# FSI SERVER

The complete Single Source Imaging Solution

User Manual
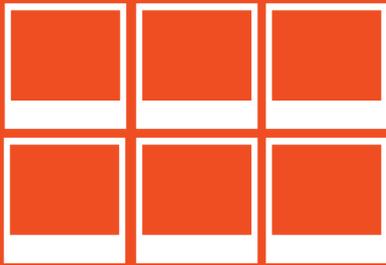
Version 2018

FSI Server

Version: 18.07.

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1 Introduction

FSI Server is a high performance Java Imaging Server, designed for outstanding scalability (multi core CPUs, multi server setups, load balancing) and excels in superior image quality compared to all imaging servers supported by FSI Viewer in the past.

While supporting Single Source Imaging (e.g. JPEG and PNG images for web sites), it also offers several JavaScript Viewers for zoom & pan, 360° object spins, slideshows and catalogs.

The HTML/AJAX based web interface makes uploading, managing and publishing images as easy as handling local files. It also offers quick access to more than 20 real-time image effects and all the FSI Viewer publishing options.

Key features:

- internal storage containing image copies optimized for fast delivery
- designed for outstanding scalability (multi core CPUs, multi server setups, load balancing)
- Superior image quality
- fast, high quality real-time image scaler
- HTML/AJAX based web interface to upload, manage and publish images
- Single Source Imaging (e.g. JPEG or PNG images for web sites)
- Publishing options for JavaScript and Flash (depending on chosen viewers)
- support for gigapixel source images
- support for transparent images (alpha channels)
- support for digital assets
- more than 20 combinable real time image effects
- support for read only source image pools
- source image pools will not be modified and performance is independent of the source image format
- Open Java API for integration into DAM, CMS or similar systems

Thank you for using NeptuneLabs software!

www.neptunelabs.com - Online Resources for FSI Server & FSI Viewer

Visit www.neptunelabs.com for software updates, regularly updated samples, tutorials and downloads.

2 Administrator Documentation

2.1 System Requirements

FSI Server – Minimum Hardware Requirements

- Quad Core CPU or better
- Minimum 4GB Java-VM RAM
- 512 MB RAM per CPU core

FSI Server – Software Requirements

- Oracle/Sun Java SE 8 or OpenJDK 8 (without FPX and CMYK support) – 64 Bit only
- Apache Tomcat 8.0 or 8.5 (Servlet Spec 3.0 and 3.1)

FSI Server has been successfully tested with the following operating systems:

- Linux (x86_64)
- Windows Server 2008, 2010, 2012 (with Apache Tomcat)
- Windows Server 2012 R2 & 2016 (only supported with Docker)

FSI Server webinterface requires one of the following browsers:

- Internet Explorer 9 or newer
- Firefox 3.5 or newer
- Safari 5.1 or newer
- Google Chrome 10 or newer
- Opera 11 or newer

> ⚠ **Please note:**
> Fulfilling the minimum hardware requirements is necessary for FSI Server to start. Production requirements may be higher depending on the amount of requests to be handled.

2.2 Installation

The current version of FSI Server is available as a Java WebArchive (war) for deployment in an existing application server or as a Docker container which conveniently includes everything you need to install FSI Server, incluiding the latest versions of TomCat and Java Runtime Environment.

2.2.1 Docker Container

We have wrapped FSI Server in a Docker container in order to make the installation as easy and secure as possible:
You only need to download and start the Docker application, run the FSI Server container und you are good to go.

How to get Docker

Linux

Get Docker for Linux

```
sudo apt install docker.io
```

Mac

Get Docker for Mac

The Mac Docker interface offers a convenient way to create your containers and launches a Web Preview in an instant. For more information, go to: https://docs.docker.com/docker-for-mac/

Windows

Get Docker for Windows

In case you are not familiar with Docker, the Docker website offers extensive information how to get started for each system: Getting started

Get the FSI Server image

You can get the latest FSI Server image with the following command:

```
docker pull neptunelabs/fsi-server
```

How to install FSI Server on docker

You will find a description for this within the repositoy, if you require a more in-depth explanation, please visit the guide on our website: How to use the Docker Image.

2.2.2 WAR File

FSI Server has been developed and tested on Apache Tomcat 8 as well as Oracle Java SE 8 or OpenJDK 8. FSI Server is installed by simply deploying the downloaded war-file.

2.2.3 Indexing Services

The internal storage will contains files and directories not relevant for any other application. It should not be scanned by any indexing services. Allowing such a service to scan the internal storage will lead to a noticeable load and therefore to a reduced server performance whenever the indexing service runs.

Windows

The storage folder should be excluded from indexing by right clicking the folder in the Windows explorer, choosing the advanced properties and clearing the checkbox from the indexing option.

Linux

Most Linux distributions come with support for the locate command as part of the find-utils. The updated process can be configured to exclude paths. Depending on the distribution the configuration is most likely to be found in /etc/updatedb.conf or /etc/sysconfig/locate.

Other common indexing services

There are some other commonly used indexing services, often referred to as desktop searches. These should also all be deactivated or be configured to exclude FSI Servers internal storage.

2.3 Benchmarking

After installing FSI Server you should verify that the hardware you are using is capable of handling the amount of traffic and requests you are expecting to see.

As these numbers are not always predictable and as the actual performance highly depends on your use case, FSI Server comes with a built-in benchmark, allowing you to compare your servers performance to a reference system.

The reference system is designed to satisfy the requirements of an average medium sized business. The benchmark consists of six different tests, measuring the performance of different hardware components. At the end of each test an index is calculated, allowing the comparison with the reference system.

The benchmark will summarize the results of these tests to two overall values, one being system performance (CPU and memory bandwidth) and the other being I/O performance (disk read and write operations). This allows to locate performance bottlenecks before integrating the server into the production environment.

2.3.1 Running the benchmark

After installing FSI Server as described in the previous chapter, you will find scripts to run the benchmark on Windows or Linux systems in *webapps/fsi/ PRIVATE/contrib/benchmark*. Alternatively the benchmark can be run directly by executing the main FSI Server Jar-file located in *webapps/fsi/WEB-INF/lib/ fsi-*.jar*. When executing the benchmark directly you can modify the benchmarks runtime behavior as well as the settings of the Java Virtual Machine. For example, this allows running only a subset of the tests or limiting the number of threads used in the benchmark. A more detailed description of the benchmark parameters can be found in the readme-file in the same directory as the benchmark scripts. As the benchmark tests also test the I/O performance, the benchmark working directory should be set to the filesystem that will host FSI Servers internal storage. This can be achieved by setting the "workdir" parameter.

As with all benchmarks, there should be no other processes running on the system that uses a significant amount of resources in order to obtain conclusive results. The output of the benchmark, by default in plain text format, will contain general system information, detailed results of all tests, as well as the main performance rating indices mentioned above.

2.3.2 Interpreting the results

As mentioned in the introductory section, the benchmark will result in a number of indices. The two main resulting indices "system performance" and "I/O performance" allow comparing your servers performance to the reference system. The test is calibrated so that the reference system achieves a result value of 1000 for each test and index. If your system achieves values higher than 1000, then it performs better than the reference system.

If the values are lower, the performance is not as good as the reference system. As stated above, this will give you an estimation if your system is fast enough to serve images for a medium sized website. If the results show that one of the performance indices is not satisfying, a detailed look into the systems hardware configuration might be necessary.

Here the detailed results of the single tests might turn out to be helpful in finding bottlenecks. In general, if you are unsure if your system can handle the expected load, then please contact your local reseller or NeptuneLabs directly before putting the system into production.

2.3.3 A note on virtualization

FSI Server is an image processing application and therefore usually has higher resource requirements than an ordinary webserver. The benchmark can help estimating the hardwares performance. On virtualized systems where the host system is not under your control this is a problem as there is no way of knowing what other processes are running or might be running on the hardware in parallel in the future. Running the benchmark in such an environment will not

produce results of any significance. Running FSI Server on shared hardware is therefore not recommended.

If virtualization is for administrative purposes only and you have full control over the host system and the resources assigned to the guest system, then the benchmark can be used as stated and the results can be interpreted accordingly.

2.4 Configuration

FSI Server consists of two core components: the source manager that imports assets into the internal storage and the request processor that delivers images and metadata to the web. The two components have separate configurations. FSI Server can be configured by manually editing the XML configuration files or through a web-based graphical interface using FSI Administrator.

2.4.1 Configuration Tasks and Preconsiderations

Basically FSI Server is delivered with a configuration suitable for most use cases. The default configuration was carefully chosen to minimize the necessary adaptions. To start using FSI Server, all that needs to be done is installing the licence key, creating a user account and defining a source connector, which includes the path to your images.

As mentioned above, FSI Server imports the provided assets into its internal storage. This import process converts and scales the source images which uses a considerable amount of the system resources and, depending on the amount and size of the source images, may take quite a long time. Due to the internal storage architecture the images in a source connector will be re-imported if the source

connector is renamed. Choosing the correct name right from the beginning is therefore advisable.

2.4.2 Users, Groups, Permission Sets and Source Connectors

FSI Server uses a highly configurable combination of permission sets and groups to control the access to the stored assets. All assets are stored within source connectors, which map a physical directory to a virtual folder used to address the asset. All users are assigned to groups which are assigned to source connectors using predefined permission sets. Permission sets can also be assigned to groups or users directly, overriding the permissions set in the connector-group-assignment. In addition to the permission sets which determine the access to data stored in connectors, there are property sets describing the interfaces behavior for specific connectors.

This chapter will take a close look at the concept behind the permission configuration in FSI Server 2016.

Source Connectors

A source connector defines a directory and a set of rules describing how FSI Server will handle the data stored in this directory, e.g. how it is imported into the internal storage. Data stored in the connectors directory can then be addressed using the connectors name. As of FSI Server 2018, there are three types of source connectors:

The most common type is **"storage"**. All assets stored in this connectors directory and subdirectory will be treated as images and will be imported into FSI Servers internal storage using the import settings specified in the connector configuration.

The source connector type **"multiresolution"** provides the ability to upload multiresolution tiff or fpx files and accessing these directly using the same URL-syntax as would be used for imported images. This feature is primarily aimed at customers with a large stock of multiresolution images. More on multiresolution compared to storage source connectors can be found in section Source Connectors.

Finally FSI Server 2018 also allows managing and serving arbitrary assets using **"static"** connectors. These can then be accessed via a simple URL. More on addressing static content can be found in part II in the section "Addressing Static Content".

The scheme below shows the usage and behavior of the different source connector types.

Source Connector Type	Source	Source Manager	Storage	Request Processor
Storage	Images	sync import	EIS format optimized images	scale encode
Multiresolution	Multiresolution Images	sync		decode color management scale encode
Static	All File Types	sync		direct delivery
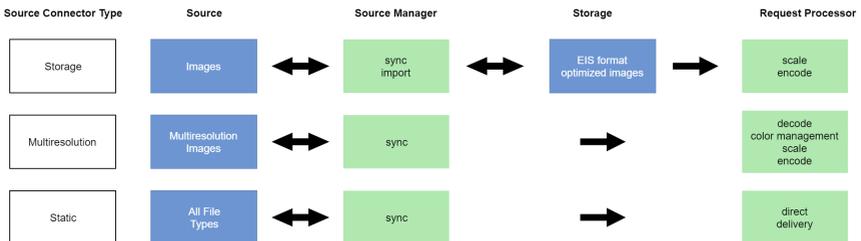
Users and Groups

In general, users are managed in groups and then the groups are used to define the access permissions. There are two special groups which can not be deleted or redefined: the group **"public"** is used to control the access for not authenticated, anonymous users whereas the group **"authenticated"** automatically contains all users known to the system. Every user is member of the group "authenticated" and can be a member of any number of additional custom groups.

Permission Sets

A permission allows or disallows executing a certain operation or request. Permissions are combined to permission sets which can then be assigned to source connector group relations or directly to groups or users or can be set as globally valid. FSI Server 2016 currently knows 29 different permissions grouped in 5 different categories and comes with 6 predefined permission sets. For more information, please see "Permissions".

In each permission set a permission can be granted, forbidden or left undefined. The final permission that will be applied will be set by hierarchically merging the defined permissions, defaulting to forbidden if not set anywhere. E.g. a user will be allowed to perform an operation relying on a permission that has been granted to this user by assigning him an appropriate permission set, even though he might be a member of a group which is not allowed to perform the operation.

Furthermore permissions granted to unauthenticated users via the public group can not be forbidden for authenticated users.

The diagrams 4.1 and 4.2 show the permission how the resulting permissions are determined.

Permissions for group "public"

Permissions granted for group "public" to access connector

Resulting permissions
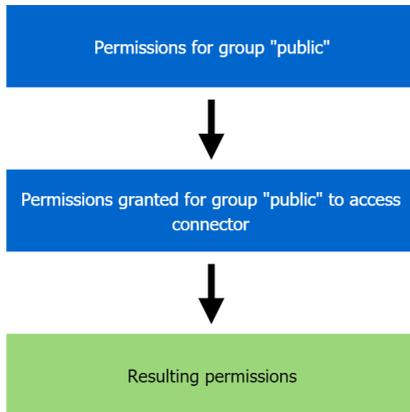
Diagram 4.1: Permissions for public access
(not authenticated requests)
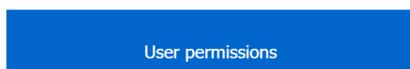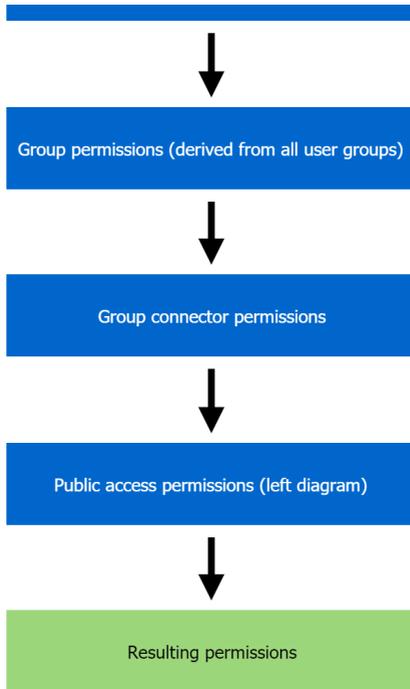
User permissions

Diagram 4.2: Permissions for authenticated requests

2.4.3 Property Sets

Similar to permission sets described in the previous section, the property sets are collections of properties. These properties are used to configure the webinterface or can be used by third party applications to store per user settings.

The property sets are also merged using the same hierarchy scheme as the permissions with the addition of being able to declare them as protected or for inheritance only. The properties are ordered in five groups:

- **Custom Metadata Fields**: configures available custom meta data fields
- **Hide Apps**: Allows hiding the publishing options for client side applications. Possible values are: FSIViewer, FSIViewer3D, FSIViewer360, FSIViewer3603D, FSIShowcase, FSIPages, FSIViewerJS, FSIViewerJS360, FSIShowcaseJS, FSIPagesJS, FSIThumbBar, Image, Image3D
- **Hide Publishing Tabs**: Allows hiding specific publishing tabs. Possible values are: cropflash, crophtml, fsi viewer, fsi pages, fsi showcase, hotspots, hyperlinks, plugins, preview, effects
- **Publishingsets**: references to one or more publishing sets (see "Publishing Sets")
- **Custom**: free for third party applications to use

Example:

```
<properties>

        <general>
                <item name="test">true</item>
        </general>

        <hideapps>
                <item name="FSIViewer" protected="false"
 inherit="false">true</item>
                <item name="FSIViewer3D"
protected="true" inherit="true">true</item>
        </hideapps>

        <hidepublishingtabs>
                <item name="crophtml" protected="false"
inherit="false">true</item>
        </hidepublishingtabs>

        <publishingsets>
                <item name="default">true</item>
        </publishingsets>

</properties>
```

> ⚠ **Please note:**
> If you are adding new users, it is crucial to assign a property set to either the corresponding user or group node.
> Otherwise, the user will not be able to publish images.
> If you do not need to configure specific values, you can use the default property set which can be found in *webapps/fsi/CONFIG/propertysets*

2.4.4 Publishing Sets

A publishing set defines which FSI Viewer instance and which proxy settings will be used to generate the code snips in FSI Servers publishing interface. The following parameters are recognized by the publishing interface:

Name	XML-Tagname	default	Description
Viewer Path	viewerpath	viewer	The path to the FSI Viewer instance
Proxy URL	proxyurl	-	The URL of the proxy (FSI Cache)
Proxy Server Pattern	proxyserver pattern	server	The FSI Cache profile to use for image, info and list requests
Proxy Static Pattern	proxystaticp attern	static	The FSI Cache profile to use for static requests

Name	XML-Tagname	default	Description
Proxy JS Path	proxyjspath	js	The FSI Cache request used for js-files (e.g fsiwriter.js)
Proxy User Viewer Base	proxyuserviewerbase	users	The FSI Cache profile used to access the users subdirectory
Proxy Viewer Path	proxyviewerpath	viewer	The FSI Cache profiles used to address the FSI Viewer

2.4.5 Protection and Inheritance

As described in the previous sections, properties are combined, resulting in final values for specific source connectors. A property value set at a higher level according to the diagram shown above can be overwritten with a value on a lower level. To prevent this behavior a value can be declared as "protected". It is then fixed and subsequent value assignments will be ignored. The publishing set property also allows marking it with the attribute "inherit".

In this case the publishing set is not offered to the user but will instead be merged with all subsequent publishing sets. This, for example, allows creating a publishing set with the proxy settings and assigning that at group level to the authenticated users group with the inherit attribute set. Further publishing sets at the connector-group-assignment level might then only specify the FSI Viewer instance to use. This would result in publishing sets containing the proxy settings and the viewer instance.

2.4.6 XML Configuration

As mentioned in the introduction to this chapter, FSI Server can be configured manually by editing the XML configuration files.

Location of the configuration files

This directory is referred to as [CONFIG DIRECTORY] in the following chapters.

The location of the FSI Server configuration files is:

```
[webapps]/fsi/CONFIG
```

FSI Server also supports using a custom configuration directory which allows easier updating when placed outside of the applications context. If the system property com.neptunelabs.fsiserver.config.home is set, its value is interpreted as an absolute path and will be used as the configuration directory. The system property can usually be set by using the -D option in the application servers startup parameters. e.g.

-Dcom.neptunelabs.fsiserver.config.home=/etc/fsi/fsi-server.

Source Connector Configuration

The source connectors are defined by files in the [CONFIG DIRECTORY]/ connectors directory of the FSI Server installation that end with the suffix .xml.

Enabled	
Description	defines if the source connector is enabled
Syntax	Boolean
Default	"true"

The enabled node allows enabling and disabling a source connector. A disabled source connector is ignored and treated as nonexistent. Files that were imported via this profile will therefore be deleted from the internal storage when a profile is deleted.

Type	
Description	defines the source connector type
Syntax	String
Default	"storage"

This setting defines the type of the source connector. The three supported types are:

- **"*storage*"**: Images found in the source directory will be imported into the internal storage. All other file types will be ignored and will not be accessible via FSI Server.
- **"*multiresolution*"**: Tiff and FPX files in the source directory are treated as multiresolution images, allowing image requests without the need of importing the images into the internal storage.
- **"*static*"**: Any file stored in the source directory is accessible via FSI Server. The files will not be imported and will all be treated equally regardless of their type. This means image-requests are not possible even though it might be an image file.

If the type-setting is omitted, the source connector will be of type "storage". For more information, especially on when to use multiresolution instead of storage, please see "When to use multiresolution source connectors".

Scanner	
Description	disables the import scanner
Syntax	Boolean
Default	false

This node can be used to disable the import scanner.

ImportEffects

The ImportEffects sections sets effects, which are used on the images while being imported.

