

PMA.View and PMA.Studio user maual

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PMA.View and PMA.Studio user manual

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Printed: May 2019 in Berchem, Belgium

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1 About PMA.Studio and PMA.View

Welcome to PMA.Studio and PMA.View, an web-based viewer for whole slide image (WSI) data, developed by Pathomation.

2 Release history

Version	Revision	Released
PMA.view 1.0.0 (also referred to as 1.0)	622	February 2015
PMA.view 1.1.0	707	August 2016
PMA.view 1.2.0	855	December 2017
PMA.view 2.0.0	1ef1466cd9a156efd8b0055d8a6a01edee07a94d	May 2019

3 Terminology

3.1 Area

Area is a group of pages inside web-application, PMA.Studio has 2 areas - Admin and Viewer. Admin area contains pages that control application state and configuration and viewer area consists of pages that user spent most of the time that gives access to slide viewing and related functionality.

3.2 Panel

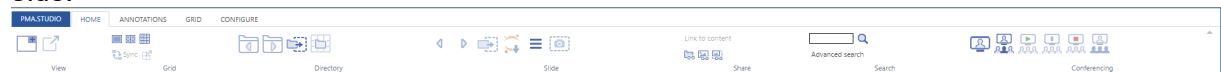
Panel is a separate application component of specific type. There are n panels - Viewer, Tree, Tray and others, you can find more details in [Panels section](#)^[10].

3.3 Panel stack

Panel stack is a group of panels organized in tabbed view each tab contains single panel and at one time only single tab can be visible in panel stack.

3.4 Ribbon

Ribbon is a group of controls (buttons, dropdowns etc.) placed on top of viewer area. On the illustration below you can see a Ribbon with specific configuration, it can be different on your side.



3.5 Tile server

Tile server is a web application - PMA.Core or PMA.Start, that stores slides and provides API which PMA.Studio is utilizing.

4 Viewer area

4.1 About

Viewer area contains application main page, [Embedded view](#)^[26] and [Embedded directory](#)^[27]. Main page consists of 2 main parts - ribbon on top and panels organized in panel stacks.



Application main page

1 - Ribbon

2 - Panels

4.2 Panels

Enter topic text here.

4.2.1 Viewer

Viewer panel consist of one or more viewports organized in grid and toolbar underneath it (only in single-slide mode). Currently selected slide is highlighted with the blue dashed border. When user adds new viewer panel its grid has only 1 column and 1 row, so it's single cell grid. When changing grid size application will always ask what to do with slides that were already loaded into grid - whether application should preserve it or clear all.



Toolbar consists of (left to the right):

1. Flip horizontally
2. Flip vertically
3. Rotate counter-clockwise 90 degrees
4. Rotate clockwise 90 degrees
5. Rotate 180 degrees
6. Previous slide
7. Next slide
8. Magnification buttons

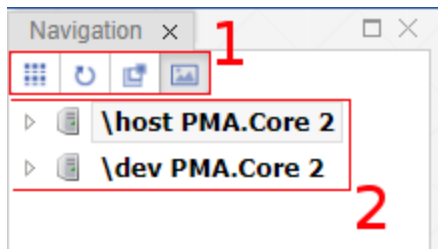
4.2.2 Navigation

Purpose of Navigation panel is to provide an access to connected Tile servers, represent folder\slides structure and select slide to inspect. Navigation panel works in 2 modes - [Tree mode](#)^[11] and [Slides mode](#)^[12].

4.2.2.1 Tree mode

Navigation panel in Tree mode consists of 2 main elements - button toolbar and Tile server content. Button toolbar consist of 4 buttons - from the left to the right:

1. **Switch navigation mode** - there are 2 Navigation modes - Tree mode (on Pic#2) and Gallery mode
2. **Reload** - force pick latest folder\slides structure from the Tile server
3. **Open in new tab** - toggles mode that opens selected slide in the current selected cell or creates a new viewer panel and put selected slide there
4. **Show preview** - toggles visibility of slide preview on hover in Tree mode

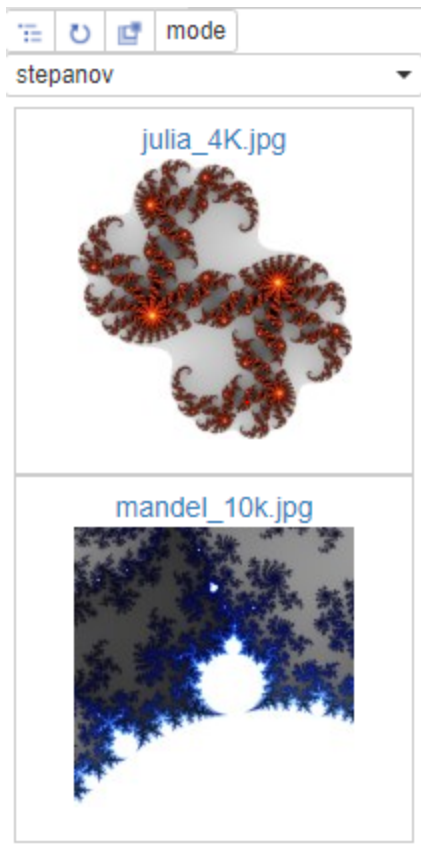


Navigation panel in tree mode
 1 - button toolbar
 2 - Tile server content

4.2.2.2 Slides mode

Navigation panel in Gallery mode consists of buttons toolbar, directory selector and directory content. Button toolbar consist of 4 buttons - from the left to the right

1. **Switch** - switches navigation mode to Tree mode
2. **Reload** - force pick latest slides in the directory
3. **Open in new tab** - toggles mode that opens selected slide in the current selected cell or creates a new viewer panel and put selected slide there
4. **mode** - toggles presence of barcode and thumbnail on the slide



Navigation panel in Gallery mode

4.2.3 Tray (available in PMA.Studio)

Tray panel is a virtual store of slides, user can send slides to the Tray and keep them in Tray for the current session. User can open select slides from tray and open them in viewer tabs or in a grid or remove them from the Tray. To make Tray persistent it's possible to export and import slides to/from tray in CSV format. Tray can present slides in 2 ways - Meta data view and Slides view. Metadata view displays slide information and shows all filled forms for the slide with it's values, while slides view shows slide contents in Gallery. Button toolbar is mostly the same for slides and metadata view except of 'Export to CSV' button which is available only for Metadata view. In both modes it's available to select slides by clicking on them, selected slides are being highlighted with blue colour, in addition slide that that is currently active in viewer will be additionally highlighted in Metadata view with blue dashed border.



