Documentation Library

Framework Developer Guide

Contents

ABOUT AXES FRAMEWORK 4

WHAT IS AXES FRAMEWORK? 4
WHO CAN USE AXES FRAMEWORK? 4
AXES TERMINAL SERVER 4

SECTION 1 – HOW TO BUILD A FRAMEWORK 5

DESIGN A FRAMEWORK 5
Design process *5*
aXes Framework Wizard *6*
DESIGN A LAYOUT 7
Choose panels *7*
Set layout properties *7*
SELECT THEME 8
NAVIGATION 8
PROPERTIES 9
MANAGING FRAMEWORK DEFINITIONS 9
PUBLISH A FRAMEWORK 10
EDIT A PUBLISHED FRAMEWORK 10
DEPLOY A PUBLISHED FRAMEWORK 11

SECTION 2 – THEME MANAGEMENT 12

ABOUT THEMES 12
Theme properties *12*
Theme definitions file *13*
Changing the themes definition file 14
aXes version upgrades 14
Theme selection list *14*
MANAGING THEMES 15
Create a theme *15*
CSS 15
Image sample 15
Theme properties 15
Change a theme *16*
Delete a theme *16*
Theme selection list *17*
Add a theme to the theme selection list 17
Remove a theme from the theme selection list 17

SECTION 3 – REFERENCE GUIDE 18

ARCHITECTURE 18
WIZARD MENU 18
WIZARD DATA AND RULES 19
PUBLISHED FRAMEWORK 21
TAB CONTENT IN A PUBLISHED FRAMEWORK 22

APPENDICES 23

QUESTIONS AND ANSWERS 23
BROWSER SUPPORT 25
TERMS AND ABBREVIATIONS 26

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List of Figures

Figure 1: Terminal Session without a Framework 5
Figure 2: Terminal Session with a Framework 5
Figure 3: aXes Framework Wizard 6
Figure 4: aXes Framework Wizard – Design a Layout 7
Figure 5: aXes Framework Wizard – Select Theme 8
Figure 6: aXes Framework Wizard – Add Navigation Items 8
Figure 7: aXes Framework Wizard – Properties 9
Figure 8: Theme Selection List in aXes Framework Wizard 14
Figure 9: aXes Framework Architecture 18
Figure 10: Sample of a Published Framework 21

List of Tables

Table 1: Design Framework Process 5
Table 2: Theme Properties 12
Table 3: Theme Definitions File 13
Table 4: Create a Theme Procedure – CSS 15
Table 5: Create a Theme Procedure – Image Sample 15
Table 6: Create a Theme Procedure – Theme Properties 16
Table 7: Delete a Theme 16
Table 8: aXes Framework Wizard – Menu Options 18
Table 9: aXes Framework Wizard – Data and Rules 19
Table 10: Questions and Answers about aXes Framework 23
Table 11: Browser Support 25
Table 12: Terms and Abbreviations 26

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About aXes Framework

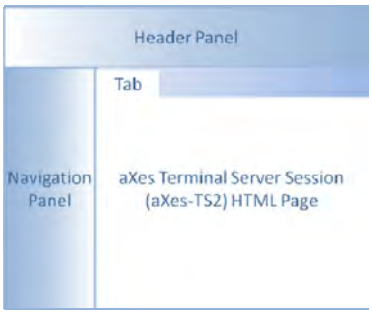
This document describes the aXes Framework and explains how to use the framework with aXes Terminal Server.

What is aXes Framework?

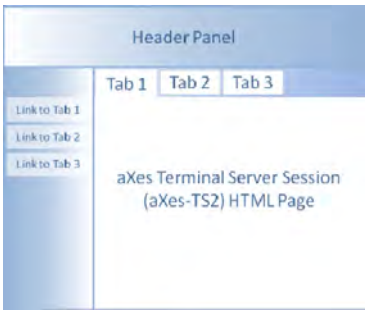
aXes Terminal Server transforms 5250 screens into pages in a browser using HTML, CSS and JavaScript. aXes Framework allows developers to add HTML panels around pages created by aXes Terminal Server.

aXes Framework encapsulates aXes Terminal Server session pages and provides optional HTML panels, including header, left, right and footer panels. The framework tools include a design wizard, HTML templates and CSS definitions to style the HTML pages.

aXes Terminal Server session without aXes Framework



One aXes Terminal Server session in a framework



Multiple aXes Terminal Server sessions in a framework

The aXes Framework Wizard allows developers to design a framework's layout, styling and navigation. Developers choose the panels they require for a layout, select a theme, add optional navigation items and save the framework definition. They use the wizard to publish the framework definition as a working framework by generating the HTML, CSS, and JavaScript that will operate the framework.

Who can use aXes Framework?

The aXes Framework uses HTML5, CSS3, jQuery and JavaScript.

Users require a browser that supports HTML5 and CSS3.