Trim	
Description	defines a trim which is used while importing
Syntax	String
Default	-

This defines a trim which is used while importing.

Trim consists of two parameters, which are set like the following: Trim(2,BL). The first value defines the Threshold, which sets the derivation of the color or transparency which is picked up in percent. The value can consist of float values, and must be between >= 0 and <= 100. Default is 0. The second value is the Trim Pickup Position, it defines the position which is set as origin for the trim. You can decide between Top Left (TL, default), Top Right (TR), BL (Bottom Left) and BR (Bottom Right) - this will be the position that is used as reference

for the trim, i.e. if the pixel is fully transparent, all coherent pixels with transparency will be removed from the image, if the pixel is not fully transparent, the contained color value will be used as reference.

Origin

The origin section defines where to look for images and how to access the found images.

Accessor	
Description	defines the accessor of the connector
Syntax	String
Default	"Filesystem"

Defines how the source connector is accessed. The default accessor is "Filesystem".

Location	
Description	specifies the location of images
Syntax	String
Default	" "

The location option specifies where to look for images. A relative path is interpreted to be relative to the applications WEB-INF directory.

Conversion

The conversion section defines parameters applied when importing files. This section is only relevant for source connectors of the type "storage".

Format	
Description	defines the compression format of images
Syntax	String
Default	"JPEG"

Specifies the compression format of the image data in the internal storage. Valid compression formats are JPEG and LOSSLESS which uses a Deflate compression algorithm. This setting has a large impact on the hard disk space used by the internal storage.

Quality	
Description	JPEG compression quality
Syntax	Number
Default	

The JPEG compression quality used internally. Only applies if the format is set to JPEG.

LevelQuality	
Description	defines the pre scaled zoom level quality
Syntax	String
Default	"Normal"

Different pre scaled zoom levels are stored within FSI Servers internal storage. This parameters allows fine tuning these zoom levels. Possible values are:

- NORMAL: each level is half the size of the previous level.
- HIGH: each level is 2/3 the size of the previous level.
- ULTRA: each level 2/3 the size of the previous and every levels image data is always calculated from the originating image.

The normal setting uses less disk space than high or ultra and ultra will significantly increase image import time.

ChromaSubsampling	
Description	defines the chroma subsampling parameter
Syntax	String
Default	"4:4:4"

Defines the chroma subsampling parameter used to encode JPG images. Possible values are: "4:4:4", "4:2:2" and "4:2:0". This setting applies to JPG and SWF only.

Access

The access section defines which groups are allowed to access the connector using which permission set.

Example node

```
<Access>
  <group permissionset="public_images" name="public" />
  <group permissionset="read_write"
name="authenticated" />
  <group permissionset="set1" name="group1" />
</Access>
```

Comment

In the comment section you are able to type a special description of the connector or the content that is supposed to be stored in it. The comment will appear in the information box on the bottom of the tree view in the web interface.

Source Manager settings

The source manager settings define the general behavior of the source manager which synchronizes the original source images with the internal storage. The source manager settings are located in [CONFIG DIRECTORY]/ sourcemanager.xml. This file is split into six main sections:

Application

The application section defines general settings for the source manager. By setting the enabled attribute to false the source manager can be disabled completely.

Storage	
Description	location of internal storage
Syntax	String
Default	

Specifies the location of the internal storage. The given directory should exist and should be writable by the user running the application server. If a relative path is given it will be interpreted as being relative to the web applications PRIVATE folder. This setting should be identical to the storage setting in the request processor settings (see "Request processor settings")

MaxCPU	
Description	number of threads for CPU tasks
Syntax	String
Default	auto

The maximum number of threads running in parallel to use for CPU heavy internal tasks like scaling and encoding. "Auto" will determine the number of CPU threads available on the system.

MaxIO	
Description	number of threads for IO tasks
Syntax	String
Default	auto

The maximum number of threads running in parallel to use for I/O heavy tasks like reading image tiles from the disk.

MaxThreadsPerJob	
Description	number of threads for single job
Syntax	String
Default	auto

Defines the maximum number of threads that will be used for a single job.

ConversionThreads	
Description	number of threads used for image conversion.
Syntax	String
Default	auto

Defines the maximum number of threads that will be used for the image conversion.

ForceCPUThreads, ForcecIOThreads, ForceCPUtThreadsPerJob	
Description	
Syntax	Number
Default	" "

MaxScaleMemratio	
Description	
Syntax	Float
Default	0.75

Prefetch	
Description	
Syntax	Boolean
Default	true

PrefetchMaxSize	
Description	
Syntax	

PrefetchMaxSize	
Default	

LogToStorage	
Description	defines if logs are written into strorage
Syntax	Boolean
Default	false

Defines if the logs are written into the storage folder instead of the tomcat log folder.

Standalone	
Description	controls FSI Administrator connection to FSI Server
Syntax	Boolean
Default	false

Allows or disallows an FSI Administrator instance to connect to this FSI Server. Note that setting standalone to "false" and not connecting an FSI Administrator may be a security risk. Please refer to the FSI Administrator manual for a detailed description.

TempDirectory	
Description	specifies directory used to store temporary files
Syntax	String
Default	"webapps/fsi/private/internal/temp"

Specifies the directory used to store temporary files. This will default to "webapps/fsi/private/internal/temp" if nothing is specified.

UserDP	
Description	specifies usage of user and group configurations
Syntax	String
Default	"xmlfile"

Defines whether to use user and groups configurations from local XML files or from a (remote) LDAP Server. Possible values are "xmlfile" (default) and "ldap".

LDAP Settings

If the above configuration parameter "userdb" is set to LDAP, then the access to the LDAP server needs to be specified.

LPADURI	
Description	specifies location of LDAP server
Syntax	String
Default	"ldap://localhost:389/"

LDAPUser, LDAPPassword	
Description	specify how to log in to the LDAP server
Syntax	String
Default	" ", " "

LDAPBaseDN	
Description	specifies which base DN is used
Syntax	String
Default	" "

Details on the required directory structure beneath the given base DN can be found in "LDAP Directory Structure".

UseKrb	
Description	defines if a Kerberos server is used
Syntax	Boolean
Default	false

Defines whether to use an external Kerberos server for authentication instead of using the password hashes from local files or LDAP servers. When using Kerberos, the operating systems Kerberos client configuration needs to define

the correct realm and KDC Location. Please see "Systemwide Kerberos configuration" for details on configuring your system as a Kerberos client.

KrbDebug	
Description	enables or disables Kerberos debug
Syntax	Boolean
Default	false

Enables or disables the debug of the external Kerberos server.

Jmx	
Description	enables or disables JMX support
Syntax	Boolean
Default	false

Enables or disables JMX support, which can be used for server monitoring with JMX MBeans. Read more about the definition of JMX MBeans.

Import	
Description	disables or enables the image import
Syntax	Boolean
Default	true

HasHT	
Description	defines if hyperthreading is used
Syntax	Boolean
Default	true

Defines if hyperthreading is used. If the processor does not support hyperthreading, set this parameter to "false" in order to ensure optimal performance.

Scanner

The scanner section controls the behavior of the scanning process, which monitors the input directories defined in the source connectors. Setting the scanner sections enabled attribute to false will disable the scanning process. New images placed in the file system will not be found and must therefore be uploaded using the webinterface or the OpenAPI.

Sorting	
Description	enables sorting of a directory before processing
Syntax	Boolean
Default	true

This specifies if the contents of a directory should be sorted before it is processed. Enabling sorting will help that new images in a folder will be imported

in the correct order. Sorting the directory contents on every scan might have an impact on the servers performance, especially with large directories.

ConvertBefore1stScan	
Description	enables immediate import of images
Syntax	Boolean
Default	false

If set to true the FSI Server will start importing images immediately. If not, newly found images will be enqueued but not imported before the first full scan after a restart of the server has been completed.

FileScanDelay	
Description	
Syntax	Number
Default	1

UseMagicBytes	
Description	
Syntax	Boolean
Default	false

Search

The search section defines where to find the external Solr server. These should match the settings of the request processor component as described in the corresponding section.

SolServerURI	
Description	defines the location of the Solr server
Syntax	String
Default	"http://localhost/solr"

Defines the URI specifying where to find the Solr server. The default is "http://localhost/solr".

Core	
Description	defines the Solr core used
Syntax	String
Default	"fsi-server"

Specifies the Solr core to use. Defaults to "fsi-server".

Authentication	
Description	defines if Solr requires authentication
Syntax	Boolean
Default	fales

Specifies whether the Solr server requires authentication. The default is "false".

AuthenticationType	
Description	defines the authentication type
Syntax	String
Default	"basic"

Defines the authentication type. Only applies if authentication is enabled. The default type is "basic".

AuthenticationUsername, AuthenticationPassword	
Description	define the login credentials
Syntax	String
Default	" "," "

Define the authentication login credentials. Only apply if authentication is enabled. User name and password have no defaults and must be specified.

Proxy	
Description	specifies proxy use
Syntax	Boolean
Default	false

Specifies whether or not to use a proxy to connect to the Solr server. The default is "false".

ProxyHostname	
Description	defines the proxy hostname
Syntax	String
Default	" "

Defines the proxy hostname. Only applies if proxy is enabled.

ProxyPort	
Description	defines the proxy port
Syntax	Number
Default	80

Defines which proxy port is used. The default is 80. Only applies if proxy is enabled.

ProxySSL	
Description	defines if SSL is activated
Syntax	Boolean
Default	false

Defines if the SSL protocol is used for proxy connection. Only applies if proxy is enabled.

ProxyAuthentication	
Description	defines if authentication is used
Syntax	Boolean
Default	fales

Defines if proxy authentication is enabled. Only applies if proxy is enabled.

ProxyUsername, ProxyPassword	
Description	defines log in credentials
Syntax	String
Default	" "," "

Define the proxy log in credentials. Only apply if proxy authentication is used. Username and password have no details and need to be specified.

ConnectionPoolMax	
Description	max. number of connections to Solr
Syntax	Number
Default	500

Defines the maximum number of connections to the Solr server. The default is "500".

ColorManagementSystem

The colormanagement section defines the settings for the colormanagement used when importing images. Disabling this section will disable the colormanagement systems and no color profiles will be used when importing images.

DefaultCMYKProfile, DefaultRGBProfile, DefaultGrayProfile	
Description	defines the default color profiles
Syntax	String
Default	"auto"

These settings define the default profiles to be used when importing images that do not contain color profiles. "Auto" will evaluate to an internal profile. Other valid values would be complete paths to valid color profile files.

FallBackICCConversion	
Description	
Syntax	Boolean
Default	true

Cache

The cache section defines the cache settings.

MaxMemory	
Description	max. amount of memory to be used
Syntax	String
Default	"auto"

The maximum amount of memory to be used by for the memory cache. The value is assumed to be given in bytes unless followed by one of the common abbreviations (KB, MB, GB etc).

DirectMemory	
Description	defines if direct memory or heap space is used
Syntax	Boolean

DirectMemory	
Default	false

Specified whether to use direct memory or heap space to store the cache. The default is "false".

L1, L2	
Description	
Syntax	Boolean
Default	true, true

L1Size	
Description	
Syntax	Number
Default	1000

PackASync	
Description	
Syntax	Boolean

PackASync	
Default	true

WriteCacheDir	
Description	
Syntax	String
Default	" "

MaxThreads	
Description	max number if threads used simultaneously
Syntax	String
Default	"auto"

Specifies how many threads usually access the cache simultaneously. This helps optimizing the caches internal organization and therefore can improve performance. Set to "auto" if uncertain.

Formats

The formats section contains a list for <format> nodes containing file types that should be imported. Other files will be ignored.

Protected files

The protected files section contains a list of <file> nodes containing names of files that should be skipped while scanning.

Request processor settings

The request processor settings are defined in [CONFIG DIRECTORY/ requestprocessor.xml]. This file has five main sections called application, search, limits, color management system and cache. These sections define general settings for the request processor component and allow disabling the component completely.

Application

The parameters in the application section contain basic configuration options of the server component. The server component can be completely deactivated by setting the enabled attribute of the application tag to false.

Storage	
Description	specifies location of internal storage
Syntax	String
Default	" "

The storage option specifies where the internal storage can be found. If located on the same machine, it should be identical to the storage setting in the source manager settings. If a relative path is specified, it will be relative to the web applications PRIVATE directory.

ServerTokens	
Description	defines the response headers
Syntax	String
Default	"full"

Defines the response headers sent by FSI Server. Possible values are "full", "prod", "debug", "none".

SourceManager	
Description	defines location of source manager
Syntax	String
Default	" "

This setting tells the real-time component where to find the source manager. This is used to request the source manager to prioritize a specific image that is currently in the import queue.

CopyrightNotice	
Description	defines a customized copyright notice
Syntax	String
Default	" "

This allows defining a customized string that will be embedded into the headers of the images delivered by the server. This allows identifying the images generated by FSI Server.

StorageHasher	
Description	
Syntax	String
Default	"crc32"

crc32, hash32

RequestProcessorTokens	
Description	
Syntax	String
Default	"prod"

CacheTemplates	
Description	
Syntax	Boolean
Default	true

Not_Found_Fallback	
Description	
Syntax	String
Default	" "

Processing_Fallback	
Description	
Syntax	String
Default	" "

MaxCPU	
Description	number of threads for CPU tasks
Syntax	String
Default	auto

The maximum number of threads running in parallel to use for CPU heavy internal tasks like scaling and encoding. "Auto" will determine the number of CPU threads available on the system.

MaxIO	
Description	number of threads for IO tasks

MaxIO	
Syntax	String
Default	auto

The maximum number of threads running in parallel to use for I/O heavy tasks like reading image tiles from the disk.

MaxThreadsPerJob	
Description	number of threads for single job
Syntax	String
Default	auto

Defines the maximum number of threads that will be used for a single job.

ForceCPUThreads, ForcecIOThreads, ForceCPUtThreadsPerJob	
Description	
Syntax	Number
Default	" "

TempDirectory	
Description	specifies directory used to store temporary files
Syntax	String
Default	"webapps/fsi/private/internal/temp"

Specifies the directory used to store temporary files. This will default to "webapps/fsi/private/internal/temp" if nothing is specified.

Search

The search section describes how to access the database containing the search data gathered by the source manager. The settings in this section should match the settings in the search section of the source manager configuration.

Limits

The limits section allows defining global default and max values that will be applied to incoming requests.

MaxWidth, MaxHeight	
Description	max. values for width and height
Syntax	Number
Default	

Define the maximum allowed values for width and height. These values can be overridden for specific server profiles by defining other values in the server profile configuration.

DefaultWidth, DefaultHeight	
Description	define default image dimensions
Syntax	Number
Default	

Define the default image dimensions that will be applied if there are no dimensions provided in the request parameters. These values can also be overridden on a per profile basis.

DefaultRenderer	
Description	defines the default renderer
Syntax	String
Default	"default"

Defines the profile to be used if no profile parameter is given in the request.

SortCollator	
Description	
Syntax	String
Default	"auto"

Cache

The cache section defines the cache settings. By default the request processor will use the same cache configured for the source manager component.

ColorManagementSystem

The colormanagement section defines the settings for the colormanagement used when importing images. Disabling this section will disable the colormanagement systems and no color profiles will be used when importing images. By default the request processor will use the same settings used configured for the source manager component.

Permissions

Permissions can be defined in the [CONFIG DIRECTORY]/permissionsets/ directory. where you will also find the six predefined permission sets. The permissions are divided into five groups: General, Read, List, Write and Tasks. If a precise definition is not required, it is possible to set each group to a default true or false. For an example, please see the end of this section. Each permission can be granted, forbidden or left undefined.

In order to see which permissions are required for the execution of certain tasks and viewers, please see the Appendix "Permissions required for Tasks and Viewers".

General

The general permissions are set on global, user or group level and apply to the session and not to the content of the connectors.

Permission	Description
switchuser	enables switching to another user within the session
changepassword	allows the user to change his password
writepreferences	
readlicence	allows the user to read information on the installed licence (activates the licence tab in the web interface)
writelicence	allows to upload a new licence, replacing the installed one

Read

The read permissions can be defined on any level (global, user, group and connector-assignment) and apply to content within a connector).

Permission	Description
renderedimages	allows single source image requests, applies to storage and multiresolution connectors only

Permission	Description
files	allows get requests to retrieve the assets (/fsi/static/ path/to/file). Applies to static connectors only.
downloadsource	allows downloading the original file with an appropriate content disposition header set
copy	allows using the asset as a source for a copy command
storagestatus	allows access to the files import status
basicmetadata	allows access to the file meta data (lm-date, size etc.)
extendedmetadata	allows access to the image (IPTC, EXIF) and custom meta data
iccprofiles	allows downloading the images color profile
totalassetcount	allows access to the number of assets in a connector

List

The list permissions can be defined on any level and apply to the content within a connector.

Permission	Description
files	allows listing the files in a directory
directories	allows listing sub-directories
searchresults	allows including assets from this connector in search results the search results

Permission	Description
connector	allows including a connector in the root list

Write

The write permissions can also be defined on any level and they apply to the content of a connector.

Permission	Description
delete	allows deleting assets
movetotrash	allows moving data from this connector to the trash
rename	allows renaming assets
movewithin-connector	move an asset to a different directory within the same connector
createdirectory	allows creating directories in this connector
upload	allows uploading assets
paste	allows using this connector as a target for copy and cut commands
extendedmetadata	allows changing the extended meta data
overwrite	allows overwriting assets

Tasks

The tasks permissions can be defined anywhere and they apply generally as well as on a per connector base.

Permission	Description
reimportFiles	trigger a re-import of images within a connector
batchRendering	render images within a batch job
createArchive	start or schedule a batch job that will create an archive file

Example PermissionSet.xml

```xml
<permissionset>

        <general default="true" />
        <read default="true" />
        <list default="true" />

        <write>
                <delete>false</delete>
                <movetotrash>false</movetotrash>
                <rename>false</rename>
                <movewithinconnector>true
                </movewithinconnector>
                <createdirectory>true</createdirectory>
                <upload>false</upload>
                <paste>false</paste>
                <extendedmetadata>true</
extendedmetadata>
                <overwrite>true</overwrite>
        </write>

        <tasks default="false" />
        <name>default</name>
</permissionset>
```

Permissions for different connector types

The table below shows how the permissions for specific connector types need to be defined.

Connector Type	Permissions defined by
Normal Source Connectors	Global-, User-, Group- and Group-Connector Assignment
Configs-Connector	Hardcoded set applies to assigned Viewers
Downloads-Connector	Configured in downloads.xml in the connectors-directory
Trash	Partially hardcoded and partially dependent on connector the file originated from

Groups and Users configured locally

If FSI Server is configured to used local user and group declarations, the groups are defined in [CONFIG DIRECTORY]/groups.xml and the users are defined in [CONFIG DIRECTORY]/users.xml.

Groups

Each group is represented by a node called <group>. The group name is specified by an attribute called "name". For every user belonging to a group, the group node needs a child node called <user> with the users login name as text value.

Example node

```
<group name="group1" permissionset="set1"
propertyset="userProperties">
        <user>user1</user>
</group>
```

Users

In the users configuration file, every user is represented by a <user>-node. The user name (login) is defined in the attribute "name". The password can be provided as plain text in an attribute called "plain" or as a SHA-256 hash in an attribute called "hash". If the FSI Server is configured to use a Kerberos Server for authentication, then the password declarations here will be ignored.

Example node

```
<user name="user1" plain="user" permissionset="set1"
propertyset="userProperties" />
```

Groups and Users configured using LDAP

The user and group declarations can be moved to an LDAP server instead of storing them in local files. Together with the Kerberos authentication this allows a tighter integration into existing system environments and provides the

possibility of using external third party tools for user management. The basic access to the LDAP Server needs to be configured in the Source Manager settings (see "Source Manager settings" for details).