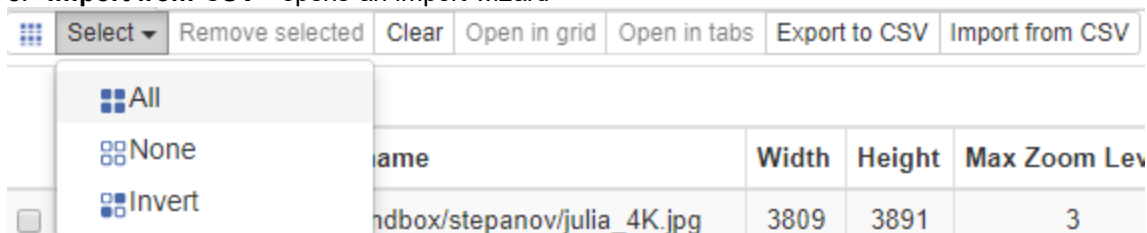
Tray slides view

Slide info													
Server	File name	Width	Height	Max Zoom Level	Micrometres Per Pixel X	Micrometres Per Pixel Y	Physical Size	Tile Size	Barcode	Overview	Layers	Channels	
<input type="checkbox"/> host PMA Core 2	sandbox/stepanov/julia_4K.jpg	3809	3891	3	0	0	3209036	512	N/A		1	1	
<input type="checkbox"/> host PMA Core 2	sandbox/stepanov/mandel_10k.jpg	10000	10000	5	0	0	21011051	512	N/A		1	1	

Tray metadata view

Tray toolbar consist of several buttons, from the left to the right:

1. **Switch mode** - switches between Metadata and Slides mode
2. **Select dropdown**
 - a. **All** - select all slides in Tray
 - b. **None** - deselect all slides in Tray - selection will be empty
 - c. **Invert** - invert selection, deselect selected slides and vice versa
3. **Remove selected** - removes selected slides from the Tray
4. **Clear** - removes all slides from the Tray
5. **Open in grid** - open selected slides in one viewer panel in Grid, it's possible to perform this action only when selected slides count is less or equal 36 (6*6 grid)
6. **Open in tabs** - open each selected slide in separate viewer panel
7. **Export to CSV** - exports slides metadata information - slide info and filled forms to the csv file, download should start immediatly
8. **Import from CSV** - opens an import wizard



Tray toolbar

4.2.4 Annotations (available in PMA.Studio)

Annotations panel displays existing annotations on the selected slide. A table contains Note, Pen Width, Color, Area and Length of every annotations. Besides this data there are buttons for remove, edit and show/hide annotation item.

Annotations		Note	Pen Width	Color	Area (mm ²)	Length (mm)	
Generic							
		annotation 1	9		24.3	17.5	
		annotation 2	9		30.1	26.3	

Available buttons:

1. Delete annotation



2. Edit annotation (opens window with caption field)



3. Show/hide annotation (toggles displaying of the annotation on viewport)



Annotation creating available with Ribbon tools at [Annotations tab](#)^[21].

After closing of the image saving dialog will be opened:

You have unsaved annotations, do you want to keep them?

You have unsaved annotations in 1 slides, do you want to save them?

Server	Slide path
\dev PMA.Core 2	_sys_aws_s3/brightfield/Aperio/CMU-2.svs



Save

Don't save

Cancel

4.2.5 Info

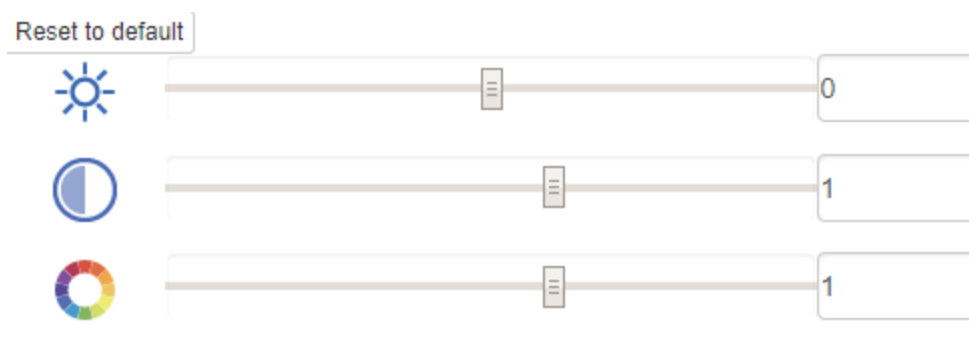
Info panel displays available slide information for currently selected slide. Currently selected slide is highlighted with blue dashed border. Columns are pretty self-descriptive and only thing to mention here is that barcode and overview is clickable and by clicking on that images it will be opened in a new browser tab.

File name	cases/18B07337/18B07337010101.mrxs
Width	168448 pixels / 23.061 mm
Height	270336 pixels / 37.010 mm
Max Zoom Level	70X
Micrometres Per Pixel X	0.136904761904762
Micrometres Per Pixel Y	0.136904761904762
Physical Size	1114531135 bytes
Tile Size	512 x 512 pixels
Barcode	
Barcode text	18B07337010101
Overview	
Layers	1
Channels	1

Slide info panel

4.2.6 Color adjustments

Purpose of color adjustment panel is to provide tools for changing color settings for selected slide. There are 3 available settings (from top to bottom) - Brightness, Contrast and Gamma, for each setting there are 2 ways of change its value - slider and input. Slider and input are synchronized and user can adjust settings using both ways. 'Reset to default' button will reset settings to the following values - Brightness: 0, Contrast: 1, Gamma: 1.



4.2.7 Forms data (available in PMA.Studio)

Forms data panel purpose is to show filled forms for the slide and provide access to editing and filling new forms for currently selected slide. The panel consists of 2 main sections - Add button that will add a panel with specific form, and section with already filled form for the selected slide, user can

collapse\expand each form with toggle control in top left corner and if user need to edit the form (s)he should click on 'Edit' button, it will open a new panel - specific form edit panel, where user can fill or edit form values and save them.