The aXes Framework has been designed for use with aXes Terminal Server aXes-TS2.

aXes Terminal Server aXes-TS1 is unsuitable for use with aXes Framework.

aXes Framework requires aXes Terminal Server aXes-TS2.
aXes Framework is available with aXes version 3.1 or later.

aXes Terminal Server

aXes Terminal Server provides access to IBM i terminal sessions from a web server and offers the advanced features found in desktop terminal emulation solutions in a browser interface. It provides access to enterprise applications from a Web browser over the Internet or corporate intranet. Users simply access a URL, which eliminates the need to install software and manage user configurations on individual desktop or mobile computers.

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Section 1 – How to build a framework

Read this section to discover the process for designing a framework and learn how to use the Framework Wizard.

Design a framework

The aXes Framework allows you to add panels beside, above and below aXes Terminal Server session pages.

Figure 1: Terminal Session without a Framework

aXes Terminal Server sessions without a framework occupy the whole page (Figure 1, page 5).

Figure 2: Terminal Session with a Framework

A framework adds panels to aXes Terminal Server session pages. The framework shown in Figure 2 (page 5) includes a tab for aXes Terminal Server session pages, a header panel, and left side panel.

Design process

This section describes what you do to design and publish a framework.

Designing a framework is a four step process.

Table 1: Design Framework Process

Steps	Actions and Outcomes
1. Design framework layout	Design a layout by selecting the panels to include in the framework.
2. Choose theme and styling	Choose a theme to apply to the framework.
3. Add navigation items	Assign a panel as the navigation panel and add one or more navigation items.

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Steps	Actions and Outcomes
4. Publish framework resources	Publishing framework resources creates the HTML, CSS and JavaScript the framework requires.

The Framework Wizard provides the tools for designing and publishing a framework.

You do not need to complete all steps in one sitting. The wizard allows you to save a partially completed design in a framework definition, and edit the definition later.

aXes Framework Wizard

The Framework Wizard (Figure 3, page 6) guides you through the design process.

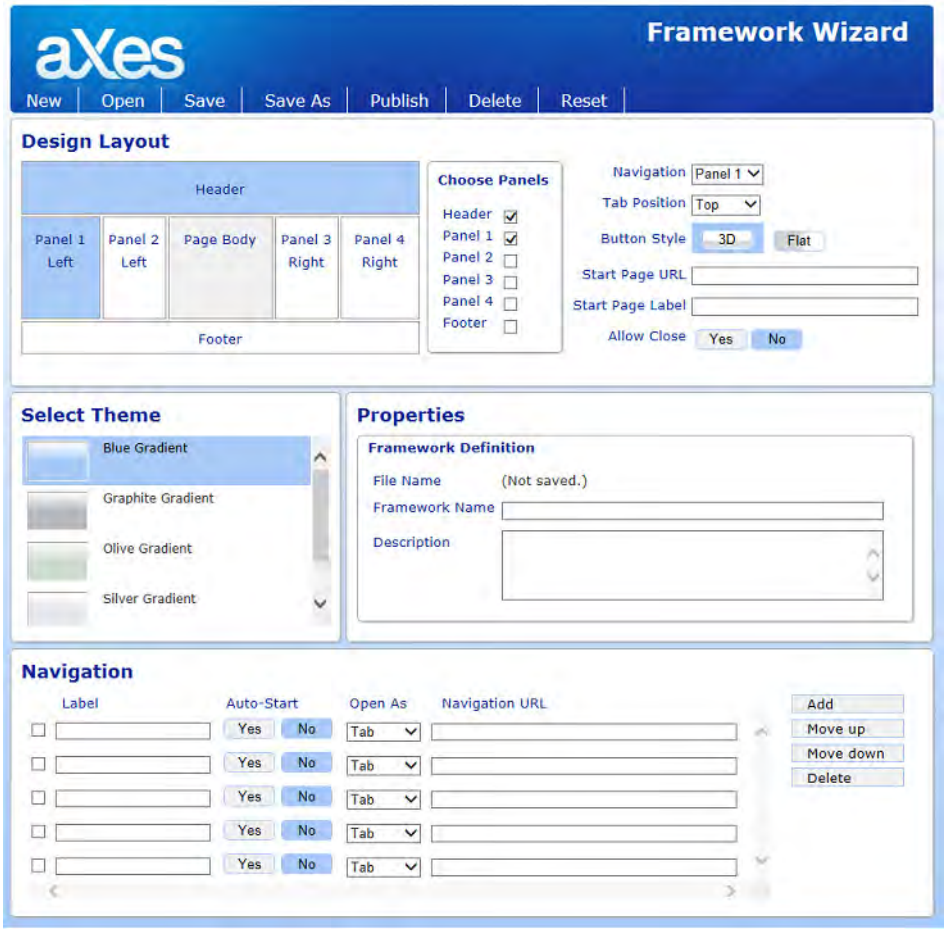

Figure 3: aXes Framework Wizard

The sections in the wizard page correspond to the steps in the design process. The design layout section is where you choose panels to include in the layout, assign a navigation panel, choose the way the framework will display buttons, and set the tab position. The select theme section allows you to choose a theme. The navigation section collects information for the buttons and links that will appear in the navigation panel of the framework. The properties section includes metadata describing the framework definition.