The required structure of the data within the LDAP Server is described in "LDAP Directory Structure". As with a locally configured user, the actual authentication can be handled by the FSI Server, if the password hash is stored within the LDAP tree or by specified Kerberos Server.

Renderers

Renderers allow defining default values or restrictions that apply to every incoming request. Every request is processed using the rules in a renderer. If no renderer name is given in the HTTP parameters, the default renderer will be used. A renderer defines how to render an image or a metadata response, which default values the image renderer will use and which file format is returned. The renderer name is given by the filename. Each renderer definition may include up to six sections:

Image Renderer

Defines the renderer to use when an image request is directed at this profile and which default values and limits apply when rendering the image. The renderer to use is selected by specifying an "implementation" node which contains the class name of the renderer. If the "implementation" node is omitted then the default renderer will be used.

Depending on the chosen renderer implementation further nodes may define parameters for the renderer.

InfoRenderer

Currently only the default info renderer is delivered with FSI Server, therefore this node can be omitted.

List Renderer

Currently only the default list renderer is delivered with FSI Server, therefore this node can be omitted.

OutputEffects

This optional section provides the ability to define output effects that will be applied to every image accessed via this profile. Effects are defined by a list of <effects> tags containing effect commands using the same syntax as in image URLs. See "Real-time Image Effects".

OutputCompression

Defines the output format and options for responses to image requests.

Compressor

Specifies the output file format, one of JPG, PNG, GIF and SWF.

Quality

Defines the default jpeg compression quality. Please note that requests containing the quality parameter can override this setting. The setting applies to JPG and SWF only.

Chroma Subsampling

Defines the chroma subsampling parameter used to encode JPG images. Possible values are: "4:4:4", "4:2:2" and "4:2:0". This setting applies to JPG and SWF only.

Compression Level

Defines the compression level used when encoding an image as PNG. Possible values range from 0 to 9.

Compression Filter

Defines the pre-compression filtering method used when encoding an image as PNG. Possible values are "none" and "sub". This setting only applies to PNG output.

Colorspace

Defines the color space of a PNG output image. Values: "rgb" or "gray".

Embed ICC

Defines whether to embed the used ICC profile into the output image. This setting applies to PNG and JPG output only.

Encoding

Defines whether to send the output image to the client as base 64 encoded data or not. Possible values are "image" and "base64".

2.4.7 Licensing

An unlicensed copy of FSI Server is nearly fully functional but all images delivered will contain watermarks. To purchase a licence please contact your local reseller or NeptuneLabs directly. A trial licence can be requested in the Licence-Tab when logged in to the webinterface as administrator. When you have acquired a licence, then this can be installed by either copying it into a file called licence.xml and placing this into the [CONFIG-DIRECTORY] of your FSI Server installation or by simply using the "Check for new licence" button in the webinterface.

Depending on the licence obtained, limitations apply regarding the number of assets hosted on the server as well as the number of groups and source connectors. A licence can also contain an expiration date. If any of these limitations are exceeded, all images delivered by the server will again contain watermarks. In this case please contact your reseller or NeptuneLabs to upgrade or extend your licence.

Furthermore, the JMX support and the batch rendering capability are enabled or disabled depending on the licence.

Every licence key is bound to the hardware it was created for. Changing essential parts of the server hardware will invalidate the licence key. In that case please request a new key from NeptuneLabs or via the licence tab in the FSI Server web interface.

2.4.8 Logging

FSI Server uses the Java **log4J** Logging framework. The configuration file for the used loggers is called log4j.xml and can be found in the [CONFIG DIRECTORY]/ directory of the applications installation directory. The server uses three loggers that can be configured independently. The first logs the activity of the source manager, the second logs the request processor and the third logs activity of the webinterface. By default all three loggers will write to rotating files in the application servers log directory. For more information on log4j and how to change the logging configuration please see the log4j website at http:// logging.apache.org/log4j/.

2.4.9 Templates

Responses to metadata requests for directories and files are rendered using templates. The response type and the content of the response can be modified by overriding the default templates or providing own custom templates. The templates delivered with FSI Server are located in *webapps/fsi/private/internal/ templates*. These should not be modified or overridden as they are required by the Webinterface and NeptuneLabs client applications like FSI Viewer. Own custom templates can be placed in [CONFIG DIRECTORY]/templates/ in the subdirectories list or info. A template must end with the suffix.ftl and is addressed by the tpl parameter in the metadata requests (see part II, "Image and

Metadata Addressing"). The templates are rendered using the freemarker template engine, documented at http://www.freemarker.org/docs/.

3 User Documentation

3.1 Getting Started

FSI Server includes a web interface allowing easy access to most of the servers features. Due to the intuitive interface, browsing and managing images is simplified. The interface provides the full functionality needed to assist in publishing images, showcases and catalogs and also allows configuring the real-time image effects. To get started, simply open up the interface by pointing your browser to: http://your.fsi-server.com/fsi

FSI Server is set up to provide real-time web access to images placed within a directory structure. It is also possible to store and manage digital assets on the FSI Server. Unlike any other imaging server, the server component merely requires read access to the directory. This guarantees the integrity of the original image files. This source directory is monitored and any new images are imported into FSI Servers internal storage retaining the directory structure. This internal storage consists of copies of the original files, optimized for fast access and real-time delivery to the web. This technique ensures high scalability and allows FSI Server to be used for high performance, heavy traffic websites.

Once configured the FSI Server does not require any further administration, the internal storage is set up automatically and will always be synchronized with the source directory. Modifications to the source directory via local file access, FTP upload or the web interface are immediately mapped to the internal storage.

3.2 Interface Overview

This section gives a brief overview of the web interface and its components. The interface consists of 3 main sections: tree view, file view and working area. The size of these sections can be changed by dragging the splitter bars between the sections. The interface is designed to provide a quick and intuitive access to the managed images and uses the modern AJAX technology.

A list of compatible browsers can be found in part 1 - "System Requirements".

Tree View

Folders | Search

images.mydomain.com
★ Favorite Folders
♻ Recycle Bin
✕ FSI Configs
↓ Documentation
↧ My Downloads
📁 Service Images
📁 Service Files
📁 Images
Multi-Res
Static

◀

Source Connector Information

Images
▦ Total Content:
1,157 Files
ℹ More Information...

Source Connector **Type: Storage**
Images in this folder will be imported to the storage for high performance single source imaging.

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Working Area

View | Metadata | Color | **Publish to Web** | Batch | Download | Upload | Licence | Help

Publishing Set:
default ▼

Single Source Image

Publish image in different dimensions, formats and apply effects.

Optionally activate FSI TouchZoom for touch enabled devices, FSI QuickZoom for desktop devices or create srcSets for responsive images.

Publishing option:
· Publish as JPEG, PNG or (animated) GIF

HTML5 Viewers

FSI Viewer Ⓗ JS
Javascript based Zoom & Pan.
Requires a single image.

Choose a preset:

FSI Viewer 360° Ⓗ JS
Javascript based 360° spin viewer.
Requires a folder containing a series of images.

Choose a preset:

File View

▲ ▼ ↑ ✕ /Images/

Geo 3 | Bananas.jpg | Berlin@Ngh. | Brandenbur... | Canal Bridg... | FAM@Night... | Flotsam.jpg | flow.jpg | Gondolier.jpg

Harvest.jpg | Little Bee.jpg | Long-tail bo... | Musikverein... | Notebook.jpg | Reichstag.jpg | Relax.jpg | Rockway.jpg | Roses.jpg

▲ Name ▼ ⊞ ▤

Status Bar

Selected Items: 1 | Files: 77 | Directories: 28 | Last Changes: Friday, August 11, 2017 1:44:08 PM | Range: 1 - 7

Username: admin

3.2.1 Logging In

When accessing the interface URL at http://your.fsi-server.com/fsi a login screen and a language option will be displayed. Users need to authenticate themselves by using a combination of username and password. The default username and password combination is username: admin / password: admin, but it is strongly recommended to change the password prior to using FSI Server. Therefore the user 'admin' will be prompted to change the password on log-in. For details on managing users please see "Configuration" in part 1 - administrator documentation.

3.2.2 Tree View

The tree view contains tabs for browsing the folder structure and for searching. On the bottom of the tree view the type of the selected folder is visible (Root Directory, Source Connector Types: Storage, Static or Multi Resolution) as well as the total amount of files contained in the selected source connector.

The following source connector types are possible within the root directory:

- **Static:** for static files only, i.e. digital assets such as videos, zips, pdf and all other document formats
- **Storage:** images will be imported to the storage for high performance Single Source Imaging
- **Multi Resolution:** connector contains multi resolution TIFF or FPX files only

New source connectors can be set up via the FSI Administrator interface or via modifying the corresponding *.xml files, as well as changing the administrative privileges (read only, write, etc) and user profiles. It is also possible to specify different **public access permissions** for each connector, which are visible in the bottom left corner of the tree view.

NeptuneLabs - FSI Viewer

The access permissions for a source connector can be viewed by clicking on the "More information"-link in the Source Connector information area.

Depending on the public access permissions, different publishing options might be disabled in the publishing tab.

It is also possible for the administrator to define custom comments (e.g. what kind of files are recommended to put into a certain folder) for each source connector, which will show up at the bottom of the tree view.

Folder Tab

The "Folder Tree" shows the directory structure of the data stored on the imaging server.

At the top, the root directory name (server FQDN) is visible. The root directory contains all available Source Connectors on this specific FSI Server that the logged in user has access to. Branches can be expanded or collapsed by clicking on the + or − buttons in front of the folder name. Selecting a connector will show the folders contents in the file view. Three special folders contain shortcuts to favorite folders, the recycle bin and the download files.

The root directory also contains the following predefined connectors:

- **FSI Configs:** Provides access to the configuration files used by the viewers in the publishing tab. The connector is treated like a static connector so configuration files can be uploaded via the webinterface.
- **Documentation:** Contains the manuals for the FSI Server release.
- **Service Images:** Contains images required for FSI Software, like the instructions on FSI Pages mobile and fallback pictures.

In addition there will be two sample connectors configured during the initial installation, one containing sample images and one containing sample static assets.
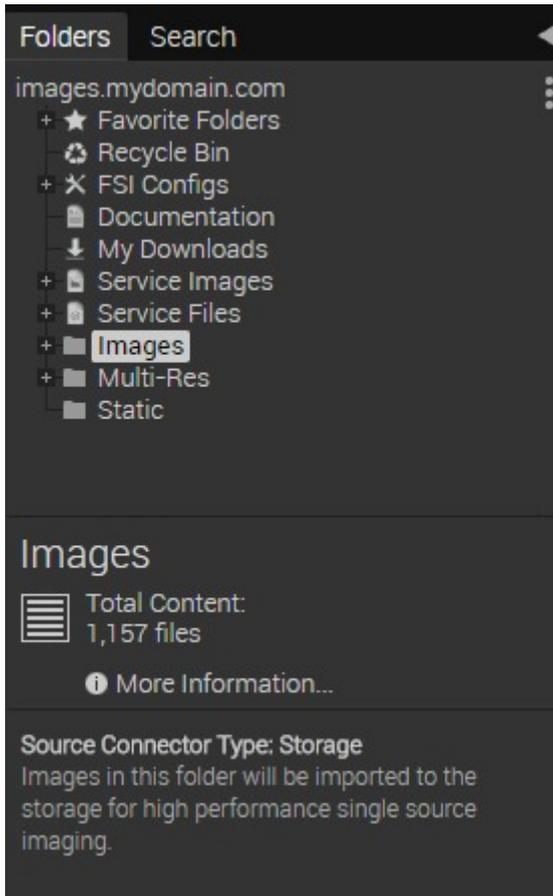
Search Bar

FSI Servers search tab provides an easy way to find specific assets. The search function not only allows a full text search in the asset metadata, but also allows image specific search such as looking for images with a certain width or height. If

the Search Tab is not displayed in the webinterface then the search is disabled in the request processor settings. At the top of the search bar, a simple text input can be found. With typing keywords into the text input it is possible to search for items that have matching keywords in any data field. Alternatively search criteria using the search conditions below the input can be set up:

- Use the check box located directly under the input to limit the search to the current selected directory
- Use the check box to include or exclude a search condition
- Choose the desired data field of the condition
- Choose whether a condition should be equal or unequal. Some fields additionally offer the option to comparatively search items (less than, greater than).
- Enter the value for the search condition

To add another condition click the "Add Condition" button at the bottom right. To remove conditions, click the "x" button at the top right of each condition. Note that with using multiple conditions it is possible to define each condition as "mandatory" or "alternatively". "alternatively" means that the condition extends the range of possibly matched items. "mandatory" usually reduces the range of possibly matched items.

Example:

Condition 1	Condition 2
mandatory	*alternatively*
field: "File Suffix"	field: "File Size"
"equal"	"less than"
value: "jpg"	value: "550kb"

These conditions will return all files with a ".jpg" file suffix and additionally all files less than 550 kb in size. Switching Condition 2 to "mandatory" would return all files with a ".jpg" file suffix that are additionally less than 550 kb in size.

Comparative search

In addition to the full text search a comparative search is supported for a set of numerical meta data fields and fields containing dates. The comparative search always begins with a field name (see table below for a full list of supported field names). The value can be pre ended with a smaller than (<) or larger than (>) prefix. If the prefix is missing, an exact match is required.

This for example allows searching for images with a minimum height (file.height:>3000) or images older than a specific date (iptc.date_created:<1.1.2009). "Search field reference" contains the full list of supported fields.

> ⚠️ **Note on date searches:**
> The given date can be provided in any standard format, independent of any country and/or regional settings. The date value may not include any spaces between the figures, as these would be treated as token separators.

Search modifiers

All entered keywords or phrases are optional by default. This means if two keywords are provided the result set will contain images having at least one the keywords in their metadata.

To perform searches with mandatory keywords precede the phrase with a plus (+). To exclude images from the results which match a certain condition precede the phrase with a minus (−).

3.2.3 Status Bar

The "Status Bar" displays additional information related to the current folder including the last modified date, the number of images or directories. It also displays the currently logged in user in the bottom right corner.

3.2.4 File View

The "File View" shows the contents of the currently selected folder or the search results. Hovering above an item in the canvas will show a tool tip containing a brief summary of the item. Double clicking a folder item will change the current directory to that folder and double clicking an image item will open the image in the "View" tab, which is described in "Working Area". Items can be selected in order to perform operations with them. A single item is selected using a left click. Multiple items are selected by dragging open a box around them or by holding SHIFT and clicking another item. Items can be added to a selection by holding the CTRL key while clicking. As in the tree view, right clicking will open a context menu containing the available operations.
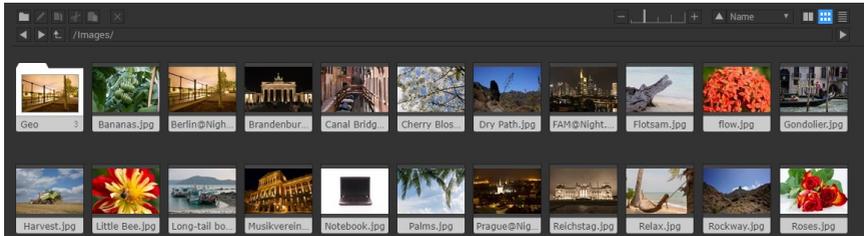
With the tool bar at the top several actions for managing files and directories are selectable via icons: Create Folder, Rename, Copy, Cut, Paste, Delete.

The sorting drop down menu allows sorting items by certain criteria. With the arrow button aside, the order of the chosen sorting feature can be changed. On the right of the sorting menu the appearance of folders and items within the file view can be changed. In order to change the sizing of thumbnails, either click on the smaller/larger thumbnail button to change the view or slide the thumbnail controller in the desired direction. The buttons group on the right switches between Page View, Thumbnail View and List View.

Similar to a browsers location bar, the tool bar shows the currently viewed position and allows entering a different location (folder) to view. Manually typing a new location is supported by an auto complete function. Additional buttons to go back and forward to the previous/next folder as well as a button to jump to the parent folder make navigating easier.

3.2.5 Working Area

The "Working Area" mainly contains operations that can be performed with the selected items or items contained in the current directory as well as information relevant to the items. Operations are enabled or disabled depending on the selection.

View
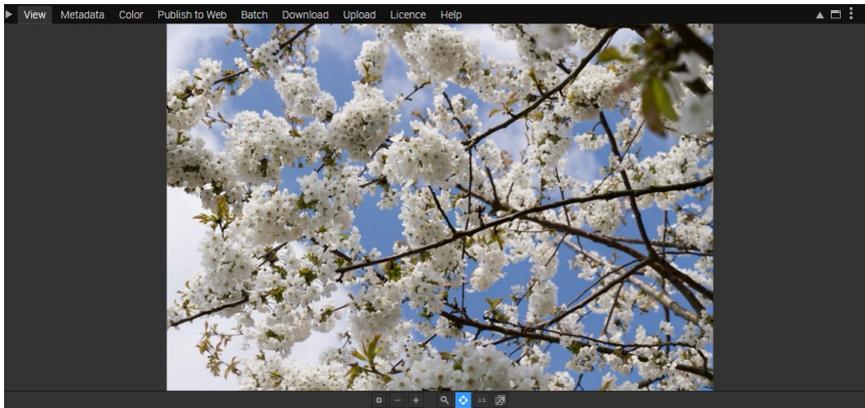
The first tab View shows the selected image in an FSI Viewer instance in which you can use all standard features including a full screen option.

Meta data
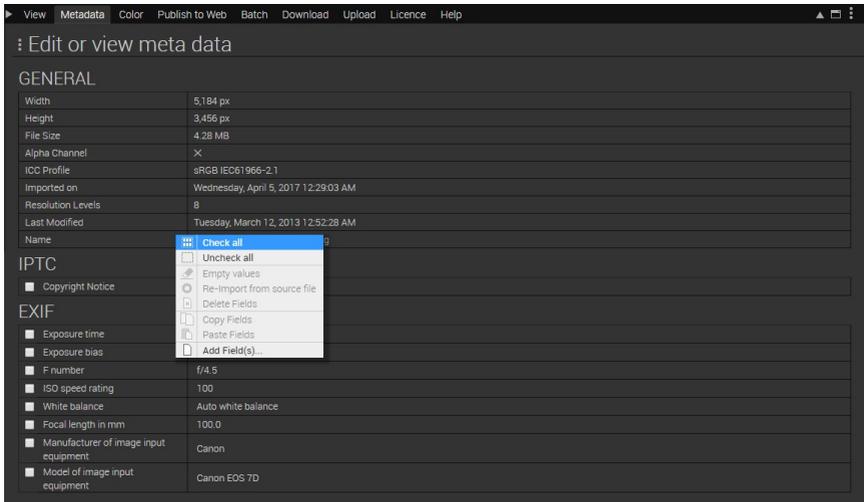
The second tab "Meta data" provides access to all meta data available for the selected image. The meta data information is divided into General, IPTC, EXIF, and Custom data.

All meta data fields - except for those in the "General" group - can be edited, deleted or added. In order to change existing data, click on the corresponding field value and type in the desired value. By clicking the "Add data fields" button you can add IPTC, EXIF or custom data fields.

With all editable meta data (which are characterized by the check boxes in front of the data name), the options in the drop down menu located below the meta data can be applied. It is possible to choose whether to check or uncheck all editable meta data, to empty the values which are currently displayed in the data fields, to re-import meta data from the source file or to delete all selected fields.

In order to do so, simply choose the desired action from the drop down menu and press the OK button. The changes will be saved automatically.

Color

The tab "Color" provides information on the dye distribution, color histograms, and the ICC Profile if applicable.