Add	
<div> <div>↗ UC form</div> <div style="float: right;">Edit</div> </div>	
Comments	some comment
IC%	98
POS/NEG	POS

Forms data panel

Forms data ×

UC form ×

□ ×

UC form

Comments

some comment

IC%

98

POS/NEG

POS ▼

Save

Reset

Specific form edit panel

4.2.8 Conferencing (available in PMA.Studio)

Conferencing panel works in 3 modes -
 no active conference
 there is an active conference and user is admin
 there is an active conference and user is not an admin

4.2.8.1 No active conference




When there is no active conference this panel just show a placeholder that allows user to Create new conference or Join to existing conference.

No active conference yet. Do you want to [Create](#) a conference or [Join](#) to the existing one?

4.2.8.2 Active conference, user is admin


When there is an active conference and user is admin of conference user can see: (from top to bottom):

1. Link to share - 'Copy' button allows to copy link to clipboard, and then this link can be used for joining a conference as participant
2. Conference name (specified by admin)
3. Owner - nickname of user who created a conference
4. Nickname - nickname of current user
5. Live mode - can be in 2 states - enabled (green circle), and disabled (red circle). When live mode is enabled conference participants can see the same ROIs as admin, when it is disabled participant cannot see
6. Everyone in control - indicator is the same as for Live mode, when everyone in control enabled all participants can control what is being shown in conference
7. Participants - list of participant nicknames

Link to share	 Copy
Conference	AnyConference
Owner	admin
Nickname	admin
Live mode	
Everyone in control	
Participants (1)	• admin (Admin) (You)

4.2.8.3 Active conference, user is participant

When user joined to a conference as participant (s)he can see a reduced list of fields that are the same to one that is described in previous chapter.

Conference	AnyConference
Owner	admin
Nickname	oleg
Live mode	
Participants (2)	• admin (Admin) • oleg (You)

4.3 Ribbon

Ribbon is a panel that sticks to the top of the screen and consists of tabs and controls. Appearance of tabs and controls are being controlled by ribbon layout, which can be specified in the Admin area. This paragraph will describe behavior of controls, but not their position, since it can be changed by user.

4.3.1 Home tab



Home tab has 7 sections:

- View;
- Grid;
- Directory;
- Slide;
- Share;
- Search;
- Conferencing.

View section contains 2 buttons:

1. Create new Viewport with 1x1 (this button creates a new tab with a 1x1 blank viewport)



2. Pop-out selected slide (this button creates a new tab with 1x1 viewport with current selected slide)



Grid section contains 5 buttons:

1. Resize existing grid to a 1x1 size



2. Resize existing grid to a 2x2 size



3. Resize existing grid to a 2x3 size



4. Toggle Synchronous navigation between cells in the current grid



5. Open slide from current cell into a new viewport panel



Directory section contains 4 buttons:

1. Select previous directory (hotkey: Ctrl + Shift + Up)



2. Select next directory (hotkey: Ctrl + Shift + Down)



3. Send directory to Tray (available in PMA.Studio)



4. Open selected directory in grid



Slide section contains 6 buttons:

1. Select previous slide (hotkey: Ctrl + Up)



2. Select next slide (hotkey: Ctrl + Down)



3. Send slide to Tray (available in PMA.Studio)



4. Download IPython notebook for the selected slide to see how to work with Annotations (available in PMA.Studio)



5. Toggle bottom Viewport toolbar (available in PMA.Studio)



6. Make a snapshot of current image



Share section contains 4 buttons:

1. Link to content (creates custom link with expiration date and password, hotkey: Ctrl + Shift + S)
2. Share Folder link



3. Share Slide link



4. Share ROI link



Search section has a input field and two buttons (available in PMA.Studio):

1. Input field for search request with a button to start search



2. Advanced search (opens window for advanced search request)

Conferencing section contains 6 buttons (available in PMA.Studio):

1. Create PMA.Live session



2. Join PMA.Live session



3. Start or resume PMA.Live session



4. Pause PMA.Live session



5. Exit from PMA.Live session



6. Toggle everyone in control



4.3.2 Annotations tab (available in PMA.Studio)



Annotations tab supplies instruments for working with annotations and has 3 sections:

- Annotations
- Shapes
- Export

Annotations section contains:

1. Save annotations



2. Delete annotation



3. Toggle annotations



4. Toggle annotation text



5. Pen color dropdown



6. Pen width dropdown

Shapes section contains:

1. Circle



2. Line



3. Arrow



4. Ellipse



5. Rectangle



6. Text



7. Icon



8. Point



9. Multi point



10. Polygon



11. Closed Freehand



12. Compound Freehand



13. Freehand



Export section contains:

1. Export to .wkt (Well Known Text)



2. Export to .mld (Visiopharm)



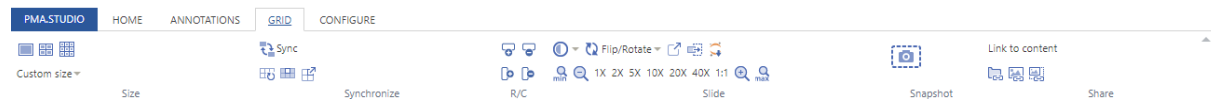
3. Export to .annotations (Indica Labs)



4. Export to .xml (Aperio)



4.3.3 Grid tab



Grid tab supplies instruments to manage grid and it has 6 sections:

- Size
- Synchronize
- Rows/Columns
- Slide
- Snapshot
- Share

Size section contains:

1. Resize existing grid to a 1x1 size



2. Resize existing grid to a 2x2 size

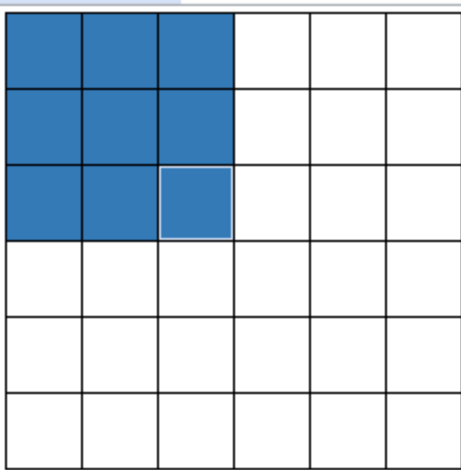


3. Resize existing grid to a 3x3 size



4. Custom size dropdown

Custom size ▾



Synchronize section contains:

1. Toggle Synchronous navigation between cells in the current grid



2. Clear all grid cells



3. Clear current cell



4. Open slide from current cell into a new Viewport panel



Rows/columns section contains (available in PMA.Studio):

1. Add row



2. Remove row



3. Add column



4. Remove column

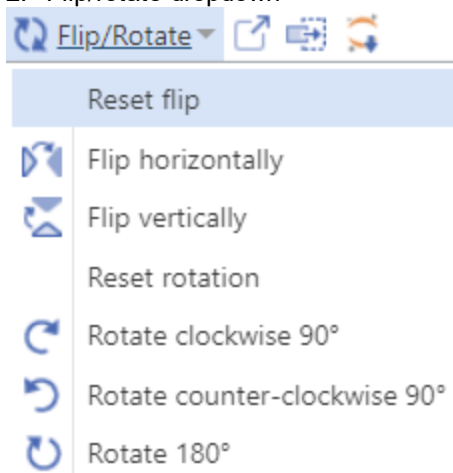


Slide section contains:

1. Brightness-contrast dropdown



2. Flip/rotate dropdown



3. Pop-out selected slide



4. Send slide to Tray



5. Download IPython notebook for selected slide (available in PMA.Studio)



6. Zoom Out



7. Zoom - (hotkey [])



8. Zoom 1X - 40X



9. Zoom 1:1



10. Zoom + (hotkey])



11. Zoom to highest magnification

max

Snapshot section contains one button:

1. Make a snapshot of current grid



Share section contains:

1. Link to content (it allows to create custom link with expiration date and password)

2. Share Folder link



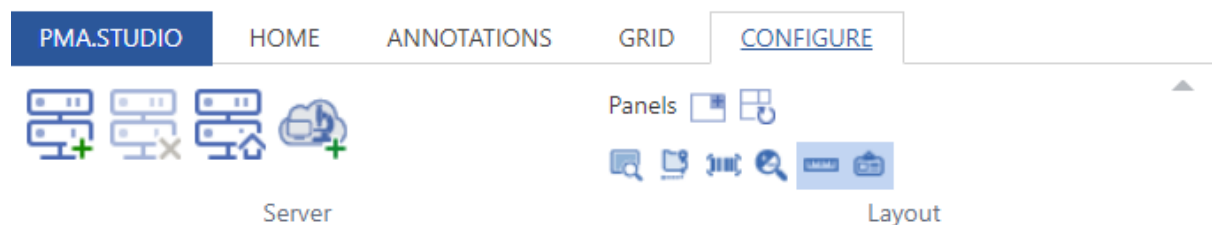
3. Share Slide link



4. Share ROI link



4.3.4 Configure tab



Configure tab has 2 sections:

- Server (available in PMA.Studio)
- Layout

Server section contains 4 buttons:

1. Quick Connect (hotkey Ctrl+Q)



2. Disconnect server (this option is not enabled for PMA.Start or PMA.Core servers with enabled auto-login)



3. Find and Connect PMA.Start



4. Connect to PMA.Hosting Cloud



Layout section contains 9 buttons:

1. Panels (the button opens dialog with panels selection) (available in PMA.Studio)
2. Create new Viewport panel with 1x1 grid