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Design a layout

The design layout section comprises two parts, the panel selector and the layout properties.

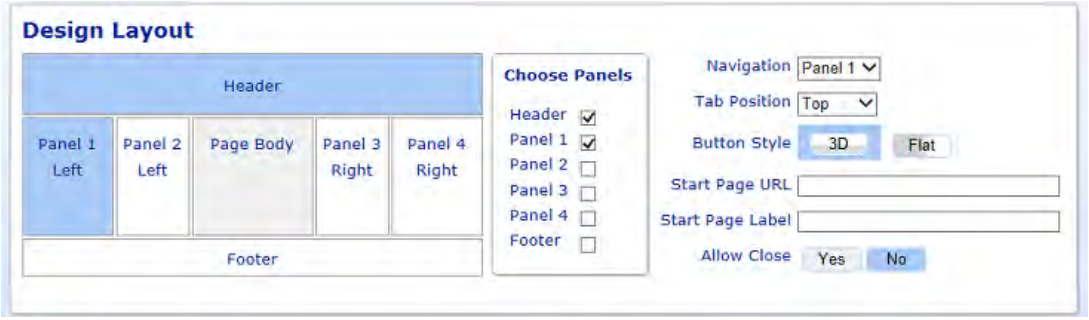

Figure 4: aXes Framework Wizard – Design a Layout

Choose panels

Choose a panel by clicking on a panel or ticking its check box.

Chosen panels display a blue background.

Click a chosen panel to remove it from the panel selections.

The page body is the section of the framework where the aXes Terminal Server sessions will display. All framework layouts include this panel.

Set layout properties

Navigation	Assign a panel as the navigation panel.
Tab position	The tab position is usually at the top of the body panel. Change its position when the top is inappropriate for your design. Choose an option from the list (top, left, right or bottom).
Button style	Click 3D or flat to choose the button style.
Start page URL and label	Nominate a URL for a page that the framework will open during framework start up. The label describes the start page and becomes the button text.
Allow close	Click yes to allow users to close the start page. Click no to prevent users from closing the start page.

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Select theme

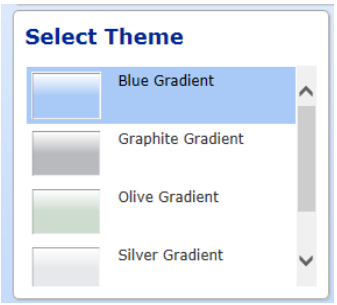

Figure 5: aXes Framework Wizard – Select Theme

Select a theme for the framework by clicking on a theme icon or label.

The selected theme displays a blue background.

Navigation

The navigation section is place where you define items the framework will display in the navigation panel.

Figure 6: aXes Framework Wizard – Add Navigation Items

Label	The label describes the navigation item and becomes the button text in the navigation panel.
Auto-start	Set auto-start to "Yes" when you want the framework to open the URL during the framework start-up. Set auto-start to "No" when you want users to open the URL.
Open as	Set open-as to "Tab" to open the URL as a new tab in the framework. Set open-as to "Window" to open the URL in a new browser window.
URL	Define the URL to open.

Add as many navigation items as you need. The framework will display a button in the framework's navigation panel for each item in the navigation list.

The navigation buttons (add, move up, move down and delete) allow you to manipulate the navigation list.

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Properties

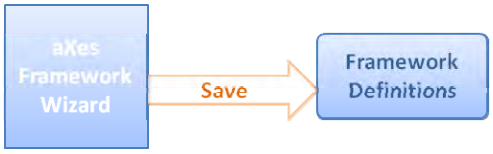
The properties section includes metadata that describes the framework.

Figure 7: aXes Framework Wizard – Properties

File name	Assign a name to use when saving the framework definition resources.
Framework name	Assign a descriptive name to the framework definition.
Description	Describe the characteristics of the framework design.

Managing framework definitions

Create framework definition (new)

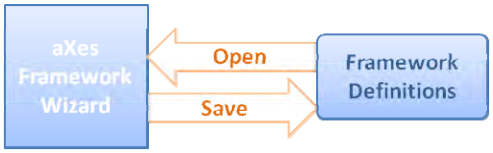


Start the wizard

Design the framework

Save the framework definition

Edit a framework definition



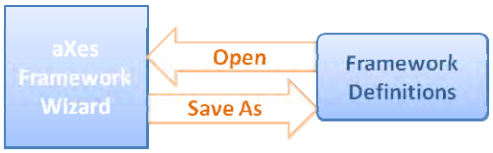
Start the wizard

Open a framework definition

Make the desired changes

Save the framework definition

Copy a framework definition

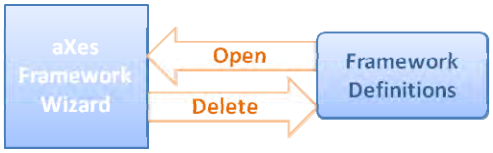


Start the wizard

Open a framework definition

Save the framework definition using a new name

Delete a framework definition



Start the wizard

Open a framework definition

Delete the framework definition

Deleting a framework definition will delete the associated published framework.