Dye Distribution: Both pie chart and histogram show the hue of each color in the image in percentage.
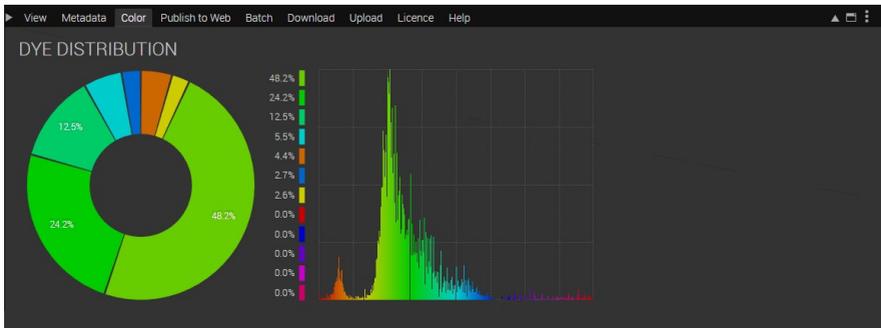
Histograms: Here the RGB, Red, Green, Blue and Saturation histograms are provided.
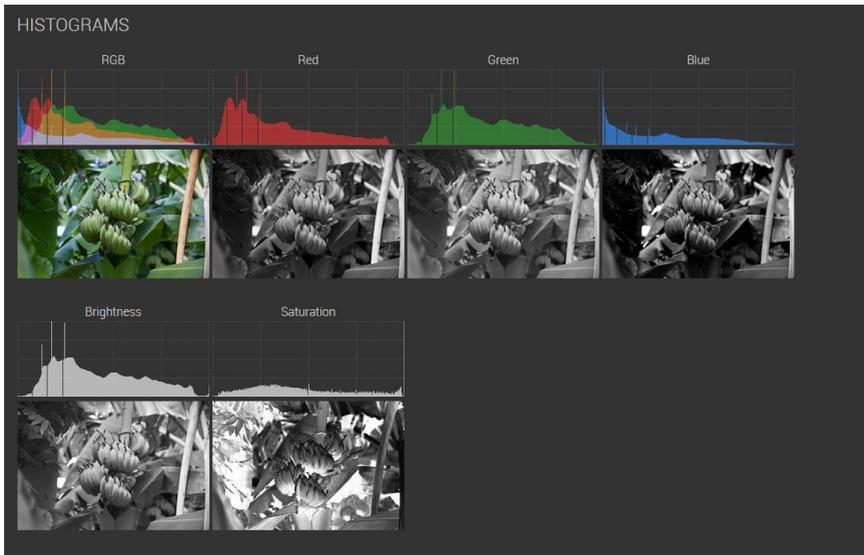
ICC Profile: The ICC profile is a color reference profile, which describes the characteristics of the device it correspondents to. They are used to enable the best possible color rendering and to provide color consistency independent of the device used. In this tab the media points (the color space which is used for the picture) as well as the profile data such as Description, CMM (color management module), manufacturer, creator and the creation date are visible. It is also the possible to download the profile in order to use it in further workflow.

ICC PROFILE

Media Points

Profile Data

Description	sRGB IEC61966-2.1		
CMM	Lino		
Manufacturer	IEC		
Creator	HP		
Type	Display		
Version	2.16		
Intent	Perceptual		
Components	3		
Date	Monday, March 9, 1998 7:49:00 AM		
White Point	0.950455	1	1.08905
Red Colorant	0.436066	0.222488	0.013916
Green Colorant	0.385147	0.716873	0.097076
Blue Colorant	0.143066	0.060608	0.714096
Profile Size	3.07 KB		

Download

Publish To Web

General

Keep aspect ratio	☐	?
Width x Height	413 x 443 px ▼	?
Nav Width x Height	___ x ___	?
Debug mode	Yes ☐ No ☑	?
Use Device Pixel Ratio	Yes ☑ No ☐	?
Prevent Image Transparency	Yes ☐ No ☑	?
Skin filename	... ___	?
Language	... ___	?
Loading animaton	... ___	?
Quality	___	?

Display Options

Background hexcolor	# ___ ▶	?
Max Zoom	___	?
Desktop Click Zoom scale	___	?
Mouse Sensitivity	___	?
Min Instance Size	___	?
No Navigation	Yes ☐ No ☑	?
Auto Hide Navigation	Yes ☑ No ☐	?
Hide Interface	false ▼	?
Adaptive Interface Size	Yes ☑ No ☐	?
New Image on Resize	Yes ☐ No ☑	?
Disable Pointer Actions	Yes ☑ No ☐	?
Show Preview	Yes ☐ No ☑	?
Show Progressbar	Yes ☐ No ☑	?
Pan Limits	▼	?
Inplace Zoom	▼	?
Document Zoom	▼	?

Load/Save Configuration

___

Load | Save | Save as

HTML Code:

```
<!DOCTYPE HTML>
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=Edge,chrome=1">
<title>FSI Viewer JS</title>
<script type="text/javascript" src="//images.mydomain.com/fsi/viewer/applications/viewer/js/fsiviewer.js">
</script>
</head>
<body>
<fsi-viewer width="413px" height="443px" src="demo/Collection/bag4.jpg" >
<noscript>
```

Dir / Image:

```
demo/Collection/bag4.jpg
```

Publish   Preview   Effects   Plug-Ins   Crop

The "Publish To Web" tab is used to publish the image or directories as Single Source Image, FSI TouchZoom, FSI QuickZoom, FSI Viewer, FSI Pages, FSI

ThumbBar or FSI Showcase. For a further explanation of this tab, please see the corresponding chapters.

Upload

For a further explanation of this tab, please see "Uploading".

Download

For a further explanation of this tab, please see "Downloading".

Batch

For a further explanation of this tab, please see "Batch".

Licence

For a further explanation of this tab, please see "Licence".

Help

This tab provides an overview on how to use the web interface to manage and publish images.

3.2.6 Logging Out

Clicking the log out button closes the current session and takes the user back to the log-in screen. By clicking the arrow right beside the Log Out button, it is possible to either change the current password or to switch the user if currently logged in with administrator privileges, this enables administrators to view the interface from a users perspective.

3.3 Managing Images

The FSI Server interface does not only assist in publishing data stored on the server, it is also an easy and comfortable way to manage images in terms of uploading, deleting, moving or renaming. An extensive search function also helps to organize large amounts of images.

3.3.1 Uploading

Depending on the type of the selected source connector, it is possible to upload different types of files. There are several possibilities to upload images into the interface:
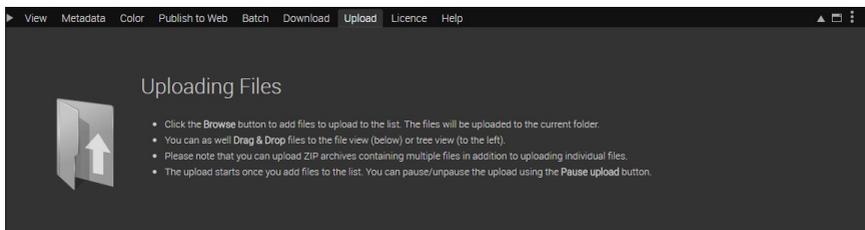
- Choose the Upload tab, click the "Choose files" button to add files to upload to the list. The files will be uploaded to the current folder.
- Drag & Drop files from your explorer to the file view or the tree view. Please note that dropping folders into the upload area is only possible in Chrome. In

case you are using another browser type, is necessary to zip the folder beforehand.

The upload starts immediately once files are added. It is possible to pause or continue the upload by using the pause upload button and to remove all files in the upload list.

3.3.2 Downloading

There are several possibilities to download images from the interface:
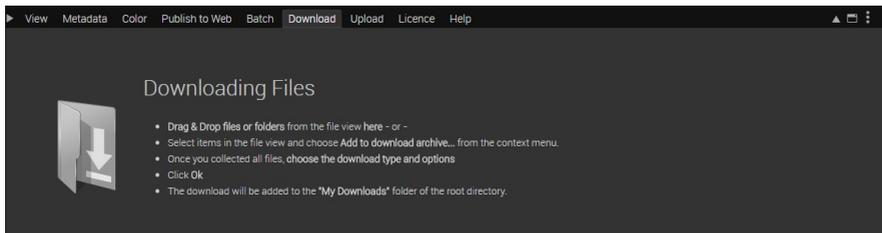
- Drag & Drop files or folders from the file view onto the "Download" tab or
- Select items in the file view and choose "Add to download archive" from the context menu.

Once all files are collected, it is possible to choose the Download Configuration using the "Download as:" drop down menu.

You can optionally schedule the download start to a specific time and choose a file name. Clicking the "OK" button starts the creation process and adds the download to My Downloads folder of the root directory.

3.3.3 Moving and Renaming

Folders and images can be renamed by selecting the item in the file view and choosing "Rename" from the tool bar or the context menu.

Moving objects from one folder to another is accomplished by selecting the item, choosing "Cut", changing to the new folder and selecting "Paste". Please note that moving or renaming a folder containing lots of files or sub folders, requires a restructure of the internal storage and therefore might take a while.

It is also possible to move the folders via drag&drop to the desired destination.

3.3.4 Batch

There are several possibilities to download batch processed images from the interface:

- Drag & Drop files or folders from the file view onto the "Download" tab or
- Select items in the file view and choose "Add to download archive" from the context menu.
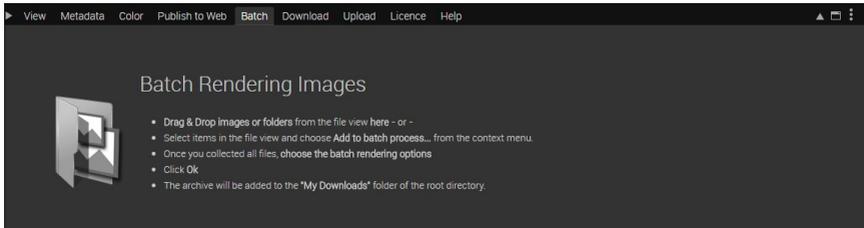
Once all files are collected, it is possible to choose the Download Configuration using the "Download as:" drop down menu.

The Download Configuration determines how the files will be archived and whether a batch rendering for the images to download should be executed.

Click the "Options" button to modify or add a Download Configuration. Within the Download Configuration, the Configuration name and type of archive (ZIP, tar.gz, tar.bz2) can be chosen. When deciding to download processed images, it is possible to choose if the file extensions should be replaced or appended.

Download Options ✕

Configuration Name
JPEG 800x600, 95% (ZIP)   Delete | Save

Type of Archive: ZIP ▾

File Extensions: replace (e.g. sample.tif -> sample.jpg) ▾

Rendering Query Parameters*:

```
type=image&width=800&height=600&profile=jpeg&quality=95
```

*You can generate these parameters interactively in the **Publish → HTML Image** section. You can add various effects, crop the image and see a preview.*

Ok | Cancel

It is also possible to set the **Rendering Query Parameters** in the configuration box, which can be generated interactively in the Publish to Web Tab choosing the Single Source Image section, where various effects can be added as well as cropping the image and seeing the preview of the processed image. (see: "Single Source Image"). After finishing the choosing of the operations which should apply to the images, the Rendering Query from the "Publish" tab can be copied.

The creation of the download can be optionally scheduled to a specific time and the file name of the archive can be defined. Clicking the "OK" button starts the creation process and adds the download to My Downloads folder of the root directory.

3.3.5 Deleting

Folders and images can be deleted by selecting the appropriate item in the file view and clicking the delete icon in the file view bar or by opening the context menu of the item and then clicking delete. The deleted items can be found in the Recycle Bin folder in the tree view, where it can be decided if you would like to delete the file permanently or if it should be restored.

3.4 Publishing Single Images

The publishing dialogs of FSI Servers interface provide assistance in generating image URLs or HTML code snippets, which can then be integrated into web pages.

A single image can be presented as a fixed size image in the end users browser or as an interactive zoomable image using FSI Viewer as well as using FSI TouchZoom for touch devices. The publishing dialogs can be accessed by selecting a single image in the file view and choosing the "Image", " FSI Viewer" or "FSI Viewer Flash" option from the "Publish To Web" tab.

3.4.1 Single Source Image

The "Image" option helps assembling a URL, which can be used directly in an HTML img tag. The publishing dialog consists of four tabs allowing the selection of an image range, setting the resulting size and output effects and showing a preview of the resulting image. The "Publish Tab" allows setting the resulting image size, the image format and in case of jpeg, the quality. It also contains a text field showing the HTML img tag, which can be integrated into web page. With this Publishing Option, it is also possible to publish zoomable images for mobile devices via FSI TouchZoom. In order to activate the zoom, check "Enable FSI TouchZoom" within the Single Source Image Publish tab.

You can also activate FSI QuickZoom within the Single Source Image tab. In ordern to activate the hover zoom, check "Enable FSI TouchZoom" within the General tab.

Publish Tab
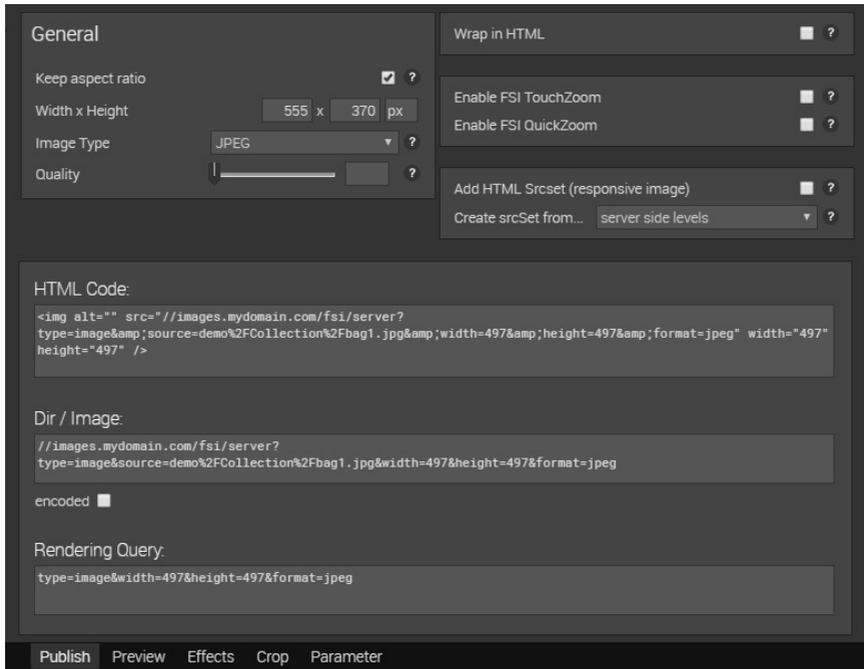
The "Publish" tab provides access to the basic image options like image size and image type.

It is possible to publish the image as JPEG; PNG or GIF. In order to create an animated GIF, please select the folder containing the series of images.

Furthermore, it is possible to activate the FSI TouchZoom for touch devices with the corresponding check box. It also contains a text field containing the HTML code snip assembled from all the settings made in the various tabs.

Preview Tab
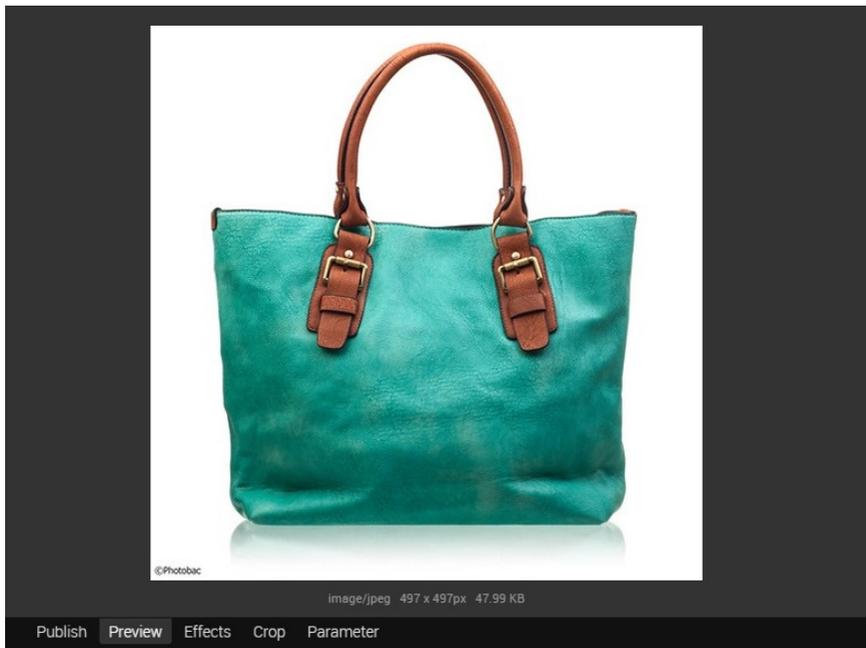
The "Preview" tab shows a preview of the published image, with all effects and parameters applied. The preview size may be limited to the current size of the working area window.

Effects Tab
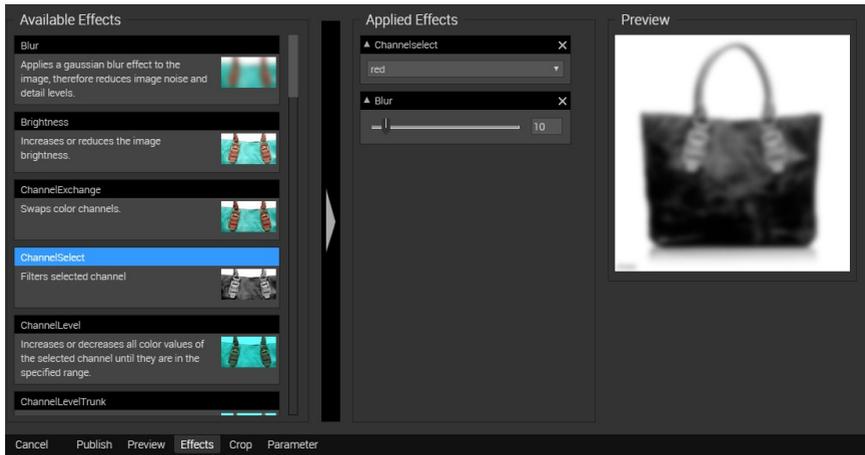
The "Effect" tab allows adding real-time image effects to the resulting image. Click on the desired effect in order to select it. Apply the effect on the picture by pressing the arrow button in the middle while the effect is selected (alternatively you can double click or drag the desired effect). You can adjust the options of the effect or delete it in the right column below the preview image. If more than one effect is applied, it is also possible to change the processing order of the effects by dragging the effect to achieve the desired sequence. Please note that overlays are always processed last and that the order of this effect cannot be changed.

Crop Tab
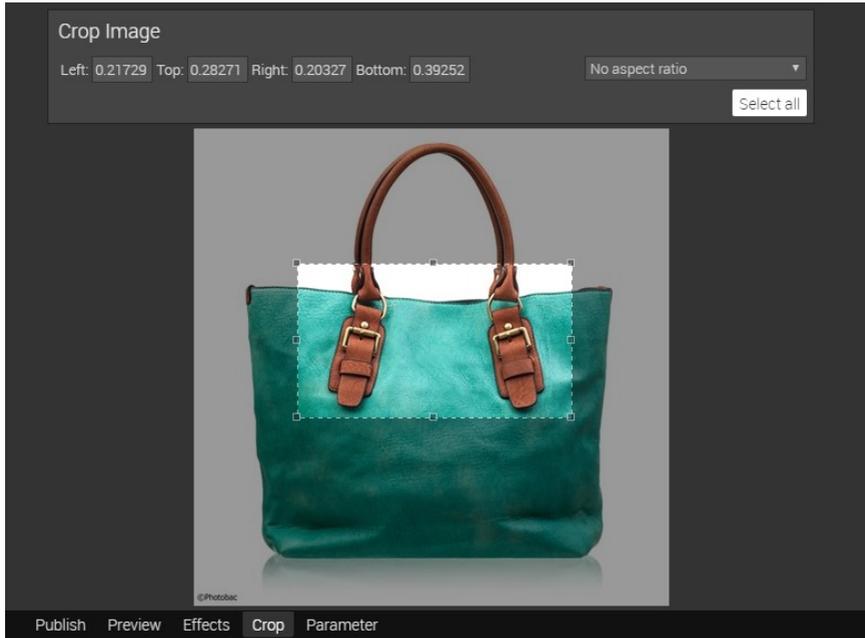
The "Crop" tab consists of a preview image with the possibility of selecting the image range. If a range is selected, only the selection will be published.