3. Reset panel layout (available in PMA.Studio)



4. Toggle overview



5. Toggle slide path



6. Toggle barcode



7. Toggle zoom controls



8. Toggle scalebar

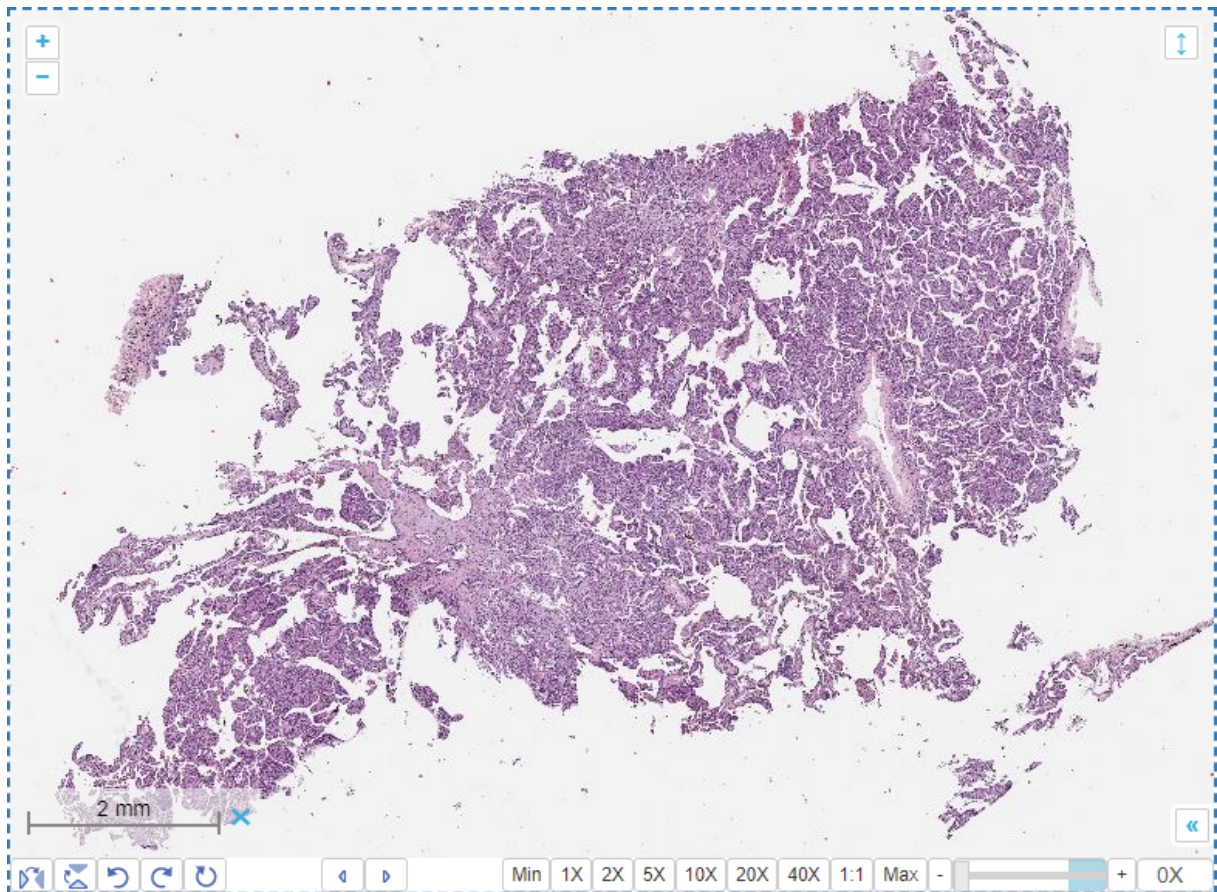


9. Toggle slide label



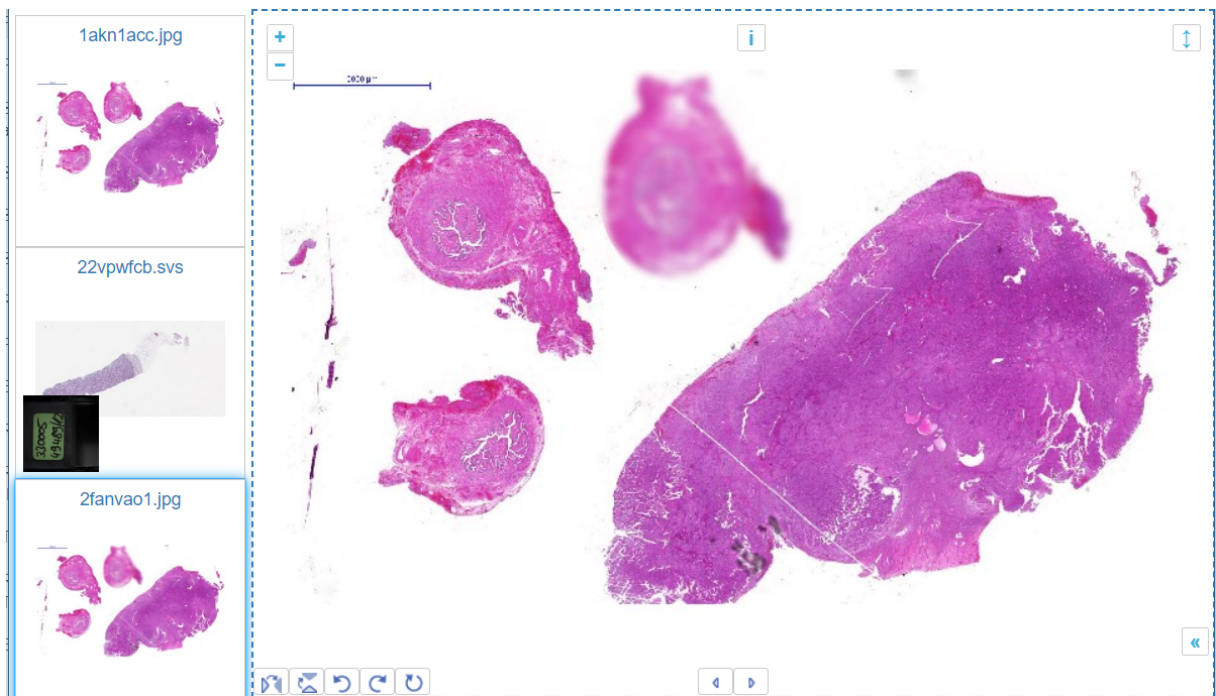
4.4 Embedded view

Embedded view looks like usual [viewer panel](#)^[10] without any other controls. It can be opened via link that can be manually created with [sharing button](#)^[19].



4.5 Embedded directory

Embedded directory is an extended version of embedded view, besides of viewer it contains slide selector, which afford you to choose slide over the shared directory.



5 Admin area

5.1 About

Admin area gives access to change settings of PMA.Studio and allows to manage tile servers.

5.2 Tile servers

Enter topic text here.

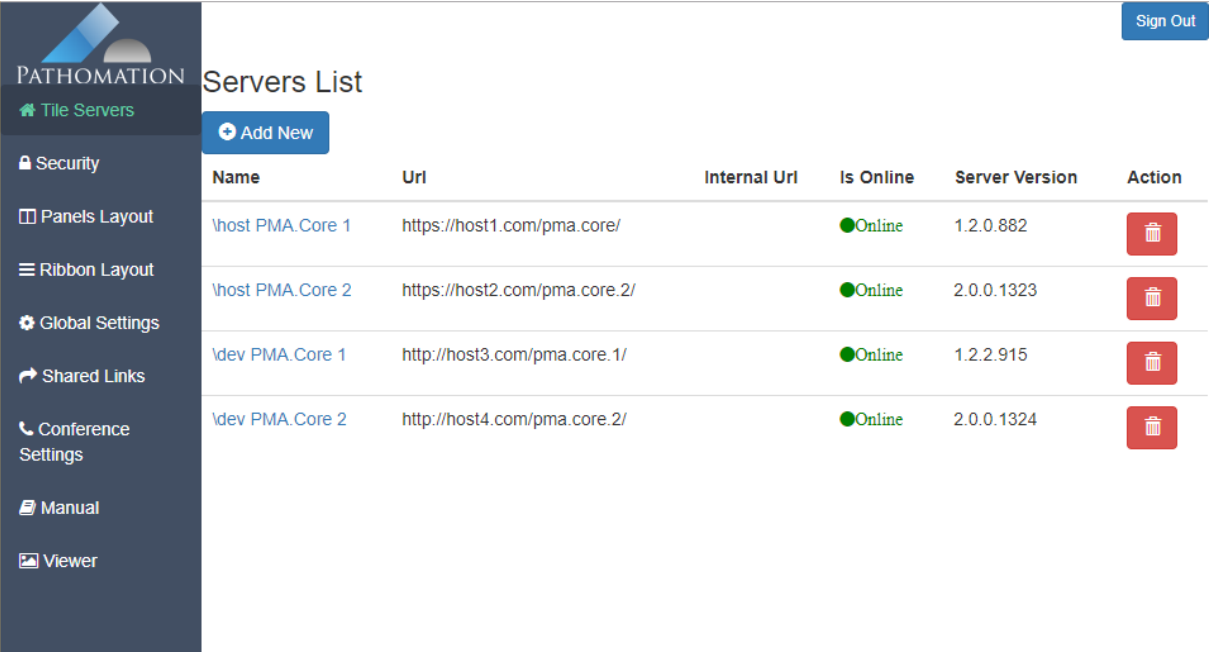
5.2.1 List





This list shows currently added tile servers.