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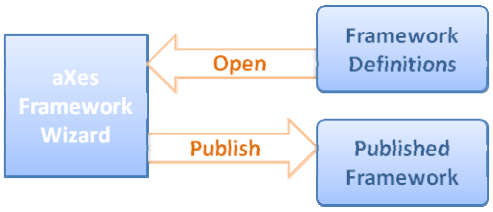
Publish a framework

Open a saved framework definition.

Edit it and save the changed definition or save it as a new definition.

Press publish and the wizard will publish a framework using the framework definition displayed in the wizard.

Publish a framework



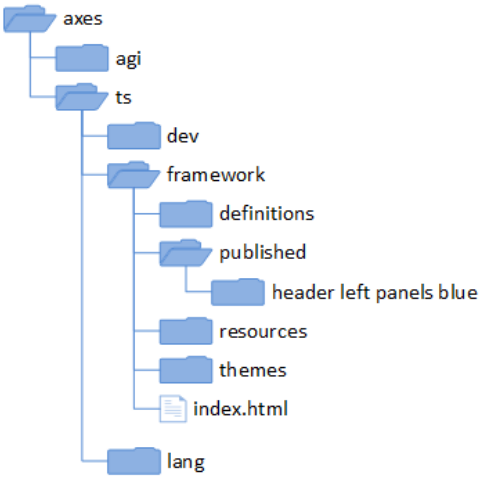
Start the wizard

Open a framework definition

Publish the framework definition

The wizard will request a name and then publish the framework resources.

You may choose any name but published frameworks will be easier to identify when the name indicates characteristics of the design and style.



The wizard will save published framework resources into the published folder.

The published folder contains a sub folder for each published framework.

This example shows one published framework named "header left panels blue".

The wizard will inform you if a published framework exists. You can overwrite the existing framework, or publish the framework using another name.

Copy the existing published framework resources before publishing another copy, publish the framework using a different name, or create another framework definition and publish the framework using another name.

Edit a published framework

Panels in a published framework have no content. The exception is the panel chosen as the navigation panel. To add content to framework panels you must edit the published framework resources. For example, you can include a company logo in a header panel.

> Copy the published framework before editing the framework resources to add content to the panels.

Publishing a framework definition after editing its framework resources will over-write your edits.

Copy the edited framework resources before publishing another version or publish using a different framework name.

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Deploy a published framework

To deploy a published framework, copy the published framework's folder to an active aXes Terminal Server instance.

The published framework folder contains all of the resources needed to operate the framework.

After copying a published framework's folder, grant read-only permissions to the folder and all files.

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Section 2 – Theme management

This section explains how to create themes and include them in the theme selection list in the Select Theme panel of the Framework Wizard.

About themes

Themes control the appearance of published frameworks, including the background colour of panels in a published framework. The Framework Wizard provides themes for you to use.

You can design and add themes. To create a theme requires the following artefacts.

- A theme CSS file
- Theme definition properties
- An image to show an example of the theme

Each framework theme has a unique CSS file (e.g. blue.css).

You create a theme definition by updating properties in the themes definition file.

Use a drawing tool to create an image to demonstrate the appearance of the theme. The image is optional but recommended.

Themes apply to published frameworks.
Themes do not apply to terminal server sessions and screens.

Theme properties

Each theme requires name, folder, CSS, and theme image properties in the theme definition file.

```
{
    "name"      : "Olive Gradient",
    "folder"    : "ts/framework/themes",
    "CSS"       : "olive.css",
    "themeimage": "./resources/img/olive-gradient.png"
}
```

Table 2 (page 12) presents a list of the theme properties and their definitions.

Table 2: Theme Properties

Properties	Definitions
Name	The name describes the theme characteristics. The framework uses the name in the theme selection panel.
Folder	The folder defines the location of the CSS file. Use the default folder ts/framework/themes.

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Properties	Definitions
CSS	CSS defines the name of the file that contains the CSS required by the theme. Use a name that identifies the theme. The name must be unique.
Theme image	Theme image defines the name and location of an image file that is a sample of theme colour. The default theme image file location is /resources/img/. The framework uses the image file in the theme selection panel. The name must be unique.

Theme definitions file

The theme definitions file (theme.json) contains the information the Framework Wizard uses to display a list of themes in the Select Theme panel and identifies the CSS file associated with the theme.

The themes definition file contains sample themes. Table 3 (page 13) shows an example themes definition file.

