly, the developer may define a penalty value (expressed as a percentage or absolute decimal value) at the global level, and this specified penalty value can then be changed for individual tasks, steps, and objects.
- **Step Repeating Options** – The developer may specify how the system will handle repeated steps (i.e., when an end user revisits a previously completed step during playback). Essentially, the developer can control whether tracking/scoring information is overwritten or continued for repeated steps, or whether each repeated step is counted as a new step. The step repeating options may be defined at the global, task, and step levels.
- **Step Repeat Feedback Text** – For any step frame, the developer may customize repeat feedback text. This text will be shown next to each repeat occurrence of the step within the evaluation report (which is displayed after submitting the assessment).
- **Additional Step Navigation Options** – There are additional options for defining navigation events at the step frame level. On any step frame, the developer may specify different target frames that playback will navigate to in response to different actions by the end user, such as performing a Correct/Incorrect/Neutral action, performing a Zero Score action (i.e., achieving a score of zero after having penalties applied), and performing a No Attempts action (i.e., exhausting all available attempts for the step). For each of these actions, the developer may specify that playback will navigate to the next frame, navigate to the previous frame, navigate to another specific frame within the current task, or jump to the next task in the assessment.
- **Additional Content Frame Support** – The Mouse Click, Validation Key, and Validation Field objects are now supported on Content frames (in addition to Step frames).
- **SCORM 2004 Compliance** – Performance assessments can now be delivered, tracked, and reported through any SCORM 2004-compliant Learning Management System. In addition, Performance Analyzer continues its support for the SCORM v1.2 and v1.1 standards (which are still widely used).
- **System Variables** – Memory locations may be assigned with the name of a system variable, which contains navigation information that is dynamically and automatically assigned by the system during playback. System variables provide developers with another way to implement navigation between frames.
- **Hide and Show Events** – Objects may be configured to repeatedly hide (disappear) and show (reappear) on the screen during playback. This is useful for creating pulsing or blinking visual effects.

- **Highlighter Object** – The Highlighter object is used to realistically simulate the action of highlighting text, cells, or screen areas. This is an ideal feature to use when creating simulations of word-processing, spreadsheet, and drawing applications.
- **Enhancements to Various Objects** – Additional properties/events are available to customize for the Mouse Click, Hyperlink, Validation Field, and Validation Key objects, including the capability to specify separate correct, incorrect, and neutral validation frame events for each of these objects.
- **Step Properties Defined Globally** – The developer may define global-level settings for the "Attempts/Hint Properties", "Validation Message" and "Validation Error Message" frame properties. These global-level settings will be automatically inherited to each new step created in any task. On each individual step, the developer may modify the inherited values as desired.

## Deploying Performance Analyzer Files

Performance Analyzer files may be deployed locally, on CD-ROM, over a network (LAN/WAN), or over the Web (Internet, Intranet, or Extranet). Local deployment is accomplished with XStream's RapidPlayer Runtime player, and Web deployment is accomplished with RapidPlayer ActiveX (for Internet Explorer) or RapidPlayer Plug-in (for Netscape).

Deployment of Performance Analyzer files is accomplished with the following tools:

### RapidPlayer Runtime

RapidPlayer Runtime is XStream's Universal Runtime Player, which is provided with Performance Analyzer.



**Figure 6: RapidPlayer Runtime**

RapidPlayer is used to play Performance Analyzer (.RPE) files from a CD-ROM, local hard drive, or LAN drive. It may also be used to play RapidBuilder (.RBX/.RPR) files and RapidExam (.EXM) files.

Automatic streaming capabilities enable Performance Analyzer files to play smoothly even across slow Internet connections. RapidPlayer's streaming technology starts and ends on the client's machine and requires no additional software on the server side. Streaming is accomplished by buffering frames in the background and displaying them as needed. Performance Analyzer files are optimized for low bandwidth environments such as dial-up modem based connections.

## NOTES

- RapidPlayer plays files regardless of the screen resolution/color depth in which they were created. If for example a file created at 1024x768 is played in 800x600 resolution, then scroll bars (both horizontal and vertical) are displayed on the screen. Likewise, if a file created at 800x600 is played in 1024x768 resolution, then the playback window will occupy the center of the screen.
- A DLL version of RapidPlayer, which is also included with Performance Analyzer, may be used to play .RPE files from a third-party application.