Parameter Tab
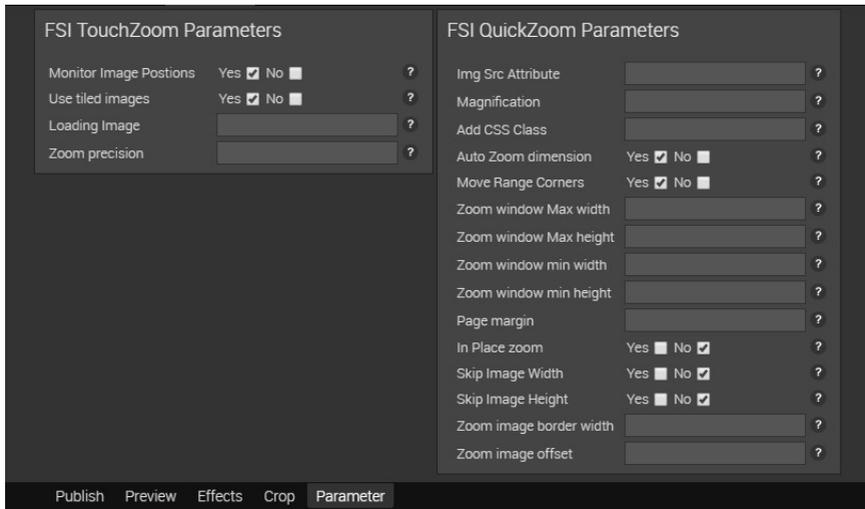
The "Parameter" tab shows parameters which can be used to configure the FSI TouchZoom.

3.4.2 FSI TouchZoom

FSI TouchZoom guarantees sharp images when pinch zooming into a website containing single source images provided by FSI Server. The images will be displayed in the resolution matching the current magnification instead of being blurry. You can enable FSI TouchZoom by activating the corresponding checkbox in the publish tab of the "Image" publishing option. (see "Single Source Image")

3.4.3 FSI QuickZoom

FSI QuickZoom adds image zoom to desktop and laptop computers on mouseover. When hovering over a single source image provided by FSI Server, the part of the image the cursor is currently pointing at will be displayed enlarged within the image or, alternatively, in a zoom window next to the original image. You can enable FSI QuickZoom by activating the corresponding checkbox in the publish tab of the "Image" publishing option. (see "Single Source Image")

3.4.4 FSI Viewer

The "Publish as FSI Viewer" section allows publishing the image as Javascript based 2D Zoom and Pan.

Choosing the preset will open the FSI Viewer publishing dialog that provides access to all FSI Viewer parameters, effects and plug-ins.

Publish Tab

General

Keep aspect ratio	☐ ?
Width x Height	413 x 443 px ▾ ?
Nav Width x Height	☐ x ☐ ?
Debug mode	Yes ☐ No ☑ ?
Use Device Pixel Ratio	Yes ☑ No ☐ ?
Prevent Image Transparency	Yes ☐ No ☑ ?
Skin filename	... ☐ ?
Language	... ☐ ?
Loading animaton	... ☐ ?
Quality	|————| ☐ ?

Load/Save Configuration

[   ]

[Load] [Save] [Save as]

Display Options

Background hexcolor	# ☐ ▸ ?
Max Zoom	☐ ?
Desktop Click Zoom scale	☐ ?
Mouse Sensitivity	☐ ?
Min Instance Size	☐ ?
No Navigation	Yes ☐ No ☑ ?
Auto Hide Navigation	Yes ☐ No ☐ ?
Hide Interface	false ▾ ?
Adaptive Interface Size	Yes ☑ No ☐ ?
New Image on Resize	Yes ☐ No ☑ ?
Disable Pointer Actions	Yes ☑ No ☐ ?
Show Preview	Yes ☐ No ☑ ?
Show Progressbar	Yes ☐ No ☑ ?
Pan Limits	▾ ?
Inplace Zoom	▾ ?
Document Zoom	▾ ?

HTML Code:

```
<!DOCTYPE HTML>
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=Edge,chrome=1">
<title>FSI Viewer JS</title>
<script type="text/javascript" src="//images.mydomain.com/fsi/viewer/applications/viewer/js/fsiviewer.js">
</script>
</head>
<body>
<fsi-viewer width="413px" height="443px" src="demo/Collection/bag4.jpg" >
<noscript>
```

Dir / Image:

```
demo/Collection/bag4.jpg
```

Publish Preview Effects Plug-Ins Crop

The "Publish" tab provides access to the basic FSI Viewer and HTML source code options like Viewer size and display options. It also contains a text field containing the HTML code snip assembled from all the settings made in the

various tabs. It is also possible to load and save customized configurations within this tab. Please make sure not to overwrite configurations which are in use.

Preview Tab

The "Preview" tab shows an FSI Viewer instance using the assembled code snip from the Publish Tab. The FSI Viewer looks exactly as if it were integrated into a web page using the code snip, except for the preview size, which is limited to the current size of the working area window. The Preview URL link allows

previewing the FSI Viewer in a separate window where the size limitation no longer applies.

Effect Tab

The "Effect" tab allows adding real-time image effects to the FSI Viewer. The Effect tab is identical with the tab in the "Publish as Single Source Image" option.

Plug-Ins Tab
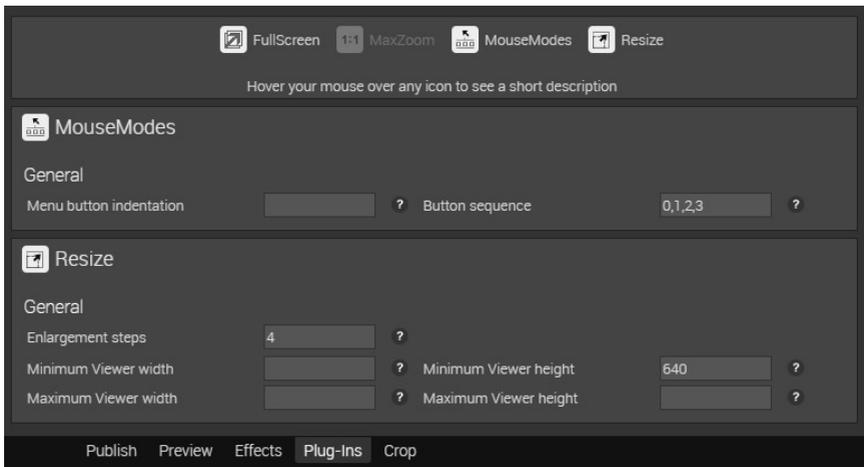
The "Plug-Ins" tab not only allows to activate and deactivate the various FSI Viewer plug-ins and also shows all configuration parameters of the activated plug-ins.

Crop Tab

As in the "Publish as Single Source Image" section, the "Crop Tab" allows selecting an image range which will then be published in the FSI Viewer.

3.4.5 FSI Viewer Flash

The "Publish as FSI Viewer Flash" section allows choosing between four commonly used presets. By clicking on "more", more customized presets can be accessed. Choosing a preset will open the FSI Viewer publishing dialog that provides access to all FSI Viewer parameters and plug-ins.

The publishing dialog contains six tabs grouping the FSI Viewer publishing options and parameters as well as the Hot Spot Editor.

Publish Tab

General

Keep aspect ratio	☐ ?
Width x Height	500 x 524 px ▾ ?
Resizeable	☐ ?
Skin filename	... ?
Intro filename	... ?
Language	... ?
Quality	98 ?

Load/Save Configuration

Load   Save   Save as

Source Code Options

Additional Parameters	?
Debug mode	Yes ☐ No ☑ ?
Image transparency	Yes ☐ No ☑ ?
Window Mode	Window ▾ ?
Background hexcolor	# ▸ ?
Viewer Border Color	# ▸ ?
Round Corners	?
Flash Detection	☑ ?
Wrap in HTML	☐ ?
HTML Title	?

HTML Code:

```
<script type="text/javascript" src="//images.mydomain.com/fsi/js/fsiwriter.js"></script>
<script type="text/javascript">
<!--
    writeFlashCode( "//images.mydomain.com/fsi/viewer/fsi.swf?
effects=quality%3D98&ImagePath=demo%2FCollection%2Fbag4.jpg&imagetransparency=false",
            "//images.mydomain.com/fsi/server?
type=image&source=demo%2FCollection%2Fbag4.jpg&height=524",
            "width=500;height=524;mobilepopupautomode=false");
// -->
</script>
<noscript>
        <object type="application/x-shockwave-flash" classid="clsid:D27CDB6E-AE6D-11cf-96B8-444553540000"
```

Dir / Image:

```
demo/Collection/bag4.jpg
```

encoded ☐

The "Publish" tab provides access to the basic FSI Viewer and HTML source code options like Viewer size and language. It also contains a text field containing the HTML code snip assembled from all the settings made in the various tabs. It is also possible to load and save customized presets within this tab. Please make sure not to overwrite configurations which are in use.

Preview Tab

The "Preview" tab shows an FSI Viewer instance using the assembled code snip from the Publish Tab. The FSI Viewer looks exactly as if it were integrated into a web page using the code snip, except for the preview size, which is limited to the current size of the working area window. The Preview URL link allows previewing the FSI Viewer in a separate window where the size limitation no longer applies.

Effect Tab

The "Effect" tab allows adding real-time image effects to the FSI Viewer Flash. The tab is identical with the tab in the "Publish as Single Source Image" option.

FSI Viewer Tab
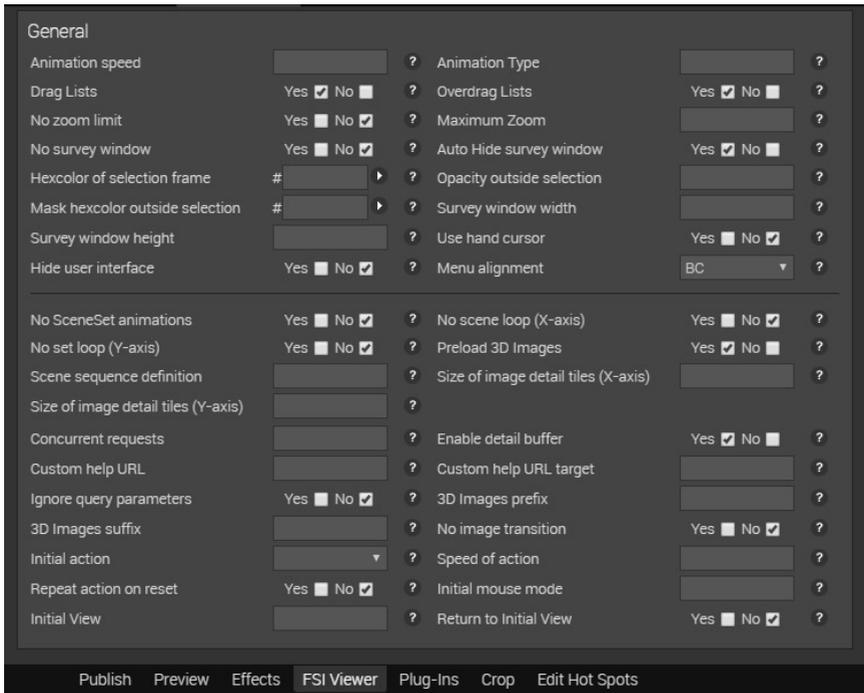
The "FSI Viewer" tab provides access to the commonly used viewer configuration parameters. The parameters mainly affect the behavior and appearance of the Viewer.

As in all the other tabs in the publishing section a short description is available for every parameter by clicking on the button with the question mark next to the parameter input field. For a more detailed help on FSI Viewer configuration parameters please see the FSI Viewer manual.

Plug-Ins Tab

The "Plug-Ins" tab not only allows to activate and deactivate the various FSI Viewer plug-ins and also shows all configuration parameters of the activated plug-ins.

Clearly arranged for quick access, the tab is split up in boxes. The first box contains a list of available plug-ins. Activating a plug-in by clicking on the plug-in icon will show a further box containing this plug-in parameters. For a detailed description of all available FSI Viewer plug-ins see the FSI Viewer manual.

Crop Tab

As in the "Publish as Single Source Image" section, the "Crop Tab" allows selecting an image range which will then be published in the FSI Viewer.

Edit Hot Spots
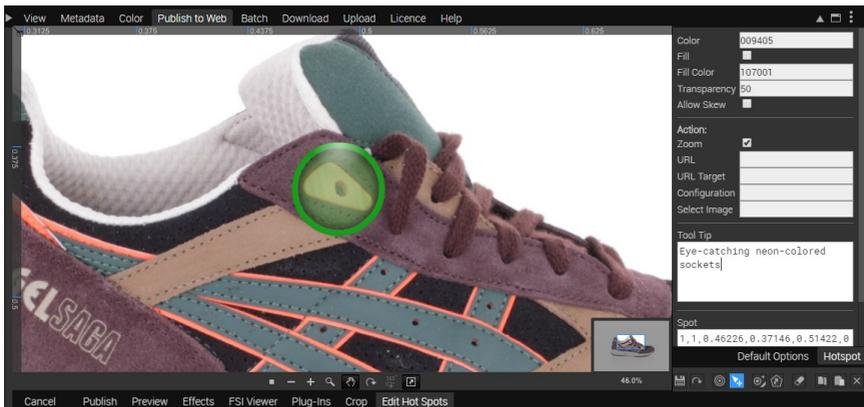
The "Edit Hot Spots" tab provides access to the hot spot editor. It is possible to choose between Default Options and the Hotspot tab, where e.g. the color, target and behavior of the tool tip can be determined. In order to draw a hotspot on the image, the shape library button or the freehand drawing tool on the bottom right can be used. Hotspots can also be saved, tested and deleted in this tab.

3.5 Real-time Image Effects

The FSI Server provides various effects, which are available in real-time and can be applied to the images before delivery.

This section describes and visualizes the included effects using an example image. The left image corresponds to the original and the right image shows the applied effect(s).

Sepia	
Example	sepia()
Version	1.0

Makes the image look like a sepia toned photo.		

ColorOverlay	
Blendmode	Enum Blendmodes (Normal, Dissolve, Exclusion, Difference, Hardmix, PinLight, LinearLight, VividLight, HardLight, SoftLight, Overlay, LighterColor, LinearDodgeAdd, ColorDodge, Screen, Lighten, DarkenColor, LinearBurn, ColorBurn, Multiply, Darken, Divide, GrainExtract, GrainMerge, Substract, LuminosityHSL, ColorHSL, SaturationHSL, HueHSL, LuminosityHSB, ColorHSB, SaturationHSB, HueHSB.)
RGB	(RGB INT) >= 0x000000 <= 0xffffff
Opacity	(float) >= 0.0 <= 100.0
Example	coloroverlay(VividLight,0x300000,20)
Version	1.0

Applies a color overlay to the image using the specified color and blend mode. By using one or perhaps several different effects, many changes in coloration can be achieved.

Pixelize	
Size	(Int) >= 0
Example	pixelize(30)
Version	1.0

Creates a pixel effect by reducing the image details. The pixel colors adapt to the most common used color around each pixel, resulting in a tile effect.

Flip	
Value	(Enum) Horizontal, Vertical
Example	flip(vertical)
Version	1.0

Flips the image horizontally or vertically.	

Distort	
Value	4 normalized xy coordinate pairs describing the new corner positions.
Example	distort(0.1,0.1,0.9,0.2,1,1,0,1)
Version	1.0

Performs a perspective distortion by moving the image corners to the new specified coordinates. The first two values are the upper left corner, based on a value of 0-1 on the X-and Y-axis. The following corners are to be entered clockwise.

Brightness	
Value	(Int) >= -100 <= 100
Example	brightness(20)
Version	1.0

Increases or reduces the image brightness.
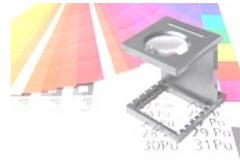
Contrast

Value	(Int) >= -100 <= 100
Example	contrast(20)
Version	1.0

Increases or reduces the image contrast.		
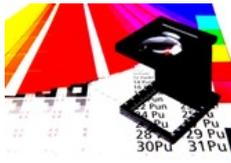
Colorize

Hue	(Float) >= 0.0 <= 360.0
Saturation	(Float) >= 0.0 <= 100.0
Lightness	(Float) >= 0.0 <= 100.0
Example	colorize(170,80,10)
Version	1.0

Applies a colorize effect to the image. This makes it possible to give a general color impression to the image.		

ChannelExchange	
Mode	(Enum) RGB, RBG, BGR, BRG, GRB, GBR
Example	channelexchange(grb)
Version	1.0

Swaps color channels.	
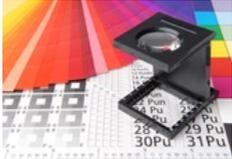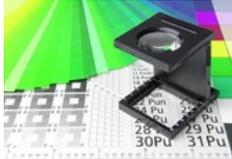
Desaturate	
Mode	(Enum) Average, Lightness, Luminosity, Saturation
Example	desaturate(lightness)
Version	1.0

Desaturates the specified image property.		
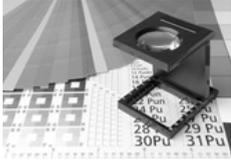
HSL	
Hue	(Float) >= -180 <= 180
Saturation	(Float) >= -100 <= 100
Lightness	(Float) >= -100 <= 100
PrimaryColor	(Enum) All, Red, Yellow, Green, Cyan, Blue, Magenta
Example	hsl(90,80,30,All)
Version	1.0

Allows increase or decrease of the hue, saturation and lightness of a specified image channel		

Sharpen	
Amount	(Float) >= 0.0 <= 100.0

Sharpen	
Example	sharpen(50)
Version	1.0

Sharpens the image using a Gaussian unsharpen algorithm. Especially details and contours will be highlighted.
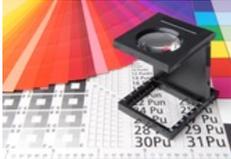
Blur	
Radius	(Float) >= 0.0 <= 100.0
Example	blur(50)
Version	1.0

Applies a Gaussian blur effect to the image and therefore reduces image noise and detail levels..

Gamma	
Value	(Float) >= 0.1 <= 9.99
Channel	(Enum) All, Red, Blue, Green
Example	gamma(6.0, Red)
Version	1.0

Reduces or increases the image gamma.		

Glow	
Amount	(Float) >= 0.0 <= 100.0
Example	glow(25)
Version	1.0

Adds a glow effect to the image by enlarging and summarizing all bright areas, so you have the impression the image shines.		

Solarize	
Example	solarize()
Version	1.0

Applies a solarize effect that negates all pixels above a certain value. Solarization allows the alienation of images.		
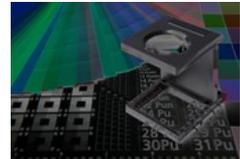
Threshold	
LevelLow	(Int) >= 0 <= 255
LevelHigh	(Int) >= 0 <= 255
Color1	(RGB INT) >= 0x00000000 <= 0xffffffff
Color2	(RGB INT) >= 0x00000000 <= 0xffffffff

Threshold	
Example	threshold(10,200,0x00471698,0x00fbdb07)
Version	1.0

Reduces the color range of the images by applying a threshold filter.		