Table 3: Theme Definitions File

Theme Definitions File

```
{
    "aXes":
    {
        "theme" : [
            {
                "name"      : "Blue Gradient",
                "folder"    : "ts/framework/themes",
                "CSS"       : "blue.css",
                "themeimage": "./resources/img/blue-gradient.png"
            },
            {
                "name"      : "Graphite Gradient",
                "folder"    : "ts/framework/themes",
                "CSS"       : "graphite.css",
                "themeimage": "./resources/img/graphite-gradient.png"
            },
            {
                "name"      : "Olive Gradient",
                "folder"    : "ts/framework/themes",
                "CSS"       : "olive.css",
                "themeimage": "./resources/img/olive-gradient.png"
            },
            {
                "name"      : "Silver Gradient",
                "folder"    : "ts/framework/themes",
```

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Theme Definitions File

```
                        "CSS"        : "silver.css",
                        "themeimage": "./resources/img/silver-gradient.png"
                    },
                    {
                        "name"       : "White",
                        "folder"     : "ts/framework/themes",
                        "CSS"        : "default.css",
                        "themeimage": "./resources/img//white.png"
                    }
                ]
            }
        }
```

The theme definitions file in Table 3 (page 13) includes theme properties for themes named blue, graphite, olive, silver and white.

Changing the themes definition file

After editing the themes definition file, make a backup copy of the file and save it outside the aXes folders.

aXes version upgrades

> Warning: aXes version upgrades may overwrite edits in the themes definition file.

Before upgrading your current aXes version to a later version, make a copy of the themes definition file and save it outside the aXes folders. After completing the version upgrade, edit the new themes definition file and copy your amendments from the backup copy of the themes definition file.

Theme selection list

Figure 8 (page 14) shows the theme selection list in the Framework Wizard.

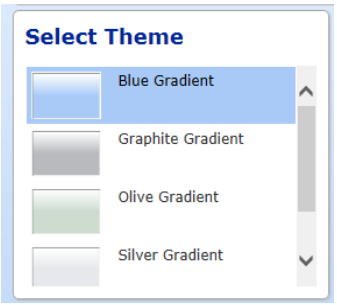

Figure 8: Theme Selection List in aXes Framework Wizard

The theme selection list shows themes available for frameworks. Themes defined in the themes definition file appear in the theme selection list.

The theme examples are images. You can create images to demonstrate the appearance of your themes. If you choose not to create images, only the name of your theme will appear in the list.

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Managing themes

This section explains how to create, change and delete themes.

Create a theme

Creating a theme requires three tasks,

- Build the CSS
- Create an image sample
- Edit theme properties

CSS

Table 4 (page 15) shows the steps required to create the CSS for the theme.

Table 4: Create a Theme Procedure – CSS

Steps	Actions
1.	Copy one of the CSS files associated with an existing theme. For example, copy the olive green theme file, named olive.css.
2.	Rename the copied file using a name that describes your new theme.
3.	Open the copied CSS file using a text editor.
4.	Use find and replace to change the theme colour. The olive theme uses colour #cddcc5. To use lavender, replace #cddcc5 with #e6e6fa.
5.	Save the CSS file.

Image sample

Use a drawing tool to create a sample image.

Table 5: Create a Theme Procedure – Image Sample

Steps	Actions
1.	Create a png image, 80 pixels wide and 40 pixels high and name it using your theme name, e.g. lavender.png. This image uses lavender with a gradient of white to lavender from top to bottom.
2.	Save the file in the /resources/img/ folder.

Theme properties

Table 6 (page 16) shows the procedure for editing theme properties.

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Table 6: Create a Theme Procedure – Theme Properties

Steps	Actions
1.	Open the theme.json file using a text editor.

2.	Select and copy an existing theme definition.
	For example, select these lines to copy the olive theme.
	{
	"name" : "Olive Gradient",
	"folder" : "ts/framework/themes",
	"CSS" : "olive.css",
	"themeimage": "./resources/img/olive-gradient.png"
	}

3.	Paste the copied lines at the end of the existing theme definitions. Add a comma to the theme above e.g.}, to ensure the correct JSON syntax.
4.	Edit the copied lines. Name: change the theme name. Folder: do not change the folder name. CSS: change the CSS file name. Themeimage: change the image file name.
5.	Save the theme.json file after completing the edits.
6.	Copy the theme.json file and save it elsewhere as a backup copy of the file.

You can edit the theme.json file without copying an existing theme, but you must use correct JSON syntax.

Change a theme

To change a theme follow the procedure for creating a theme for the items you wish to change. For example if you wish to change the theme name open the theme.json file and change the name.

Create a backup copy of the theme.json file after making the changes.

Delete a theme

Table 7 (page 16) shows the procedure for deleting a theme.

Table 7: Delete a Theme

Steps	Actions
1.	Delete the CSS file associated with the theme.
2.	Delete the image file associated with the theme.
3	Open the theme.json file using a text editor.