## **RapidPlayer ActiveX Control for Internet Explorer**

XStream's ActiveX Control streams and plays .RPE files over the Internet through the Internet Explorer browser. It is available from XStream's download page at <http://www.xstreamsoftware.com/downloads.htm>.

## **RapidPlayer Plug-in for Netscape**

XStream's plug-in for Netscape streams and plays .RPE files over the Internet through the Netscape browser. It is available from XStream's download page at <http://www.xstreamsoftware.com/downloads.htm>.

## **Back-end Administration and Tracking (with XStream RapidShare LMS)**

Performance Analyzer works with **XStream RapidShare LMS**, which is XStream Software's powerful, web-based Learning Management System (LMS) within the XStream RapidShare web environment and digital workspace. The system includes full capabilities for registering, tracking, and reporting on Performance Analyzer files.

XStream RapidShare LMS is a secure, feature-rich communication, collaboration, and learning management system within an easy-to-use web environment accessible to a global audience. It enables management of all types of online learning content (including SCORM content) and offline scheduled events with optional capabilities for web-based communication and collaboration.

Based on a scalable .NET architecture, XStream RapidShare LMS is available as a cost-effective **hosted service solution** (which minimizes total cost of ownership and accelerates deployment time for quick realization of benefits) or as a **non-hosted license offering**. It is the ideal web solution for any organization that needs to efficiently share and manage information and facilitate real-time communication and collaboration across the enterprise. With XStream RapidShare LMS, everyone within an organization can use the same secure system to perform administrative tasks, access assigned learning content, communicate and collaborate on any topic or project, and manage/access any type of content or files that may be used within the organization. Full flexibility is provided to customize and organize the use of the LMS within the organization.

XStream RapidShare LMS includes the following features and capabilities:

- **Decentralized administration capabilities (with comprehensive security)** – Control the access and user rights of each administrator (i.e., each administrator may have full access to all aspects of the LMS or only partial access to certain elements within the LMS, and each administrator has defined rights that control the type of functions the administrator can perform at each level).

- **Hierarchical administration capabilities (with comprehensive security)** – Customize and organize the use of the LMS by creating multiple organizational units (with complete security for the LMS data/content within each organizational unit). Each organizational unit can contain its own users/groups, designated administrators, assigned content matter/events, user rights, etc.
- **SSL Security** – The LMS can be made accessible using either the HTTP or HTTPS protocol. The HTTPS protocol provides SSL security using 128-bit encryption, providing a completely secure environment for all transactions, including file uploads/downloads.
- **Learning Content Capabilities** – The LMS can register, track, and report on various types of learning content and SCORM content created with RapidBuilder, RapidExam, Performance Analyzer, RapidGuide, and other third-party SCORM-authoring technologies. A large variety of information and settings may be configured for each learning content matter registered in the system, including the capability to define the Start Date and Expiry Date for each learning content matter.
- **Event Capabilities** – Schedule, track, and report on offline events of all types, including instructor-led training sessions, meetings, workshops, seminars, conferences, trade shows, etc. Administrators may track the number of seats available for each scheduled event and enable registration and cancellation of registrations. Administrators may also send an event registration URL (via email or using some other method) to enable users to self-register for the event using the URL. Other capabilities include alternate scheduled event registrations, event roster generation (along with other reports), and the ability to change an event's status (open, completed, or cancelled).
- **Self-Registration Capabilities** – Users without accounts are able to self-register in the system by creating their own accounts online. An account creation confirmation e-mail (containing login credentials) is automatically sent to a user after he/she registers.
- **Required Learning Paths/Curriculums** – Administrators may define learning paths containing assigned content matter/events that must be completed by the user.
- **Recommended Learning Curriculums** – Users may also access supplementary assigned content matter/events not included as part of required learning paths.
- **Learning Catalogs** – Administrators may create defined learning catalogs containing groupings of online and offline content matter. For each learning catalog created, administrators can also define if assigned users can directly access the online content or if they need to request access to it. Access requests are made via means of notifications that are fulfilled by administrators assigning the user to the requested content matter. The user then receives a confirmation message stating that the content matter has been assigned to the user.
- **E-mail Notification Capabilities** – E-mail reminders (i.e., reminder messages automatically sent to participants before the content matter is taken) and e-mail notifications (i.e., results automatically sent to participants after the content matter has been taken) can be configured for learning paths and each type of content matter within XStream RapidShare LMS. Administrators can configure the e-mail messages for each type of content matter separately and define who has access to the different e-mail reminders/notifications that have been configured.
- **Prerequisites** – Administrators may establish prerequisites for each content matter (including conditions such as progress, time taken, score, and attendance at the content matter level) before a user may launch/register for the content matter. This controls the conditions that must be met by the user before being able to launch/register for a content matter.
- **Bookmarking Capability** – While logged in to a registered RapidBuilder file, RapidExam file, or SCORM v1.2 course, an authenticated user may stop at and mark a specific screen/frame before exiting in order to return to that location upon the next login.