Invert	
Mode	(Enum) Brightness, All, Red, Green, Blue, Alpha
Example	invert(red)
Version	1.0

Inverts one channel, all channels or the brightness of the image.		
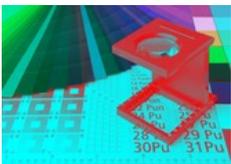
Posterize	
Level	(Int) >= 0 <= 255
Example	posterize(11)
Version	1.0

Applies a posterize effect, reducing the image to a limited number of color levels. Posterize is a separation of the tonal values with a simultaneous tonal value reduction.		

GradientMap	
Mode	(Enum) Average, Lightness, Luminosity
Value	(HexColor) ARGB, [ARGB], ...
Example	gradientmap (luminosity,ff0000,ff00ff,0000ff,00ffff, 00ff00,ffff00,ff0000)
Version	1.0

Maps a defined gradient over a grayed image.		
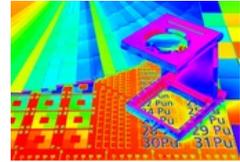
Transparency	
Value	(Int) >0 <= 100
Example	transparency(30)
Version	1.0

Adds transparency to the image. If the image contains an alpha channel it will be strengthened. If there is no alpha channel in the image, then one will be created.		
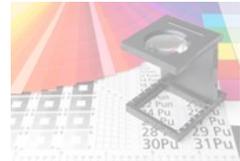
Matte	
Value	(Hex RGB)
Example	matte(2cb4ac)
Version	1.0

Removes transparency and renders all translucent pixel against the matte color.		

ChannelLevel	
Value	(Enum)red,green,blue,all
Min	(int) >= 0 <= 255
Max	(int) >= 0 <= 255
Example	channellevel(red,30,70)
Version	16.07

Increases or decreases all color values of the selected channel until they are in the specified range.		
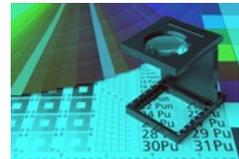
Fill	
Value	HexARGB

Fill	
Example	fill(AA332255)
Version	16.07

Fills the image with the specified color considering the alpha channel if it exists in the image.		

ChannelRGBfilter	
Value	(HexRGB)
Example	channelrgbfilter(FF0000)
Version	16.07

Applies the specified color filter to the image		

Noise	
Amount	(Int) >0 <= 100
Strength	(Int) >0 <= 100
Monochrome	(Boolean)
Example	noise(60,80,true)
Version	1.0

Adds noise to the image.		
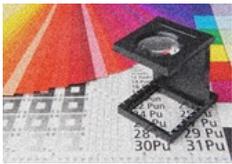
Pad	
Position	(Enum)TL,TC,TR,CL,CC,CR,BL,BC,BR
Color	(HexRGB)
Example	pad(CC,00FF00)
Version	16.07

Pads the image to fit the requested size exactly, placing the actual image on the colored canvas at the specified position.		
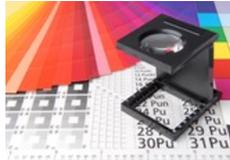
Temperature	
Value	(int) >= -100 <= 100
Example	temperature(-50)
Version	16.07

Changes the image color temperature.		
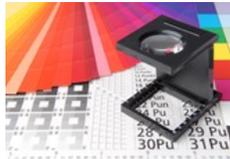
Saturation	
Mode	(Enum)HSL,YIQ
Strength	(int) >= -100 <= 100
Example	saturation(HSL,-50)

Saturation	
Version	16.07

Changes the image saturation.		

Opaque	
Example	opaque()
Version	16.07

Removes the Alpha Channel from an image if it exists.		

ChannelSelect	
Mode	(Enum)red,green,blue,hue,saturation,brightness

ChannelSelect

Example	channelselect(red)
Version	16.07

Displays only the information contained in the selected channel.		
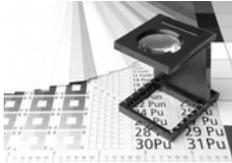
ChannelLevelTrunk

Value	(Enum)red,green,blue,all
Min	(int) >= 0 <= 255
Max	(int) >= 0 <= 255
Pad	(int) >= 0 <= 255
Example	channelleveltrunk(red,20,255,10)
Version	16.07

Sets all color values of the selected channel outside the specified range to the pad value.		
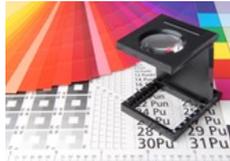
Select	
Action	Select(Command)
	Select(Command, Range, RangeParameters)
Examples	Select(New,Path,2)
	Select(Add,Alpha,3)
	Select(Sub,Rect,0.25,0.25,0.5,0.5)
	Select(Clear)
	Select(Invert)
Version	16.07

Limit subsequent effects to image regions using clipping paths and/or alpha channels. range parameters.		

Supported commands:

New: clears old and starts a new selection.

Add: adds region to existing selection.

Sub: subtracts region from existing selection.

Clear: clears the current selection.

Invert: inverts the current selection. T

The New, Add and Sub commands require a range with appropriate range parameters. Possible range values are:

Path: Selects a path defined in the image. Requires the number of the path are range parameter.

Alpha: Selects one of the alpha channels defined in the image. Requires the number of the alpha channel as range parameter.

Rect: Selects a rectangular region within the image. Requires the rectangle coordinates as range parameters.

Overlays	
Image	Overlay location
Position	(Enum)TL,TC,TR,CL,CC,CR,BL,BC,BR
Opacity	(int) >= 0<= 100
Horizontal Offset	(int) desired horizontal offset in pixel
Vertical Offset	(int) desired vertical offset in pixel
Example	overlays=_service/demo_watermark.png(70,CC,0,0)

Overlays	
Version	16.07

Adds an overlay to the image. This effect is always applied before all other effects.		
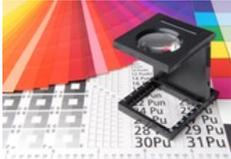
3.6 Publishing Image Collections

Image collections can be published by placing the desired images into a folder and publishing the folder. Collections are used for 360° object presentation (FSI Viewer 360°), catalogs (FSI Pages), slideshows or image carousels (FSI ThumbBar) or slideshows combined with a zoom viewer (FSI Showcase) . A folder can be published by navigating into the folder and selecting a FSI Viewer 360°, FSI Pages, FSI Showcase or FSI ThumbBar preset from the "Publish To Web" tab.

3.6.1 FSI Viewer 360

FSI Viewer 360 is an HTML5 and JavaScript based tool to display 360° Object spins on touch devices. The tabs not listed below are identical with the tabs for publishing "FSI Viewer ".

Publish Tab
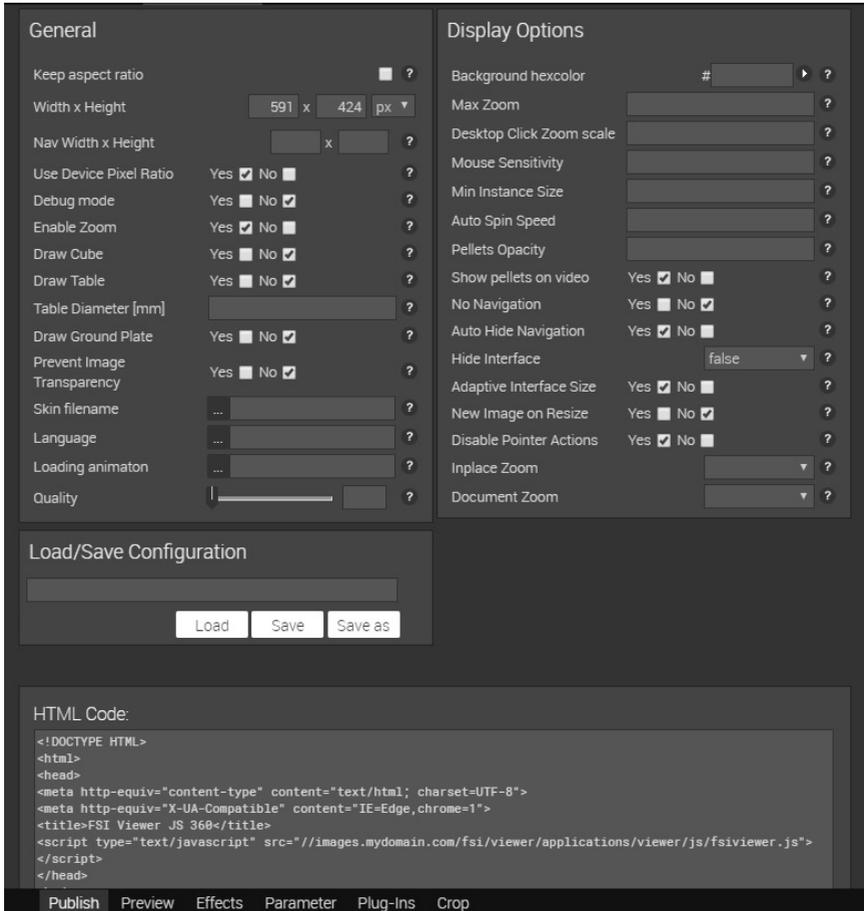
Within "Publish Tab" general options such as width x height and the possibility of zoom can be set. The display options provide access to options like changing the background color of the spin or the menu bar color. It also contains a text field containing the HTML code snip assembled from all the settings made in the

various tabs. It is also possible to load and save customized presets within this tab. Please make sure not to overwrite configurations which are in use.

Parameter Tab

General Parameters

Show Preview	Yes ☐ No ☐	?	Show Progressbar	Yes ☑ No ☐ ?
Spin Preview	Yes ☑ No ☐	?		
Progress Bar Horizontal Align	Left ▾	?	Progress Bar Vertical Align	Top ▾ ?
Progress Bar Width		?	Progress Bar Height	?

Scene sequence definition		?	Reverse Scenesets	Yes ☐ No ☑ ?
No set loop (Y-axis)	Yes ☐ No ☑	?	No scene loop (X-axis)	Yes ☐ No ☑ ?
Repeat action on reset	Yes ☐ No ☑	?	Initial mouse mode	?
Initial View		?	Return to Initial View	Yes ☐ No ☑ ?

Video Parameters

Video filename		?	No. of capture frames	?
Spin Direction	Left ▾	?	Base	?
Capture Offset Start		?	Capture Offset End	?
Width Correction Factor		?	Height Correction Factor	?
X Correction Factor		?	Y Correction Factor	?
Frameoffset		?	Video Sceneset	?

Camera Parameters

Digital Crop Factor		?	Focal Length [mm]	?
Distance to table center [mm]		?	Height above table [mm]	?
Table Height [mm]		?	Camera Height [mm]	?
Target Y offset [mm]		?	Target X offset [mm]	?
Shift X		?		

Virtual Space Parameters

Rotation X sets		?	Rotation Y Scenes	?
Width of Boundingbox [mm]		?	Height of Boundingbox [mm]	?
Depth of Boundingbox [mm]		?	Offset X [mm]	?
Offset Y [mm]		?	Offset Z [mm]	?

Publish   Preview   Effects   **Parameter**   Plug-Ins   Crop

This tab shows parameters which can be used to configure the FSI Viewer 360. e.g. the Hotspot and Video parameters.

3.6.2 FSI Pages

If you choose a FSI Pages preset for a collection, it will be presented as an interactive book or catalog. In the publishing dialog, the "Plug-Ins Tab" is extended by additional plug-ins and a new tab called "FSI Pages" as well as the "Edit Hyperlinks" tab. The other tabs are identical with the tabs in the section "Publish as FSI Viewer".

Publish Tab

General

Width x Height   894 x 318 px ▾
Debug mode   Yes ☐ No ☑   ?
Skin filename   ...   ?
Language   ...   ?
Quality   ?

Load/Save Configuration

pages_presets/catalog_links.xml

Load   Save   Save as

Display Options

Hide Interface   false ▾   ?
Adaptive Interface Size Yes ☑ No ☐ ?
Menu Button Order   ?

Intro Content   ?

HTML Code:

```
<!DOCTYPE HTML>
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=Edge,chrome=1">
<title>FSI Pages JS</title>
<script type="text/javascript" src="//images.mydomain.com/fsi/viewer/applications/pages/js/fsipages.js">
</script>
</head>
<body>
<fsi-pages width="894" height="318" Dir="images/Spin360/star" cfg="pages_presets/catalog_links.xml" >
<noscript>
```

Dir / Image:

images/Spin360/star

encoded ☐

Publish   Preview   Effects   FSI Pages   Plug-Ins   Crop   Edit Hyperlinks

The "Publish Tab" gives access to the basic FSI Pages source code options like Viewer size and display options.

In the section "Display Options" any intro content (HTML Code to be displayed next to the front cover of the publication, useful to display e.g. usage instructions) can be defined.

It also contains a text field containing the HTML code snip assembled from all the settings made in the various tabs and it is possible to load and save customized configurations within this tab. Please make sure not to overwrite configurations which are in use.

FSI Pages Tab

General

Thumb Size	[____] ?	Bend effect	Glossy ▼ ?
Page Layout	flip ▼ ?		

Configuration

First page number	[____] ?	
Remember last page	Yes ☐ No ☑ ?	Forget last page after [____] ?
Turn pages when idle	Yes ☐ No ☑ ?	
Turn pages when idle delay	[____] ?	Initial page [____] ?
Turn pages when idle min page	[____] ?	Turn pages when idle max page [____] ?
Empty images at	[____] ?	Remove pages at [____] ?

Cover

Back cover	Yes ☑ No ☐ ?	
Back cover image	[____] ?	Blank back cover	Yes ☐ No ☑ ?
Front cover	Yes ☑ No ☐ ?	
Front cover image	[____] ?	Blank front cover	Yes ☐ No ☑ ?

Links

Enable/Follow links	Yes ☑ No ☐ ?	Link template data [____] ?
Link templates	[____] ?	
Default link URL	[____] ?	Default link target [____] ?
Default link URL prefix	[____] ?	Default link URL suffix [____] ?
Default link tool tip	[____] ?	Default Javascript target [____] ?
Global link URL	[____] ?	Global link target [____] ?
Force link URL	[____] ?	Force link target [____] ?
Force link URL prefix	[____] ?	Force link URL suffix [____] ?
Force link tip	[____] ?	Force Javascript target [____] ?

Publish   Preview   Effects   **FSI Pages**   Plug-Ins   Crop   Edit Hyperlinks

The "FSI Pages" tab provides quick access to all FSI Pages specific parameters. For details on the various configuration options please see the FSI Pages manual.

Edit Hyperlinks

The "Edit Hyperlinks" tab provides access to the hyperlink and overlay editor for FSI Pages. It is possible to choose between Standard mode (normal catalogue view), Link mode (edit links) or Overlay mode (edit or add overlays such as videos or icons).

3.6.3 FSI ThumbBar

FSI ThumbBar is a Javascript based image slideshow with optional image zoom which can be used on desktop computers and touch enabled devices.

The "Publish as FSI ThumbBar" section allows choosing between three presets. By clicking on "more", more customized presets can be accessed.

Publish Tab

Within "Publish Tab" general options such as width x height, the possibility of zoom and the image type can be set. The display options provide access to options like changing the background color of the carousel or the element width. It also contains a text field containing the HTML code snip assembled from all the settings made in the various tabs. It is also possible to load and save customized presets within this tab. Please make sure not to overwrite configurations which are in use.

Preview Tab
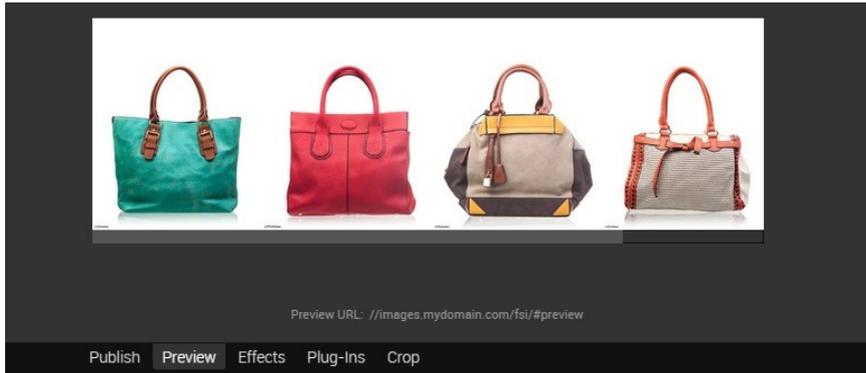
Effects

The effects tab is identical to the effects tab for publishing a single image. For more information please refer to "Single Source Image".

Parameter Tab
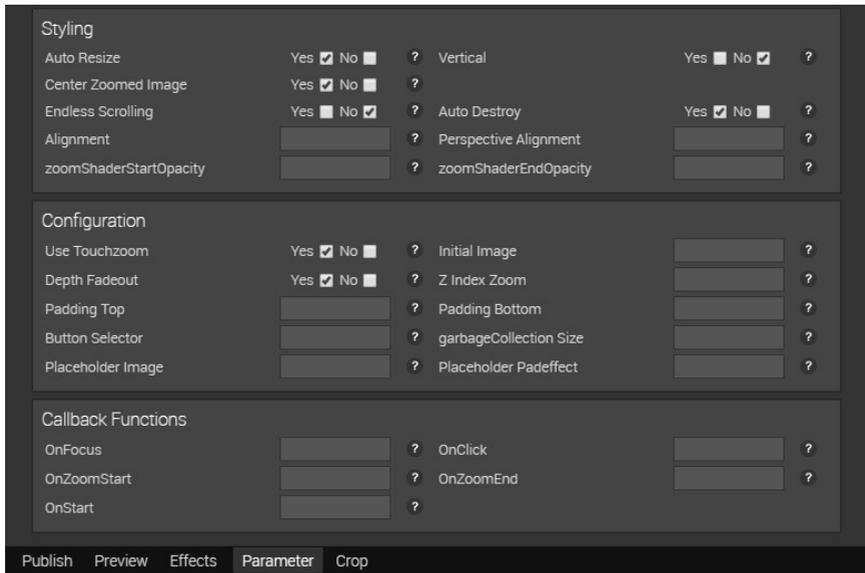
This tab shows parameters which can be used to configure the FSI ThumbBar, e.g. color parameters and miscellaneous parameters such as mirror height and background darkness.

3.6.4 FSI Showcase

FSI Showcase combines the benefits of FSI Viewer with FSI ThumbBar. It is created for viewing multiple images with an image carousel. By clicking on an image, it will be displayed in the FSI Viewer instance placed above the carousel. The option publishes all images in a folder including preview thumbnails.

Publish Tab

General

Viewer Width x Height	198 x 228	px
Nav Width x Height	x	px
ThumbBar Size	120	px

Debug mode   Yes ■ No ☑   ?
Skin filename   ...   ?
Language   ...   ?
Loading animaton ...   ?
Quality |———————————| ?