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Steps	Actions

4.	Select the theme definition you wish to delete.
	For example, select the following lines to delete the olive theme.
	{
	"name" : "Olive Gradient",
	"folder" : "ts/framework/themes",
	"CSS" : "olive.css",
	"themeimage": "./resources/img/olive-gradient.png"
	}

5.	Cut (delete) the selection.
6.	Verify the JSON syntax in the theme definition file.
7.	Save the theme.json after deleting the theme.
8.	Copy the theme.json and save it elsewhere as a backup copy of the file.

Theme selection list

Add a theme to the theme selection list

Creating a theme will add the theme to the theme selection list automatically.

The Framework Wizard inserts items in the theme selection list from the theme definitions in the theme.json file.

Remove a theme from the theme selection list

Deleting a theme removes it from the theme selection list.

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Section 3 – Reference guide

This section provides conceptual information about the aXes Framework.

Architecture

The aXes Framework consists of two parts, a framework definition and the framework resources created by publishing a framework from a framework definition. The aXes Framework Wizard provides the tools to design and edit a framework definition.

Figure 9 (page 18) shows the components and services that constitute the aXes Framework.

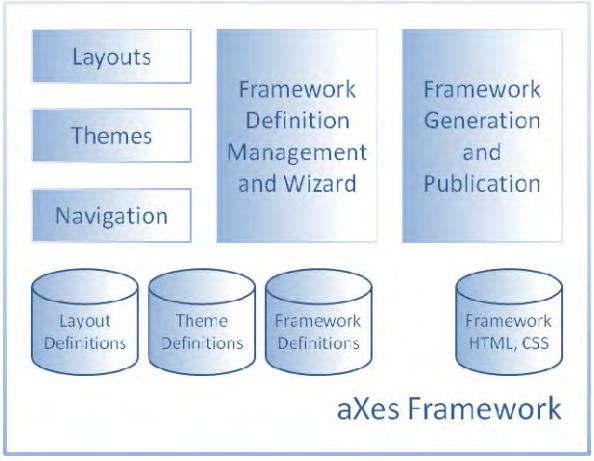

Figure 9: aXes Framework Architecture

Framework definition management services provide the design wizard and the file and resource management for designing and assembling a framework definition. Its tasks are:

- Layout design
- Theme selection
- Navigation details
- Saving layout, theme and navigation data as a framework definition

Framework generation and publication services build and publish framework resources (HTML, CSS and JavaScript) using data from a framework definition file.

Developers or administrators deploy framework resources to a production aXes instance.

Wizard menu

Table 8 (page 18) explains actions associated with each item in the wizard menu.

Table 8: aXes Framework Wizard – Menu Options

Menu Options	
New	The New option clears the wizard contents and presents the wizard page with its default settings.

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Menu Options	
Open	The Open option presents a list of saved framework definitions and loads the selected definition into the wizard.
Save	The Save option saves the framework definition in the wizard using the existing file name. When the definition has no name this option will request a name.
Save as	The Save As option saves the framework definition in the wizard and requests a name.
Delete	The Delete option discards the framework definition in the wizard and removes its saved definition.
Publish	The Publish option creates the framework resources (including the HTML and CSS used to operate the framework).
Reset	The Reset option clears the contents of the wizard page and presents the wizard page with its default settings.

Wizard data and rules

Table 9: aXes Framework Wizard – Data and Rules

Data	Definition	Actions and Rules
Button style	Button style is either 3D (rounded corners) or flat (square corners).	Click 3D or flat.
Choose panel check boxes	Check boxes correspond to the panels in the layout.	Tick a check box to include, or remove tick to exclude the panel.
Footer	Include/exclude the footer panel in a layout.	Click to select or deselect
Framework description	Use the framework description to define features of the framework design.	Optional
Framework file name	The file name is assigned to the framework definition during save or save as actions.	Framework file name is required when saving a framework definition.
Framework name	A descriptive name assigned to a framework definition. This is not necessarily the same as the file name.	Optional
Header	Include/exclude the header panel in a layout.	Click to select or deselect

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Data	Definition	Actions and Rules
Navigation auto-start	Auto start defines navigation items that the framework will open during start-up.	Yes enables auto start. No prevents auto start.
Navigation label	The label is text to describe the navigation URL. The text becomes the button label in the navigation panel.	The label is required for each navigation item.
Navigation open as	Navigation items can open as a new tab inside the active browser window, or in a new browser instance in a new window.	Tab opens a new tab. Window opens a new browser instance.
Navigation panel	Choose a panel in the layout to use as the navigation panel. Panel 1 (left) is the usual choice. Header and footer panels are unavailable as a navigation panel.	Navigation panel selection is active only when panels 1, 2, 3 and 4 are included in the layout.
Navigation select	The select check box marks an item (or items) for move up, move down and delete. The action buttons in the navigation section in the wizard manipulate selected navigation items.	Delete: removes all selected items. Move up: all selected items move up one place in the list. Move down: all selected items move down one place in the list.
Navigation URL	URL for a page the framework will open when a user clicks a navigation button.	The URL Is required for each navigation item.
Panel 1 left	Include/exclude panel 1 in a layout.	Click to select or deselect
Panel 2 left	Include/exclude panel 2 in a layout.	Click to select or deselect
Panel 3 right	Include/exclude panel 3 in a layout.	Click to select or deselect
Panel 4 right	Include/exclude panel 4 in a layout.	Click to select or deselect
Start page allow close	Allow close defines whether users may close the start page after it has opened.	Yes allows close. No prevents close.
Start page label	The label is text to describe the start page URL. The text becomes the button label.	Optional