- **Reporting Capabilities** – Over 150+ predefined reports (with a large variety of permutations/combinations) are available. User reports may be generated from the user, group, or department-level points of view, and content matter reports may be generated from the content matter/event or learning path points of view. Reports may be viewed online, printed, exported to other formats (including Microsoft Excel, Adobe PDF, and Rich Text Format), and e-mailed.
- **Customize User Interface Elements** – Customized banner images and welcome pages may be specified for each organizational unit within the LMS. Other interface elements (such as fonts, colors, etc.) may be customized via Cascading Style Sheets (CSS).
- **Offline Exams** – System administrators may generate RapidExam exams (.EXM files) and performance exams (.RPE files) as offline exams. Assigned users can take offline exams without being connected to the LAN or the Internet. Upon completing the offline exam, the end user transfers the results to an administrator, who then uploads the results to the LMS for tracking and reporting purposes.
- **Archiving Capabilities** – The system can automatically store all deleted content matter/events and associated data in an archived location. The archived content may be subsequently restored to the LMS or permanently removed.
- **Section 508 Compliance** – Includes full support for the accessibility requirements specified in Section 508 of the U.S Rehabilitation Act. XStream RapidShare LMS is a 508-compliant technology that may be fully accessed by users with physical disabilities or limited mobility.
- **Unicode Support** – Includes support for the Unicode character set (for encoding multiple written languages).
- **Multi-Language Support** – Supports English, French, Danish, and Norwegian (with upcoming support for additional languages).

In addition to its learning management elements, XStream RapidShare LMS provides **optional** access to powerful Communication and Collaboration Capabilities, which enable users to share files, collaborate on the development of learning content and other types of content, and engage in live chat and discussions.

The following communication and collaboration capabilities are available as part of the LMS:

- **File Transfer/Sharing Capabilities** – These capabilities enable collaboration on the development of content matter files, images, media files, etc. Files and documents (created using any application) can be easily uploaded to the system, organized in folders and subfolders, and shared with other users.
- **Threaded Discussion Forums** – Users can initiate one-on-one, topic-based discussions with other users.
- **Interactive Chat Sessions** – Users can initiate synchronous text-based chat sessions with other users on demand. One or more invited internal users or external users may join the chat. Internal LMS users invited for a chat may be notified via animated marquee to join a chat in progress. External users may participate in chatting by receiving a URL that they can use. Each chat session can be saved and made available to other users.
- **“Notify Me” Capability** – This capability allows users to keep track of changes occurring within the LMS. A user may choose to be automatically notified (by e-mail) as soon as a change occurs in a selected LMS component, or he/she may choose to receive a daily summary of all changes made to a selected LMS component or all changes made to the complete LMS.

- **Electronic Mail Facility** – Users may compose, send, receive, and store e-mail messages. Since anyone can send e-mail to the mailbox, it is particularly useful for receiving e-mail from people outside of the LMS.
- **Calendar** – Provides a mechanism for users to keep track of upcoming events or activities. Events can be organized and viewed by day, week, month, or year.
- **Notes** – Users can post general notes pertaining to the LMS.
- **Web Links** – Users can create shared links or shortcuts to Web URLs. A link is a shortcut to a web site. It allows you to specify whether a web page referred to by the link should be opened in a new window or not.
- **Comments** – Users may add comments to various objects within the LMS. Comments are user-defined annotations or notes that provide extra details, recommendations, hints, tips, or other general information to any user accessing the LMS object.

## **Contact Information**

For more information on **Performance Analyzer v3.0**, please contact our sales team either by phone at (613) 731-9443 or by e-mail at [salesupport@xstreamsoftware.com](mailto:salesupport@xstreamsoftware.com).

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