There is "Add new" button at the top of the list, it links to [add new server page](#)^[31].

Table contains name, url (or internal url), status, version and removing button.

Server name is clickable and links to [server edit page](#)^[29].



Name	Url	Internal Url	Is Online	Server Version	Action
\host PMA.Core 1	https://host1.com/pma.core/		●Online	1.2.0.882	
\host PMA.Core 2	https://host2.com/pma.core.2/		●Online	2.0.0.1323	
\dev PMA.Core 1	http://host3.com/pma.core.1/		●Online	1.2.2.915	
\dev PMA.Core 2	http://host4.com/pma.core.2/		●Online	2.0.0.1324	

5.2.2 Edit

Server edit page allows to change settings of server.

Editing server with id 00000000-0000-0000-0000-000000000000

Name: \host PMA.Core 1

Uri: https://host.com/pma.core/

Internal Uri: Internal Uri, That Is Accessible From Local Network

Use Internal Uri: ☐

Username: admin

Password:

Enable Auto-Login: ☒

Selected For Admin Access Control: ☐

Check Connection

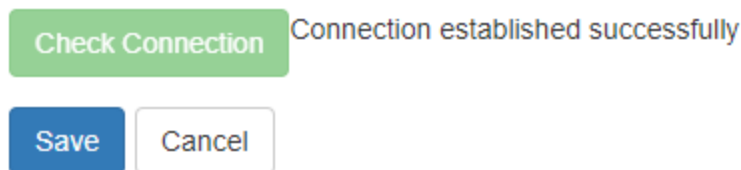
Save Cancel

© Pathomation 2013-2019, Version 2.0.0.736

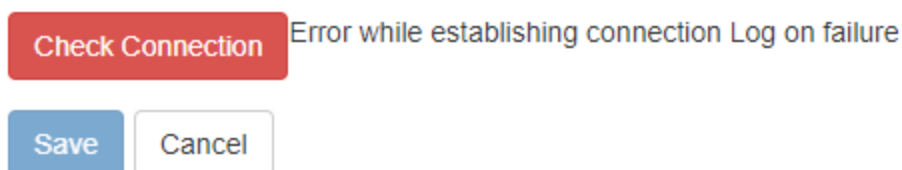
Fields available to change:

1. Server name
2. Server Uri
3. Internal Uri
4. Choose, what url should be used (internal or global)
5. Username
6. Password
7. Enable Auto-Login (users can connect to the server without authentication, if checked)
8. Selected for Admin Access Control (the server will be used for Admin Area authentication if checked)

After changing of URL or requisites it's required to check connection before saving. It can be done with "Check Connection" button. If connection checking is failed, error text will be written near button.



Successful checking

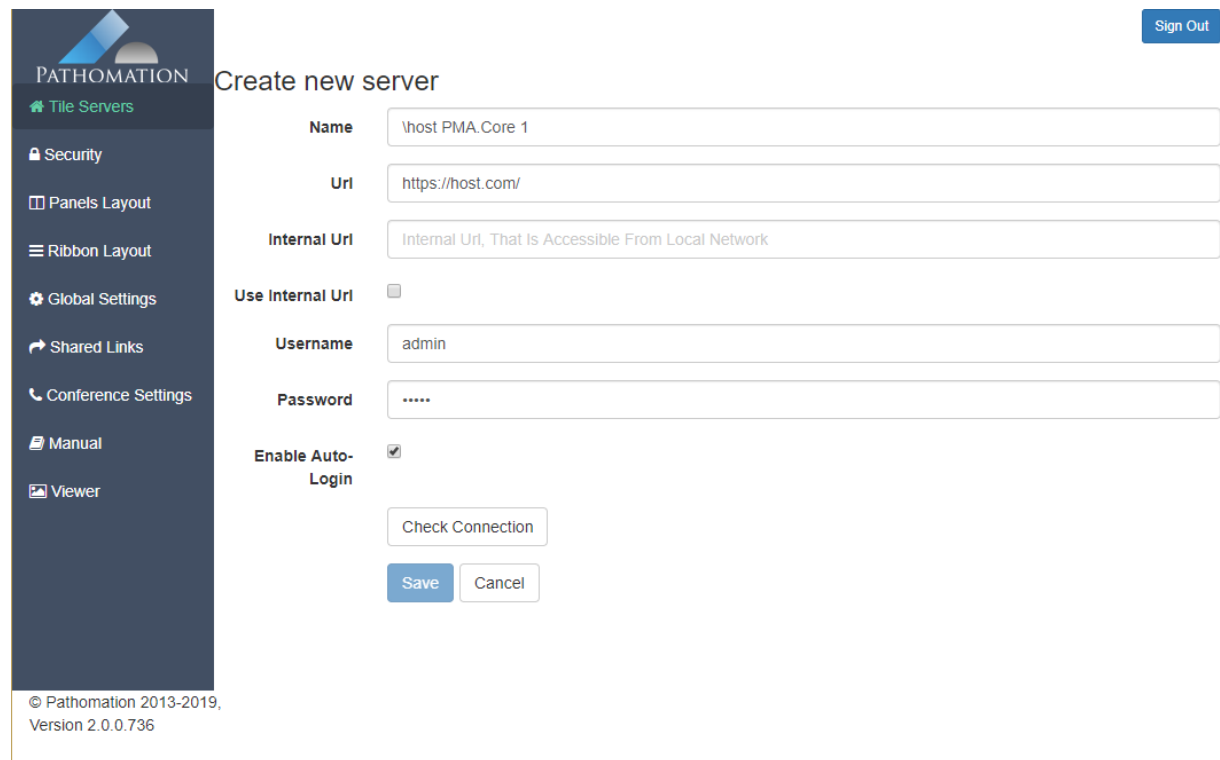


Failed checking

Server can be saved after successful checking.

5.2.3 Add new

Server edit page allows to change settings of server.