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Data	Definition	Actions and Rules
Start page URL	URL for a page the framework will open during start-up. Use this URL to open a page when a framework layout includes no navigation.	Optional
Tab position	The tab label can reside on the top, left, right or the bottom of the body panel.	Choices are: Top (default) Left Right Bottom
Theme selection	Theme selection is a list of themes that to apply to a framework.	Click the theme image or text to select a theme.

Published framework

Figure 10 (page 21) shows an example of a published framework.

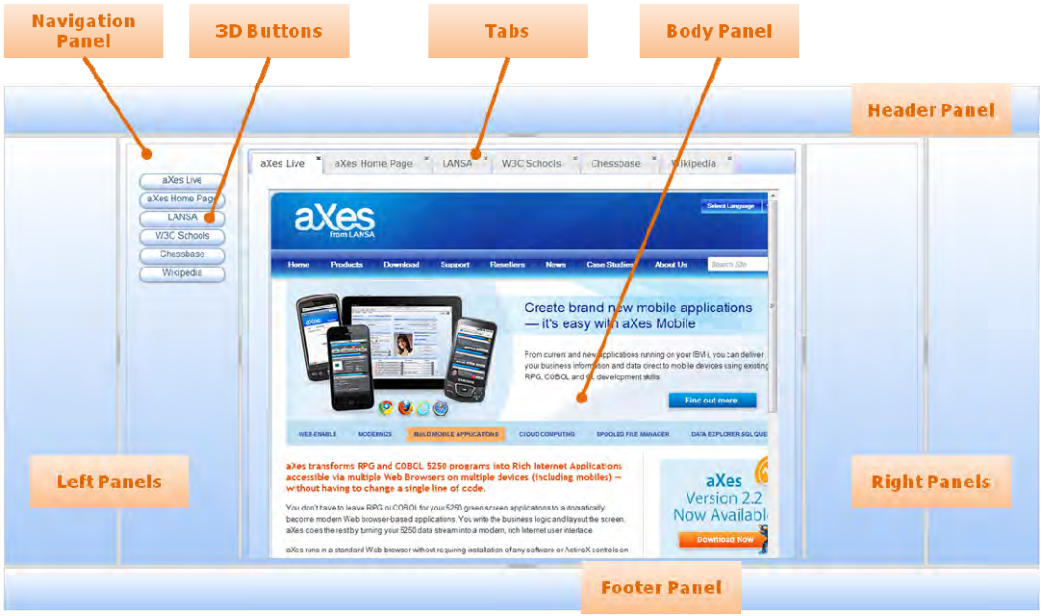

Figure 10: Sample of a Published Framework

The example (Figure 10, page 21) shows a published framework before editing to add content to the framework panels.

The framework includes header, left, right and footer panels and the body panel.

The panels are resizable.

The button style is 3D and the theme is blue.

The framework includes six navigation items and all are open in tabs in the body panel.

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Tab content in a published framework

A published framework can include several tabs and the content of each tab is a HTML page. Pages displayed in tabs can be any URL with some restrictions.

aXes Version	Restrictions on Pages Tabs can Display
Version 3.1 or later	The framework can include pages from aXes version 3.1 or later
Version 2.2.0	The framework can include pages from aXes version 2.2.0 only when the 2.2.0 instance of aXes includes hot-fixes for aXes external hosting feature.
Version 2.1.1	The framework can include pages from aXes version 2.1.1 only when the 2.1.1 instance of aXes includes hot-fixes for aXes external hosting feature.

If a page does not display in the framework, a possible cause is the URL offending cross domain rules administered by the browser.

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Appendices

Questions and answers

Table 10 (page 23) provides answers to questions about aXes Framework.