Load/Save Configuration

viewer_presets/showcase_endless.xml

Load   Save   Save as

HTML Code:

```
<!DOCTYPE HTML>
<html>
<head>
<meta http-equiv="content-type" content="text/html; charset=UTF-8">
<meta http-equiv="X-UA-Compatible" content="IE=Edge,chrome=1">
<title>FSI Showcase JS</title>
<script type="text/javascript" src="//mydomain.com/fsi/viewer/applications/thumbbar/js/fsithumbbar.js">
</script>
<script type="text/javascript" src="//mydomain.com/fsi/viewer/applications/viewer/js/fsiviewer.js">
</script>
</head>
```

Dir / Image:

```
demo/Collection
```

encoded ■
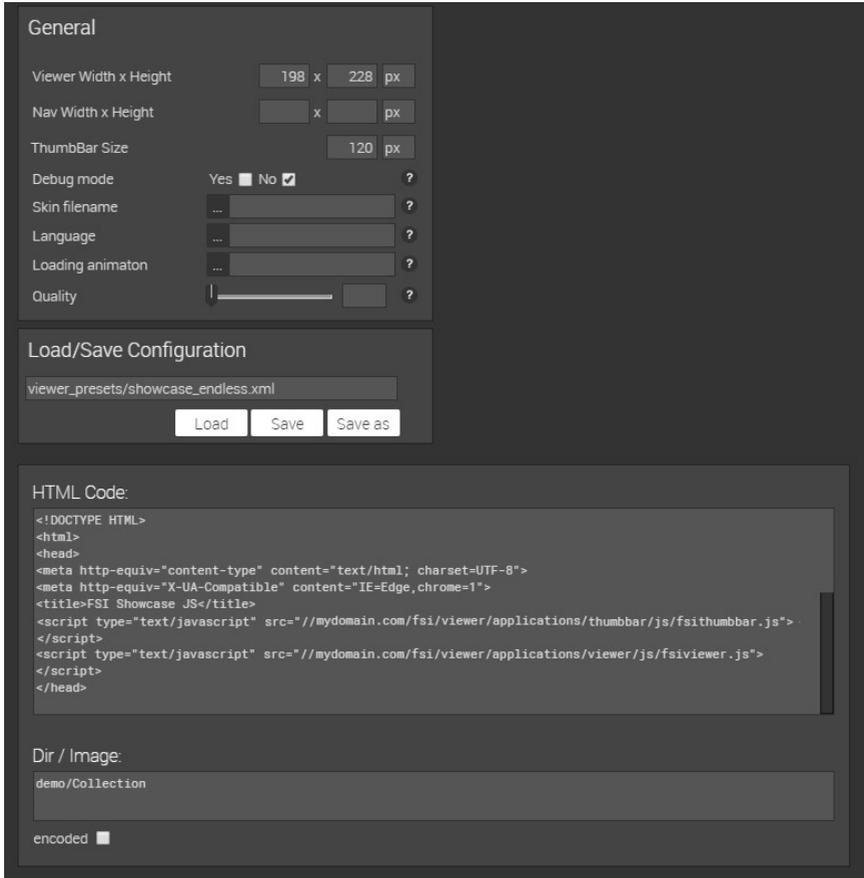
The Publish Tab contains all pasic source code options such as Viewer dimensions, Navigation dimensions and ImageFlow height.

It also contains a text field containing the HTML code snip assembled from all the settings made in the various tabs and it is possible to load and save customized configurations within this tab. Please make sure not to overwrite configurations which are in use.

Preview Tab
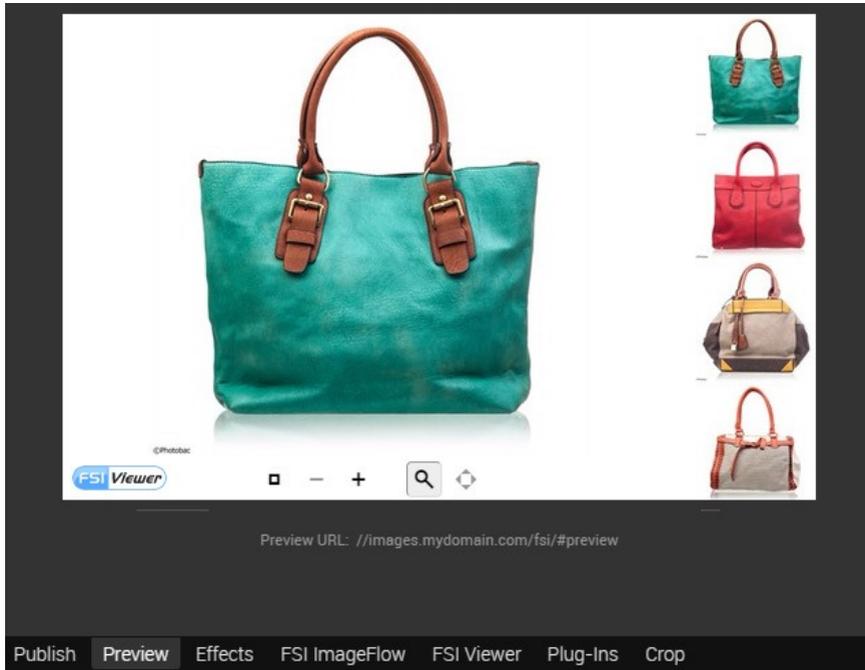
FSI ThumbBar Tab & FSI Viewer Tab

As FSI Showcase is a combination of FSI ThumbBar and FSI Viewer, the same parameter tabs that are used in the single viewers apply here. More information upon these tabs can be found in the corresponding sections.

3.6.5 FSI Viewer 360 Flash

Publishing a collection as FSI Viewer 360 Flash will create an FSI Viewer instance, displaying a rotatable view of an object composed by all images in the collection. The publishing dialog is identical to publishing a single image with FSI Viewer Flash. Please refer to "FSI Viewer Flash" for details.

3.6.6 FSI Pages and FSI Pages mobile

Choosing an FSI Pages preset for a collection will activate the FSI Pages add-on for FSI Viewer. The collection will be presented as a book or catalog. In the FSI Pages publishing dialog, the "Plug-Ins Tab" is extended by seven additional plug-ins and a new tab called "FSI Pages" as well as the "Edit Hyperlinks" tab. The other tabs are identical with the tabs in the section "Publish as FSI Viewer Flash".

FSI Pages Tab

The "Pages" tab provides quick access to all FSI Pages specific parameters. For details on the various configuration options please see the FSI Pages section in the FSI Viewer manual.

The FSI Pages publishing interface is also used to publish image collections with FSI Pages mobile. The publish tab contains code snips for both FSI Pages and FSI Pages mobile.

Edit Hyperlinks

The "Edit Hyperlinks" tab provides access to the hyperlink and overlay editor for FSI Pages. It is possible to choose between Standard mode (normal catalogue view), Link mode (edit links) or Overlay mode (edit or add overlays such as videos or icons).

3.6.7 FSI Showcase Flash

Choosing an FSI Showcase preset when publishing a collection will activate the FSI Showcase add-on. A showcase allows to present multiple images in a single FSI Viewer instance as a kind of image gallery. The FSI Showcase publishing dialog adds a new tab to the common FSI Viewer publishing dialog.

FSI Showcase Tab

The "FSI Showcase Tab" provides quick access to all FSI Showcase specific parameters. For a detailed description of the configuration options please see the FSI Showcase section in the FSI Viewer manual.

3.6.8 Animated GIFs

FSI Server can automatically create GIF animations from multiple still images. To do so, select the folder containing the source images in the File View and choose the "Publish as Image" from the Publishing Tab in the Working Area.

The output format will be automatically set to "GIF". The publishing options are described in "Single Source Image". Please note that gif animations can only be created from equally sized images. The first image in the selected folder will be used as reference image for the size and the indexed color palette. All following images will only be added to the animation if the size matches the reference image.

3.7 Publishing Stereoscopic images

FSI Server supports real-time generation of stereoscopic 3D images. The only things required are two source images of the same object, taken from slightly different angles. The two source images can be published as one plain stereoscopic image or as a FSI Viewer or FSI Viewer Flash instance, allowing the user to zoom into the image. Two sets of source images can be published either as a FSI Viewer 360 3D spin or FSI Viewer 360° Flash instance, if they are placed into separate directories.

3.7.1 Publishing a single stereoscopic image

Selecting two images with the same dimensions in the file view enables the "Image 3D" option in the "Publish To Web" tab. Selecting this option brings up a publishing dialog similar to that used for publishing a standard Single Source image (see "Single Source Image"). The dialog has three additional parameter fields in the publish tab, allowing to select the type of 3D glasses by specifying the lens colors for the left and right eye as well as choosing a desaturation effect to increase the 3D impression.

3.7.2 Publishing a stereoscopic image in FSI Viewer (JS or Flash)

Selecting two images with the same dimensions in the file view also enables the "FSI Viewer 3D" and the "FSI Viewer Flash 3D" options in the "Publish To Web" tab. The resulting publishing dialog will also be identical to the standard "Publish as FSI Viewer" or "Publish as FSI Viewer Flash" dialog with the three additional fields described in the chapter above.

3.7.3 Publishing stereoscopic images as FSI Viewer 360 (JS or Flash)

Selecting two directories containing the same number of images with the same dimensions in the file view will enable the "FSI Viewer 3D 360°"and the "FSI Viewer Flash 360 3D" options in the "Publish To Web" tab. These options open the FSI Viewer 360 publishing dialog (either of the JS or the Flash version) with the additional parameter fields as described above.

3.8 Licence

This tab gives you an overview of your licence information and enables you to enter your key either by uploading the corresponding licence file or by typing in the licence data manually.

The Licence Request Data is crucial for updating your licence.

3.9 Server Adressing

Data on the FSI Server is addressed using standard HTTP requests and in case of image requests HTTP GET query parameters to specify the request.

3.9.1 Image and Metadata Addressing

The main server URL for image-, metadata- and list-requests will always be in the form http://your.fsi-server.com/fsi/server? followed by the desired parameter. If the application is deployed under a name different to "fsi" the above URL needs to be adapted accordingly.

The following sections describes the available parameters in detail and gives examples on their usage. Please note that not all parameter combinations are possible or make sense.

ASCII Code needs to be converted to UTF8.

Alternatively the FSI Server webinterface provides an easy way to try out the parameters and assemble image URLs more interactively. This interface is described in detail in section 3 of this manual. In addition to the following descriptions , "Server Addressing Quick Reference" contains a server addressing quick reference. The parameters described in this chapter apply to the default renderers. Other renderers might not support all the parameters listed here or rely on additional parameters. More on renderers can be found in the OpenAPI manual.

Source

The source parameter describes the accessed resource in form of a path. This can be either an image or a directory. The source parameter is mandatory.

Type

The mandatory type parameter defines the type of response expected. Available values are image, info and list. Image and info can be used if the source parameter defines an image file. Depending on the renderer used (see "Renderer") an image request will return a jpg, png or swf. Info and list requests provide access to image and directory meta data. The response type of these two depends on the used template (see "Template").

Width and Height

At least one of the parameters width or height must be provided for image requests. The value is interpreted as pixels and the result will be an image scaled to fit into the requested dimension. Depending on the renderer used the aspect ratio is preserved, so if width and height are specified the resulting image may be smaller than the requested size.

Rect

The optional rect parameter can be used in image requests. It allows cropping images prior to scaling. The value is expected to consist of four comma-separated float values. The first two values define the top-left corner and the other two values define the bottom-right corner of the crop area. All values are expected to be normalized, this means the valid values range from 0 to 1 where 0 is left or top and 1 is right or bottom.

Left, Top, Right, Bottom

The parameters left, top, right, bottom are a more human readable version of the rect parameter described above. The possible values are identical.

Quality

Used in image requests that return JPEG images this optional parameter defines the JPEG compression quality. The default value depends on the renderer settings.

Template

The template parameter defines the template used to render info and list responses. For more on templates see "Templates" in part I.

Effects

The effects parameter allows applying real-time image effects to an image. The effects parameter value is a comma-separated list containing the effect name followed by brackets containing effect-specific parameters. The effects will be applied in the order they are listed. For a detailed description of the available effects and the effects-specific parameters please see "Real-time Image Effects".

Renderer

Used in all request types this optional parameter defines the renderer used to build the response. If omitted the default renderer will be used. The default renderer is defined by the request processor settings. For more information on renderers see "Renderers" in part I.

3.9.2 Addressing Static Content

All assets other than images are stored in directories configured in "static" source connectors.

These assets can be addressed as any other static file on a webserver by sending an HTTP GET request to http://your.fsi-server.com/fsi/static/path/to/file.txt.

As noted in "Image and Metadata Addressing", the "fsi" in the URL needs to be adapted if the application is deployed under a different name. The full URL for an asset lying on the server can also be seen in the metadata-tab when selecting the asset in the FSI Server webinterface.

4Appendix

4.1Supported Input/Output Formats

4.1.1Input formats

Format	Description
PNG	Portable Network Graphics files are fully supported, including alpha channels. The maximum image size depends on the amount of memory available.
JPEG	Joint Photographic Experts Group files are fully supported. The maximum image size depends on the amount of memory available.
TIFF	Tagged Image File Format files are fully supported, including pyramid tiffs. The maximum image size is limited to 2GB assuming the necessary hard disk capacity is provided.
BMP	Bitmap file format is fully supported. The maximum image size depends on the amount of memory available.
FPX	FlashPix file format is fully supported. The maximum image size depends on the amount of memory available.
GIF	Graphics Interchange Format is fully supported. The maximum image size depends on the amount of memory available.

4.1.2 Output formats

Format	Description
JPEG	The default output format providing the additional quality parameter to specify image compression quality
PNG	The png output supports alpha channels by default.
SWF	A special format wrapping image data into an swf for image presentation within flash movies.
GIF	The gif output format also supports animations.

4.2 Server Addressing Quick Reference

4.2.1 Image Requests

?type=image&source=path/to/image

Parameter	Description	Mandatory	Default
width	Width/height of the resulting image	yes (one)	server defaults
height	Width/height of the resulting image	yes (one)	server defaults
rect	Crop to a given range	no	0,0,1,1
left	Crop to a given range	no	0
right	Crop to a given range	no	1

Parameter	Description	Mandatory	Default
top	Crop to a given range	no	0
bottom	Crop to a given range	no	I
quality	Jpeg compression quality	no	depends on renderer
effects	Real-time image effects	no	none
renderer	Used renderer	no	depends on setting
encoding	Allows to specify if the response should be base64 encoded.	no	image
colorspace	Allows to specify the colorspace of the response image. Only applies to png output.	no	RGB
pixelrange pixelright pixeltop pixelleft pixelbottom	Crop to a given range (pixel based).	no	-

Parameter	Description	Mandatory	Default
referencewidth referenceheight	Define the reference dimensions for pixelbased cropping.	no	-
disposition	Defines whether to send a content disposition header in the response.	no	false
save	Alias for "disposition".	no	false
savename	The filename to send with the disposition header.	no	-

4.2.2 Info Requests

?type=info&source=path/to/image

Parameter	Description	Mandatory	Default
template	Defines the template used to render the response	no	depends on renderer
renderer	Used renderer	no	depends on settings

4.2.3 List Requests

?type=list&source=path/to/directory

Parameter	Description	Mandatory	Default
template	Defines the template used to render the response	no	depends on renderer
limit	Limits the amount of entries in the result set	no	all results
renderer	Used renderer	no	depends on settings
items	Allows specifiing the assets to include in item list	no	-
range	Allows applying a range parameter, to get only parts of the list	no	-

4.2.4 Search Requests

?type=search or ?type=simplesearch

Parameter	Description	Mandatory	Default
source	Path in which to search	yes when not authenticated	empty
query	Search phrase	yes	–

Parameter	Description	Mandatory	Default
context	Simplesearch only. Comma-separated list of fields to search (see Appendix D for field names)	yes	–

4.3 Permissions required for Tasks and Viewers

4.3.1 Permissions required for Viewers and Publishing

All the parameters below need to be set to true for the user in order to be able to publish thecorresponding option.

Publishing Option/ Task	Permissions required
HTML Image	read.renderedImages
FSI Viewer Flash & FSI Viewer JS	list.files && read.basicMetadata && read.renderedImages
FSI Pages & FSI Showcase	list.files && read.basicMetadata && read.renderedImages (read.searchResults for search in FSI Pages and read.extendedMetadata for links and showcaseinfo)
Editing chapters or links	write.extendedMetadata

4.3.2 Permissions required for Asset Management Tasks and Actions

In order to fullfill the tasks listed below, the specific parameters need to be set to true in the corresponding permissionset.

Task	Permissions required
Copy file	Source Connector: read.copy Target Connector: write.paste, (write.overwrite)
Move file within the same connector	write.moveWithInConnector, (write.overwrite)
Move file between connectors	Source Connector: read.copy, write.delete Target Connector: write.paste, (write.overwrite)
Copy directory	Source Connector: read.copy, list.files, list.directories Target Connector: write.paste, (write.overwrite)
Move directory within the same connector	write.moveWithInConnector, (write.overwrite)
Move directory between connectors	Source Connector: read.copy, list.files, list.directories, write.delete Target Connector: write.paste, (write.overwrite)

Task	Permissions required
Reimport (Files and Directories)	Target Connector: tasks.reimportFiles
Save Metadata (Files and Directories)	Target Connector: write.extendedMetadata
Delete Metadata (Files and Directories)	Target Connector: write.extendedMetadata
Restore Metadata (Files and Directories)	Target Connector: write.extendedMetadata, (write.overwrite)
Delete (Files and Directories)	Source Connector: write.delete
Move to Trash (Files and Directories) -	Source Connector: write.moveToTrash
Delete file from Trash	Origin Connector: write.delete
See files in Trash	Origin Connector: list.connector, list.files
Get ICC profile	Source Connector: read.iccProfile
Create job with Batch Rendering	Download Connector: write.paste all Source Connectors: tasks.batchRendering, read.renderedImage

Task	Permissions required
Create job without Batch Rendering	Download Connector: write.paste all Source Connectors: tasks.createArchive, read.sourceFiles
Upload asset	Target Connector: write.upload, (write.overwrite)
Create directory	Target Connector: write.createDirectory

4.4 Tomcat and JVM Settings

4.4.1 Java Virtual Machine Settings

The optimal settings for the Java virtual machine depend on the hardware running FSI Server and any other application sharing the hardware resources. Generally speaking, increasing the memory available in the virtual machine will increase FSI Servers performance as larger images can be converted in memory and more objects can be cached. The recommended setting for Oracle Java SE8 is:

-XX:+UseConcMarkSweepGC -XX:+UseParNewGC

-XX:+UseBiasedLocking -XX:+CMSParallelRemarkEnabled

In addition to the JVM settings mentioned above, the memory settings need to be specified. The amount of heap space to configure depends not only on the amount of physical memory present. The recommended minimum heap space is 2GB per CPU core. In addition to the heap space, FSI Server uses direct memory when performing image operations, so the maximum heap space should be set well below the amount of physical memory present.

The maximum number of connections specified in the Tomcat configuration also needs to be taken into consideration as under full load every connection requires a thread and every thread requires a fixed amount of memory for its execution stack. In order to be able to handle more connections the stack size should be reduced using the Xss parameter. The minimum allowed value for Java SE8 160k. Both should be sufficient for running FSI Server 2016.

Furthermore the used memory can be reduced by configuring Javas Permanent Generation memory. If FSI Server is the only application running in the Tomcat. Then a value of 128M is sufficient.