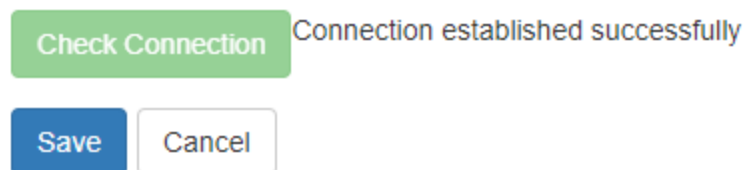


The screenshot shows the 'Create new server' form in the Pathomation admin interface. On the left is a dark sidebar with the Pathomation logo and a menu containing: Tile Servers (active), Security, Panels Layout, Ribbon Layout, Global Settings, Shared Links, Conference Settings, Manual, and Viewer. The main content area has a 'Sign Out' button in the top right. The form fields are: Name (filled with '\host PMA.Core 1'), Uri (filled with 'https://host.com/'), Internal Uri (filled with 'Internal Uri, That Is Accessible From Local Network'), Use Internal Uri (checkbox is unchecked), Username (filled with 'admin'), Password (filled with '.....'), and Enable Auto-Login (checkbox is checked). Below the fields are three buttons: 'Check Connection', 'Save', and 'Cancel'. At the bottom left of the sidebar, the copyright notice reads: '© Pathomation 2013-2019, Version 2.0.0.736'.

Fields available to change:

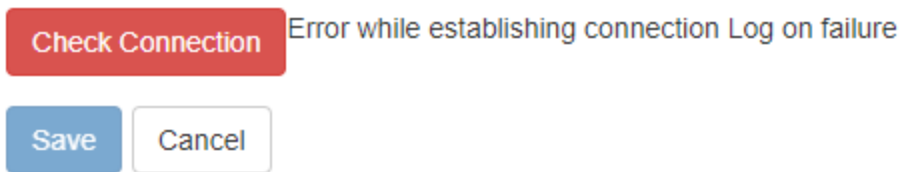
1. Server name
2. Server Uri
3. Internal Uri
4. Choose, what url should be used (internal or global)
5. Username
6. Password
7. Enable Auto-Login (users can connect to the server without authentication, if checked)

After entering of URL or requisites it's required to check connection before saving. It can be done with "Check Connection" button. If connection checking is failed, error text will be written near button.



This block shows a close-up of the 'Check Connection' button, which is green and has the text 'Check Connection' in white. To its right, the text 'Connection established successfully' is displayed in a blue, slightly faded font. Below these are the 'Save' and 'Cancel' buttons, which are blue and white respectively.

Successful checking

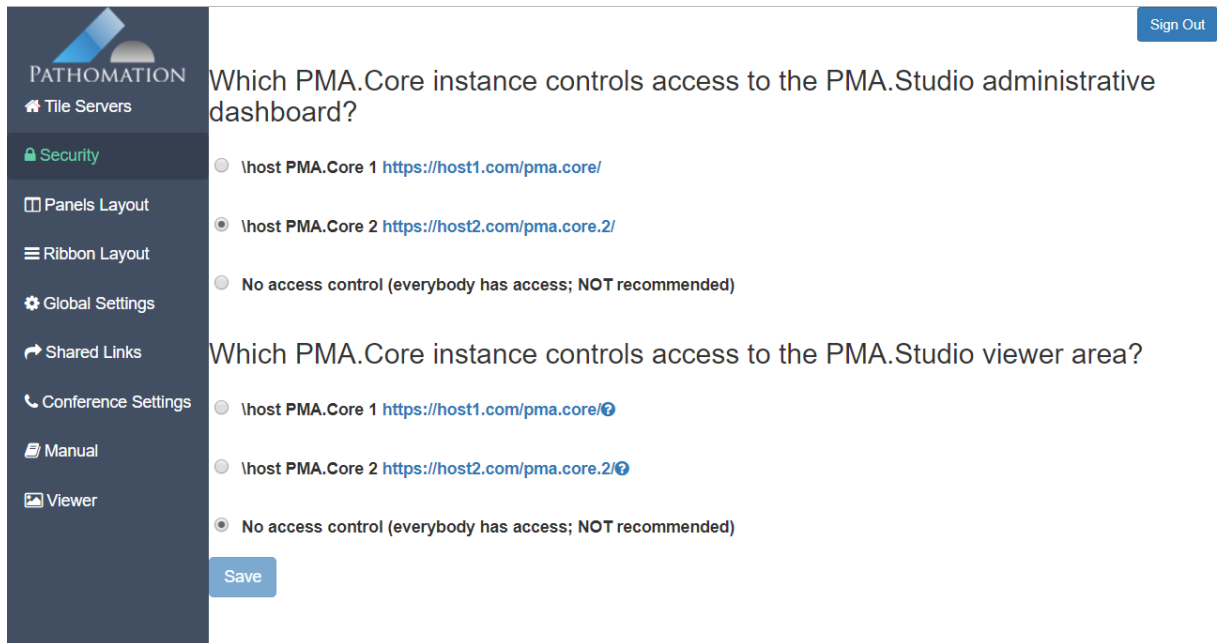


Failed checking

Server can be saved after successful checking.

5.3 Security

This page allows to select PMA.Core instance for accessing to administrative dashboard and viewer area. There is ability to fully disable access control (highly not recommended).



5.4 Panels layout

The page allows to change Panels layout in XML format. Button "Restore default layout" restores layout to default.


```
4 showPopoutIcon="false"
5 showMaximiseIcon="true"
6 showCloseIcon="true"
7 <Item type="row">
8   <Item type="column" width="15">
9     <Component name="ServerNavigation" label="Navigation"/>
10   </Item>
11   <Item type="column" width="85">
12     <Item type="row" height="70">
13       <Component name="Viewer"
14         label="Viewer"/>
15     </Item>
16     <Item type="row" height="20">
17       <Item type="stack">
18         <Component name="Tray" label="Tray"/>
19       </Item>
20     </Item>
21   </Item>
22   <Item type="column" width="10">
23     <Item type="column">
24       <Item type="stack">
25         <Component name="SlideInfo" label="Info" tooltip="Slide information"/>
26         <Component name="ColorAdjustment" label="Color" tooltip="Color adjustment controls"/>
27       </Item>
28       <Component name="Annotations"
29         label="Annotations" />
30     </Item>
31     <Item type="column">
32       <Component name="FormsData" label="Forms data"/>
33     </Item>
34   </Item>
35 </Item>
36 </Layout>
37
```