Table 10: Questions and Answers about aXes Framework

Questions	Answers
Can developers edit the framework HTML?	Yes. Developers can run the wizard to design and publish framework resources and then copy and edit the HTML and CSS.
Can developers implement aXes eXtensions without using aXes Framework?	Yes. The aXes eXtensions apply to the content of aXes Terminal Session pages and do not apply to the framework.
Can developers use the wizard to edit an existing framework definition file?	Yes. The wizard saves the design and style choices a developer makes in a framework definition file. Developers open and edit framework definition files.
Can developers use the wizard to edit an existing framework HTML file?	No. The wizard will not edit the HTML directly. It can create the HTML by publishing a framework definition. Developers can use a text editor or HTML development tools to edit a published framework.
Can I add themes to the list of themes in the Framework Wizard?	Yes. The managing themes section of this guide describes the artefacts and process you need to create themes.
Can I use the aXes Framework with aXes Terminal Server?	Yes, the framework is designed to work with aXes Terminal Server, aXes-TS2.
Do developers have to use Framework Wizard to implement the aXes Framework?	Yes. The framework will not exist until a developer runs the wizard to design and publish a framework. The wizard is accessible from the aXes projects developer environment.
Does aXes Framework replace the default starting URL for aXes Terminal Server?	No. The default URL for aXes Terminal Server remains unchanged. To use a terminal session in the framework users must open the framework URL first. An administrator can configure multiple URLs so that some users can operate an aXes Terminal Server session without the framework and other users can operate an aXes Terminal Server session within a framework.

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Questions	Answers
Does aXes Framework require HTML5?	Yes. Users require a browser that supports HTML5, CSS3 and JavaScript.
Does aXes Framework use the jQuery libraries?	Yes
Does aXes Framework work with aXes Terminal Server, aXes-TS2?	Yes, the framework is designed to work with aXes Terminal Server, aXes-TS2.
Does aXes Framework work with the basic aXes Terminal Server, aXes-TS1?	No. The framework is incompatible with aXes Terminal Server, aXes-TS1.
Does the framework include aXes Data Explorer automatically?	No. Developers can add a navigation item to the framework that links to aXes Data Explorer.
Does the framework include aXes Spooled File Manager automatically?	No. Developers can add a navigation item to the framework that links to aXes Spooled File Manager.
Does the framework theme apply to the aXes Terminal Server HTML pages in tabs?	Yes. However, aXes eXtensions applied to individual screens will override the framework theme.
How can I open a URL in layouts with only a header panel?	The start page URL allows you to open a page in layouts that do not include a navigation panel.
How do developers access the Framework Wizard?	Developers can access the Framework Wizard from the aXes Projects Home page.
How do I create themes?	The managing themes section of this guide describes the artefacts and process you need to create themes.
How will users access the framework?	Developers or administrators will publish the URL that points to the framework HTML page in the same way as they do for aXes Terminal Server sessions.
Is it possible to have multiple copies of an aXes Framework?	Yes. Developers can run the wizard to publish an instance of a framework, then edit the published framework definition, save it and publish the revised framework definition.
Should I use a mobile device to operate aXes Framework?	The framework increases the page size of aXes Terminals Server sessions and is best used with desktop and laptop computers and large screen tablets. Phones and small screen tablets require scrolling to see the entire page.

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Questions	Answers
What happens to the aXes Terminal Session HTML pages when the framework operates?	The aXes Terminal Session HTML pages become tabs and panels inside the framework.
Where will framework resources reside?	The framework resources reside in the axes/ts/framework folder. Framework definitions reside in the definitions folder. Published frameworks reside in the published folder.
Where will navigation buttons reside when a layout includes both left and right navigation panels?	Developers can choose the panel where navigation buttons reside. Navigation items often reside on the left-hand side of a page.
Will the aXes Framework change the way aXes works out-of-the-box?	The framework will not change the out-of-the-box experience. Users will see an aXes Terminal Server session HTML page after installing aXes and running it without modification. Developers must use the Framework Wizard to design and publish a framework, then deploy the framework resources.

Browser support

The aXes Framework will operate in the browsers and browser versions defined in Table 11 (page 25).

Table 11: Browser Support

Browsers	aXes Supports	aXes Framework Requires
Chrome	4.0 or later	7.0 or later
FireFox	3.6 or later	3.6 or later
Internet Explorer	9.0 or later	10.0 or later
Safari	4.0 or later	4.0 or later

To use the aXes Framework and take advantage of HTML5 and CSS3 features, a browser version must support HTML5, CSS3 and JavaScript.

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Terms and abbreviations

Table 12: Terms and Abbreviations

Terms and Abbreviations	Definitions
aXes Framework	The aXes Framework is a HTML page that includes one or more aXes Terminal Server pages and several optional panels (including header, left, right and footer panels). The Framework Wizard publishes a framework instance from a framework definition.
aXes Terminal Server session HTML page	This document uses the term aXes Terminal Server session HTML page when referring to 5250 screens converted to HTML and CSS by aXes Terminal Server. These HTML pages are tabs that reside in the page body panel of a framework layout.
Framework definition	A framework definition is the collection of data describing layout, theme, navigation and properties associated with an instance of the framework. The framework will generate the HTML, CSS and JavaScript using this data.
Framework Wizard	The Framework Wizard is the tool that developers use to define and edit framework definitions and publish frameworks.
Navigation item	A navigation item refers to a row in the navigation panel of the wizard and includes the data items, Navigation label Navigation auto-start Navigation open as Navigation URL

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