To summarize the above, the following parameters should be used in addition to the settings mentioned further up:

-Xss160k

-XX:MaxPermSize=128m

-Xms:[Heap Size depending on physical memory and Tomcat configuration]

-Xmx:[Heap Size depending on physical memory and Tomcat configuration]

4.4.2 AJP & JK

If FSI Server is set up in an application server, reachable via AJP only, please ensure the Proxy Pass Reverse Settings are included in the AJP configuration, as the webinterface will not be usable with incorrect or missing AJP settings.

```
<IfModule mod_proxy_ajp.c>
        <Location /fsi-server>
                ProxyPass ajp://localhost:8009/fsi
                ProxyPassReverse ajp://localhost:8009/fsi
                ProxyPassReverseCookiePath /fsi /fsi-server
        </Location>
</IfModule>
```

4.5 Search field reference

4.5.1 Textual search field

Fieldname	Description
file.name	the image filenames
IPTC	
iptc.caption	The contents of the IPTC 'Caption' field
iptc.writer	The contents of the IPTC Writer/Editor field
iptc.headline	The contents of the IPTC Headline field
iptc.special_instructions	The contents of the IPTC Special Instructions field
iptc.by_line	The contents of the IPTC By-line field
iptc.by_line_title	The contents of the IPTC By-line Title field
iptc.credit	The contents of the IPTC Credit field
iptc.source	The contents of the IPTC Source field
iptc.object_name	The contents of the IPTC Object Name field
iptc.city	The contents of the IPTC City field

Fieldname	Description
iptc.province_or_state	The contents of the IPTC Province/State field
iptc.country_or_primary_location	The contents of the IPTC Country/Primary Location field
iptc.original_transmission_reference	The contents of the IPTC Original Transmission Reference field
iptc.category	The contents of the IPTC Category field
iptc.supplemental_categories	The contents of the IPTC Supplemental Categories field
iptc.keywords	The contents of the IPTC Keywords field
iptc.copyright_notice	The contents of the IPTC Copyright Notice field
iptc.originating_program	The contents of the IPTC Originating Program field
iptc.fsi_search_data	The contents of the IPTC FSI Search Data field
iptc.country_code	The contents of the IPTC Country Code field
iptc.date_created	The contents of the IPTC Date Created field
iptc.record_version	The contents of the IPTC Directory Version field
iptc.fsi_encoding	The contents of the IPTC FSI Encoding field

Fieldname	Description
iptc.fsi_xmldata	The contents of the IPTC FSI Extra field
iptc.fsi_scenesets	The contents of the IPTC FSI SceneSets field
iptc.fsi_tilesx	The contents of the IPTC FSI Tiles X field
iptc.fsi_tilesy	The contents of the IPTC FSI Tiles Y field
iptc.release_date	The contents of the IPTC Release Date field
iptc.release_time	The contents of the IPTC Release Time field
iptc.time_created	The contents of the IPTC Time Created field
iptc.urgency	The contents of the IPTC Urgency field
EXIF	
exif.ApertureValue	The contents of the EXIF Aperture field
exif.BitsPerSample	The contents of the EXIF Bits per Sample field
exif.BrightnessValue	The contents of the EXIF Brightness field

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Fieldname	Description
exif.CFAPattern	The contents of the EXIF CFA pattern field
exif.ComponentsConfiguration	The contents of the EXIF Color components field
exif.ColorSpace	The contents of the EXIF Color space information field
exif.CompressedBitsPerPixel	The contents of the EXIF Compressed Bits per Pixel field
exif.Compression	The contents of the EXIF Compression field
exif.Contrast	The contents of the EXIF Contrast field
exif.Copyright	The contents of the EXIF Copyright holder field
exif.CustomRendered	The contents of the EXIF Custom image processing field
exif.DateTimeDigitized	The contents of the EXIF Date and time of digital data generation field
exif.DateTimeOriginal	The contents of the EXIF Date and time of original data generation field

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Fieldname	Description
exif.DeviceSettingDescription	The contents of the EXIF Device setting description field
exif.DigitalZoomRatio	The contents of the EXIF Digital zoom ration field
exif.ExifIDFPointer	The contents of the EXIF Exif IFD Pointer field
exif.ExifImageHeight	The contents of the EXIF Exif Image Height field
exif.ExifImageWidth	The contents of the EXIF Exif Image Width field
exif.ExifVersion	The contents of the EXIF Exif version field
exif.ExposureBiasValue	The contents of the EXIF Exposure bias field
exif.ExposureIndex	The contents of the EXIF Exposure index field
exif.ExposureMode	The contents of the EXIF Exposure mode field
exif.ExposureProgram	The contents of the EXIF Exposure program field

Fieldname	Description
exif.ExposureTime	The contents of the EXIF Exposure time field
exif.FNumber	The contents of the EXIF F number field
exif.DateTime	The contents of the EXIF File change date and time field
exif.FileSource	The contents of the EXIF File source field
exif.FlashEnergy	The contents of the EXIF Flash energy field
exif.Flash	The contents of the EXIF Flash field
exif.FlashpixVersion	The contents of the EXIF Flashpix Version field
exif.FocalLengthin35mmFilm	The contents of the EXIF Focal length in 35mm field
exif.FocalLength	The contents of the EXIF Focal length field
exif.GainControl	The contents of the EXIF Gain control field
exif.GPSAltitudeRef	The contents of the EXIF GPS Altitude Reference field

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Fieldname	Description
exif.GPSAltitude	The contents of the EXIF GPS Altitude field
exif.GPSDateStamp	The contents of the EXIF GPS Date Stamp field
exif.GPSDifferential	The contents of the EXIF GPS Differential field
exif.GPSDOP	The contents of the EXIF GPS Dilution of Precision field
exif.GPSImgDirectionRef	The contents of the EXIF GPS Image Direction Reference field
exif.GPSImgDirection	The contents of the EXIF GPS Image Direction field
exif.GPSLatitudeRef	The contents of the EXIF GPS Latitude Reference field
exif.GPSLatitude	The contents of the EXIF GPS Latitude field
exif.GPSLongitudeRef	The contents of the EXIF GPS Longitude Reference field
exif.GPSLongitude	The contents of the EXIF GPS Longitude field

Fieldname	Description
exif.GPSMapDatum	The contents of the EXIF GPS Map Datum field
exif.GPSMeasureMode	The contents of the EXIF GPS Measure Mode field
exif.GPSSatellites	The contents of the EXIF GPS Satellites field
exif.GPSSpeedRef	The contents of the EXIF GPS Speed Reference field
exif.GPSSpeed	The contents of the EXIF GPS Speed field
exif.GPSStatus	The contents of the EXIF GPS Status field
exif.GPSTimeStamp	The contents of the EXIF GPS Time Stamp field
exif.GPSTrackRef	The contents of the EXIF Track Reference field
exif.GPSTrack	The contents of the EXIF GPS Track field
exif.GPSInfoIDFPointer	The contents of the EXIF GPSInfo IFD Pointer field
exif.ImageHeight	The contents of the EXIF Image Height field

Fieldname	Description
exif.ImageDescription	The contents of the EXIF Image title field
exif.ImageWidth	The contents of the EXIF Image Width field
exif.InteropIDFPointer	The contents of the EXIF Interop IFD Pointer field
exif.InteropabilityIndex	The contents of the EXIF Interoperability Index field
exif.InteropabilityVersion	The contents of the EXIF Interoperability Version field
exif.ISOSpeedRatings	The contents of the EXIF ISO speed rating field
exif.LightSource	The contents of the EXIF Light source field
exif.MakerNote	The contents of the EXIF Manufacturer notes field
exif.make	The contents of the EXIF Manufacturer of image input equipment field

Fieldname	Description
exif.MarkerNoteIDF Pointer	The contents of the EXIF MarkerNote IFD Pointer
exif.MaxApertureVal ue	The contents of the EXIF Maximum lens aperture field
exif.MeteringMode	The contents of the EXIF Metering mode field
exif.Model	The contents of the EXIF Model of image input equipment field
exif.OECF	The contents of the EXIF Optoelectric conversion factor field
exif.Artist	The contents of the EXIF Person who created the image field
exif.PhotometricInte rpretation	The contents of the EXIF Photometric Interpretation field
exif.FocalPlaneYReso lution	The contents of the EXIF Pixels (height) per focal unit field
exif.FocalPlaneXRes olution	The contents of the EXIF Pixels (width) per focal unit field

Fieldname	Description
exif.PlanarConfiguration	The contents of the EXIF Planar configuration field
exif.PrimaryChromaticities	The contents of the EXIF Primary Chromaticities field
exif.PrintIM	The contents of the EXIF PrintIM field
exif.ProcessingSoftware	The contents of the EXIF Processing Software field
exif.RatingPercent	The contents of the EXIF Rating Percent field
exif.Rating	The contents of the EXIF Rating field
exif.ReferenceBlackWhite	The contents of the EXIF Reference Black White field
exif.RelatedImageFileFormat	The contents of the EXIF Related Image File Format field
exif.RelatedImageLength	The contents of the EXIF Related Image Length field

Fieldname	Description
exif.RelatedImageWidth	The contents of the EXIF Related Image Width field
exif.RelatedSoundFile	The contents of the EXIF Related Sound File field
exif.ResolutionUnit	The contents of the EXIF Resolution Unit field
exif.SamplesPerPixel	The contents of the EXIF Samples per Pixel field
exif.Saturation	The contents of the EXIF Saturation field
exif.SceneCaptureType	The contents of the EXIF Scene capture type field
exif.SceneType	The contents of the EXIF Scene type field
exif.SensingMethod	The contents of the EXIF Sensing method field
exif.Sharpness	The contents of the EXIF Sharpness field
exif.ShutterSpeedValue	The contents of the EXIF Shutter speed field
exif.Software	The contents of the EXIF Software used field

Fieldname	Description
exif.SpatialFrequency Response	The contents of the EXIF Spatial frequency response field
exif.SpectralSensitivity	The contents of the EXIF Spectral sensitivity field
exif.SubSecTimeDigitized	The contents of the EXIF Sub Sec Time Digitized field
exif.SubSecTimeOriginal	The contents of the EXIF Sub Sec Time Original field
exif.SubSecTime	The contents of the EXIF Sub Sec Time field
exif.SubjectDistance Range	The contents of the EXIF Subject distance range field
exif.SubjectDistance	The contents of the EXIF subject distance
exif.SubjectLocation	The contents of the EXIF Subject location
exif.Orientation	The contents of the EXIF The orientation of the image field

Fieldname	Description
exif.ImageUniqueID	The contents of the EXIF Unique Image ID field
exif.FocalPlaneResolutionUnit	The contents of the EXIF Unit for focal plane resolution field
exif.UserComment	The contents of the EXIF User comments field
exif.WhiteBalance	The contents of the EXIF White balance field
exif.WhitePoint	The contents of the EXIF White point field
exif.XResolution	The contents of the EXIF X Resolution field
exif.YCbCrCoefficients	The contents of the EXIF Y Cb Cr Coefficients field
exif.YCbCrPositioning	The contents of the EXIF Y Cb Cr Positioning field
exif.YResolution	The contents of the EXIF Y Resolution field

4.5.2 Comparative search fields

Fieldname	Description	Type
file.size	The file size in bytes	Number

Fieldname	Description	Type
file.width	The image width in pixels	Number
file.height	The image height in pixels	Number
file.lastmodified	The last modified date of the original image file	Date
iptc.release_date	The contents of the IPTC 'Release Date' field	Date
iptc.date_created	The contents of the IPTC 'Date Created' field	Date

4.6 When to use multiresolution source connectors

FSI Server 2016 supports multiresolution tif and fpx images as image sources without the need of importing them into the internal storage.

This feature is primarily directed at customers who already have a large stock of images with multiple resolutions embedded. Those customers establishing an FSI Server solution starting with flat (single resolution) images will need to use storage connectors if they do not want to rely on an external service to provide the multi-resolution images.

Customers with a small to medium size stock of multi-resolution images should consider the advantages and disadvantages of both options. The following table will assist in the decision.

|	storage	multi-resolution
supports jpg and png as source format	yes	no
response time (server performance) independent of source image size	yes	no
response time (server performance) independent of originating software	yes	no
requires import	yes	no
disk space required	usually more	usually less

4.7 LDAP Directory Structure

When configuring your FSI Server to retrieve the user and group information from an LDAP Server, then this information must be stored in a predefined directory structure. FSI Server will presume to find three branches beneath the base DN provided in the configuration.

All three branches must be instances of the object class "organizationalUnit" (OID: 2.5.6.5) as defined in the LDAP Core schema (RFC 2256). Two of the units contain the users, divided into administrators and standard users, the other contains the groups. The user objects are instances of "account" and optionally also instances of "simpleSecurityObject" if the password are also stored on the LDAP Server. Both, account and simpleSecurityObject are defined by the COSINE schema (RFC 1274). The group unit contains instances of "groupOfNames", also defined in the Core schema.

The following diagram illustrates the layout of the DIT as required by FSI Server.

```
                          ┌──────────────────┐
                          │     base DN      │
                          └──────────────────┘
                                   │
         ┌─────────────────────────┼─────────────────────────┐
┌──────────────────────┐  ┌──────────────────────┐  ┌──────────────────────┐
│class=organizationalUnit│ │class=organizationalUnit│ │class=organizationalUnit│
│ou=administrators      │ │ou=users               │ │ou=users               │
└──────────────────────┘  └──────────────────────┘  └──────────────────────┘
```

class=organizationalUnit
ou=**administrators**

class=organizationalUnit
ou=**users**

class=organizationalUnit
ou=**users**

class=account,
simpleSecurityObject
uid=**mr.slate**
userPassword=...

class=account,
simpleSecurityObject
uid=**fred**
userPassword=...

class=groupOfNames
uid=**flintstones**
member=uid=fred, ou=users,...
member=uid=wilma, ou=users,...

class=account,
simpleSecurityObject
uid=**barney**
userPassword=...

class=groupOfNames
uid=**rubbles**
member=uid=fred, ou=users,...
member=uid=wilma, ou=users,...

class=account,
simpleSecurityObject
uid=**wilma**
userPassword=...

class=account,
simpleSecurityObject
uid=**betty**

4.8 Systemwide Kerberos configuration

If FSI Server is configured to use a Kerberos server to validate the users passwords, then it will use the JVM wide Kerberos configuration by default.

This means that the Kerberos realm and the location of the KDC must be configured outside of the FSI Servers context. This configuration can therefore nnot be done using FSI Administrator or by editing the FSI Server configuration

files. The JVM will look for the configuration file in the following locations respecting the given order:

- a filename and path set by the JVM system property "java.security.krb5.conf",
- a file named krb5.conf in <java-home>\lib\security on Windows systems or <javahome>/lib/security on Linux
- in C:\winnt\krb5.ini on Windows or /etc/krb5.conf on Linux.

4.9 JMX MBean definitions

The MBeans provided by FSI Server are for monitoring purposes only and are logically grouped depending on the component providing them.

Request Processor Beans

Bean name	Description
Category: General	
Build	Build number the currently running FSI Server version
Major Version	Major version of the currently running FSI Server
Uptime	Number of seconds since the last start of the FSI Server
Vendor	The vendor of the software (NeptuneLabs)
Version	human-readable representation of the version number
VersionDecimal	Integer representation of the version number
Category: Licence	

Bean name	Description
BatchProcessing	States if batch processing is permitted by the licence
Edition	The purchased FSI Server Edition
Expired	States if the installed licence is expired
Licenced	States if a valid licence is installed
MaxGroups	Maximum number of user groups permitted by the licence key
MaxImages	Maximum number of assets permitted by the licence key
MaxConnectors	Maximum number of connectors permitted by the licence key
Staging	States if the installed licence is meant for staging prupuses only
Category: Performance	
ActiveCPUCount	Currently active CPU threads
ActiveCPUCountMax	Maximum number of simultaneously active CPU threads in the last 60 seconds
ActiveIOCount	Currently active IO threads
ActiveIOCountMax	Maximum number of simultaneously active IO threads in the last 60 seconds

Bean name	Description
CPULoadTotal	Current system CPU load
ConcurrentProcessing	Number of images currently being processed
ConcurrentProcessingMax	Maximum number of simultaneously processed images in the last 60 seconds
ConcurrentRequests	Number of requests currently being handled
ConcurrentRequestsMax	Maximum number of simultaneously handled requests in the last 60 seconds
GET	Number of GET requests handled by the server
HEAD	Number of HEAD requests handled by the server
POST	Number of POST requests handled by the server
HitsCached	Number of responses served from cache
HitsImage	Number of image-requests processed (excl. cached responses)
HitsInfo	Number of info-requests processed (excl. cached responses)
HitsList	Number of list-requests processed (excl. cached responses)
HitsSearch	Number of search-requests processed (excl. cached responses)
HitsTotal	Total number of requests handled

Bean name	Description
PixelsTotal	Total number of pixels sent out (excl. cached responses)
CPUQueueLength	Current number of CPU tasks waiting for execution
CPUQueueLengthMax	Maximum number of CPU tasks simultaneously waiting for execution in the last 60 seconds
IOQueueLength	Current number of IO tasks waiting for execution
IOQueueLengthMax	Maximum number of IO tasks simultaneously waiting for execution in the last 60 seconds
Status200	Number of requests answered with HTTP Status 200
Status302	Number of requests answered with HTTP Status 302
Status304	Number of requests answered with HTTP Status 304
Status400	Number of requests answered with HTTP Status 400
Status403	Number of requests answered with HTTP Status 403
Status404	Number of requests answered with HTTP Status 404
Status500	Number of requests answered with HTTP Status 500
Status503	Number of requests answered with HTTP Status 503
TTFB10 / TTLB10	Number of responses where the first/last byte was sent out in less than 10ms

Bean name	Description
TTFB25 / TTLB25	Number of responses where the first/last byte was sent out in less than 25ms
TTFB50 / TTLB50	Number of responses where the first/last byte was sent out in less than 50ms
TTFB100 / TTLB100	Number of responses where the first/last byte was sent out in less than 100ms
TTFB250 / TTLB250	Number of responses where the first/last byte was sent out in less than 250ms
TTFB500 / TTLB500	Number of responses where the first/last byte was sent out in less than 500ms
TTFB1000 / TTLB1000	Number of responses where the first/last byte was sent out in less than 1s
TTFB2500 / TTLB2500	Number of responses where the first/last byte was sent out in less than 2.5s
TTFB5000 / TTLB5000	Number of responses where the first/last byte was sent out in less than 5ms
TTFB5000plus / TTLB5000plus	Number of responses where the first/last byte was sent after more than less than 5s
TTFBAvg60 / TTLBAvg60	Average time to first/last byte for all requests handled in the last 60 seconds

4.9.1 Source Manager Beans

Bean name	Description
Category: Cache	
CachedObjects	Total Number of cached objects
TotalCacheSize	Total size of the level 2 cache
UsedCacheSize	Amount of level 2 cache used
*Requests	Number of requests directed at the cache
*L1Hits	Number of hits to the level 1 cache
*L2Hits	Number of hits to the level 2 cache
*SaveFailures	Number of failed attempts to save data in the cache
*Saves	Number of successful attempts to save data in the cache
* = Blob, Image, List, Metadata, Response, Tile	
Category: Scanner	
ScanTime	Number of milliseconds taken for the last scan
Category: Storage	

Bean name	Description
AssetCount	Total number of assets stored on the server
GroupCount	Total number of groups defined
ConnectorCount	Total number of connectors defined
AssetSize	Total size of the source files stored on the server (in bytes)
FreeSpace	Amount of free disk space on the partion containing the internal storage (in bytes)
ImagesProcessed	Images imported since last start
Pixels	Total number of pixel imported since last start
Processing	Number of images currently being imported
ProcessingSwap	Number of images currently being imported using swapfiles.
SwapImagesProcessed	Number of images imported using swapspace since last start
UsedSpace	Amount of disk space used on the partition containing the internal storage (in bytes)
TotalSpace	Total space on the partition containing the internal storage (in bytes)

4.10 Updating from FSI Server 2 to 2018

FSI Server 2018 introduces some major changes to the internal storage as well as the configuration file layout. In most cases it will be easier to perform the configuration from scratch based on the predefined configuration files instead of migrating existing files.

When configured to use an FSI Server 2 storage directory, the internal storage will be migrated to the new layout in the background. This implies, that storage can no longer be used by an FSI Server version 2, which makes downgrading impossible. You will also notice a higher load on the system while the storage is migrated.

Detailed information on migrating from FSI Server 2 as well as a list on configuration changes can be found in the "FSI Server 2018 Overview" available on the FSI Server website.

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