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Save Restore default layout

5.5 Ribbon layout

The page allows to change Ribbon layout in XML format. Button "Restore default layout" restores layout to default.

```
37 <Command name="sign-out"
38   label="Sign Out"
39   hint="Sign out"
40   icon="sign_out.png"/>
41 </FileTabMenu>
42 <Tab label="Home" hint="Default" name="tab-home" enabled="true" visible="true">
43   <Ribbon label="View" width="3%">
44     <Tool type="buttons" size="large">
45       <Command hint="Create new Viewport panel with 1x1 grid" name="add-tab" icon="add_tab.png"/>
46       <Command name="popout" icon="popout.png" hint="Pop out selected slide"/>
47     </Tool>
48   </Ribbon>
49   <Ribbon label="Grid" width="4%">
50     <Tool type="buttons" size="small">
51       <Command name="toggle-1x1-grid" hint="Resize existing grid to a 1x1 size" icon="view_1.png" />
52       <Command name="toggle-2x2-grid" hint="Resize existing grid to a 2x2 size" icon="view_4.png" />
53       <Command name="toggle-3x3-grid" hint="Resize existing grid to a 3x3 size" icon="view_9.png" />
54     </Tool>
55     <Tool type="break"></Tool>
56     <Tool type="toggle-buttons" size="small">
57       <Command name="sync-views-toggle"
58         hint="Toggle Synchronous navigation between cells in the current grid"
59         label="Sync"
60         icon="synchronize.png"/>
61       <Command name="open-in-tab"
62         icon="cell_to_tab.png"
63         hint="Open slide from current cell into a new viewport panel"/>
64     </Tool>
65   </Ribbon>
66   <Ribbon label="Directory" width="6%">
67     <Tool type="buttons" size="large">
68       <Command hint="(Ctrl+Shift+Up) Select previous directory"
69         name="prev-directory"/>
70     </Tool>
71   </Ribbon>
72 </Tab>
73 </FileTabMenu>
```

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Save Restore default layout

5.6 Global settings

This page contains global settings of the PMA.Studio.

Fields available to edit:

1. Language
2. Show files (enable showing files in [Tree mode](#)^[11])
3. Application icon
4. Email for help (email address that will be displayed as support email in PMA.Studio)

5.7 Shared links

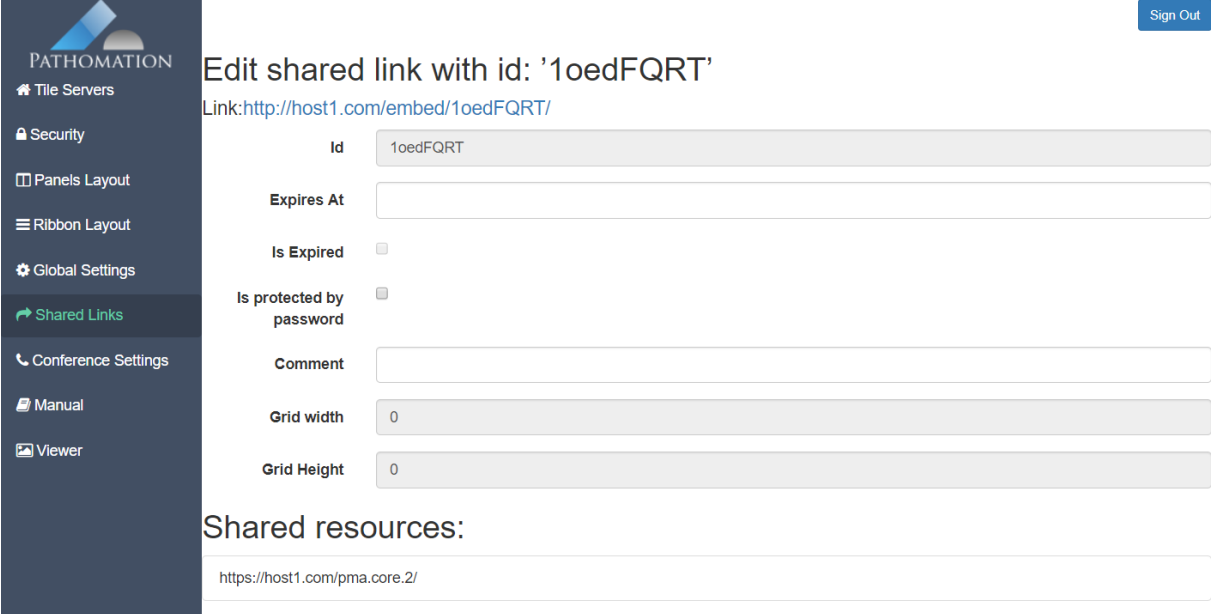
The page contains list of the shared links, where their id, comment type, password protection and expiration date displayed. Every id is clickable and refers to link edit page.

There are two actions available for every link: deleting and suspending.

Id	Comment	Type	Is protected by password	Expires At	Actions
1oedFQRT		Directory	Not Protected	Never	
cqkWuD3Y		Directory	Not Protected	Never	
nSYZDsNM		Directory	Not Protected	Never	
rH9ndH0N		Directory	Not Protected	Never	
sMktDOTX		Directory	Not Protected	Never	

5.7.1 Link edit

The page allows to edit shared link parameters. Shared resources are displayed at the bottom of page.



PATHOMATION

Tile Servers

Security

Panels Layout

Ribbon Layout

Global Settings

Shared Links

Conference Settings

Manual

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Sign Out

Edit shared link with id: '1oedFQRT'

Link: <http://host1.com/embed/1oedFQRT/>

Id: 1oedFQRT

Expires At:

Is Expired: ☐

Is protected by password: ☐

Comment:

Grid width: 0

Grid Height: 0

Shared resources:

<https://host1.com/pma.core.2/>

Fields available to edit:

1. Expire at (expiration date)
2. Is expired (flag displays fact of expiration)
3. Is protected by password (flag of password protection)
4. Password (the field is displaying only if password protection enabled)
5. Comment

5.8 Conference settings

The page allows to edit PMA.Live URL.

