

# Definiens XD 1.2

## Release Notes

DEEPER INSIGHTS  
FASTER RESULTS  
BETTER DECISIONS

[www.definiens.com](http://www.definiens.com)



## Imprint and Version

Document Version

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## Dear User,

Thank you for using **Definiens** software. We appreciate being of service to you with image intelligence solutions.

At Definiens we constantly strive to improve our products. We therefore appreciate all comments and suggestions for improvements concerning our software, training, and documentation.

Feel free to contact us via web form on the Definiens support website <http://www.definiens.com/support/index.htm>.

Thank you.

## Legal Notes

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Protected by patents US 7146380, US 7117131, US 6832002, US 6738513, US 6229920, US 6091852, EP 0863485, WO 00/54176, WO 00/60497, WO 00/63788 WO 01/45033, WO 01/71577, WO 01/75574, and WO 02/05198. Further patents pending.

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## Overview

Definiens XD is a comprehensive image analysis platform for multi-dimensional image analysis. It contains all the client and server software needed to extract intelligence from any digital image in a fully-automated or semi-automated way.

### About Definiens XD 1.2

Definiens XD 1.2 is a minor functional update to Definiens XD 1.1 and includes a significant number of bug fixes to the XD software. Therefore, Definiens XD 1.2 is recommended for new customers and customers migrating from Definiens Enterprise Image Intelligence Suite™ products. Existing customers should review these release notes and decide the correct point in time to update to XD 1.2 to take advantage of these new features and bug fixes.

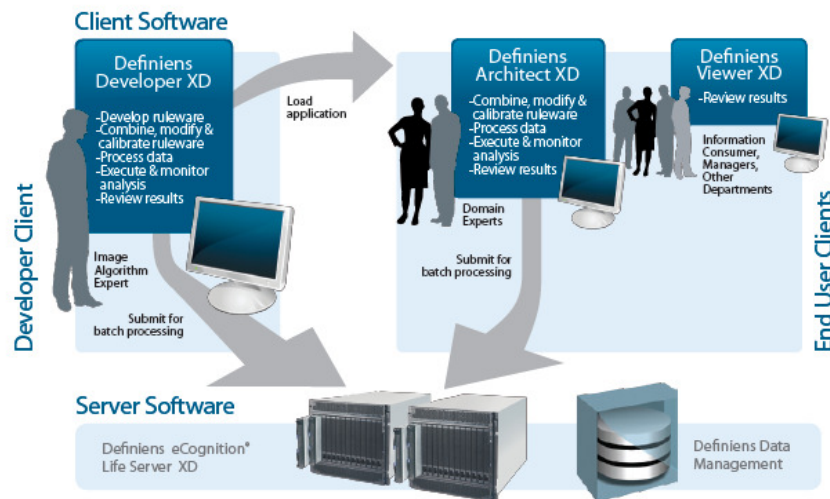


Figure 1: Definiens XD multi-dimensional image analysis software

## Key Features

### Role-based Definiens XD clients for application developers and end users

- Definiens Developer XD
- Definiens Architect XD
- Definiens Viewer XD

### Definiens eCognition Life Server® XD

- A scalable, server-based batch processing environment for multidimensional analysis.

### Comprehensive multi-dimensional data import

- DICOM support
- Generic import builder tool
- Multidimensional data model
- Support for many multi-dimensional image formats

**High performance analysis of complex multidimensional data**

- Definiens Cognition Network Technology® for XD
- Object-based pixel processing
- Multimap support and regions to support flexible analysis workflows including multi-magnification, registration and comparison workflows

**Full multi-dimensional object model**

- 3D features and algorithms
- Object linking for time series support

**Multi-dimensional image viewing**

- Multi-planner projections (XY,YZ,ZX)
- Animations of time series data
- Comparison views of multiple images side by side
- Linked object selection and picking
- Independent or synchronized views

**Sophisticated 3D visualization**

- Surface rendering of classified objects
- Rotation, zoom, class selection, transparency
- settings and export
- OpenGL hardware acceleration

**Integrated image registration**

- Rigid and elastic transformations
- Landmark and non-landmark based schemes
- Automated, semi-automated or manual landmark identification

**Comprehensive SDK for integration of XD image analysis into existing workflows or applications**

- Automation API
- Data IO API
- Engine API

# Moving to Definiens XD from Definiens Enterprise Image Intelligence™ Suite

Definiens XD has been designed carefully to enable customers currently using the Definiens Enterprise Image Intelligence™ Suite to move to Definiens XD. This is possible as Definiens XD provides a comprehensive range of backwards compatibility features.

The following features have been designed to enable a smooth transition for existing production applications.

- **Definiens XD GRID will support XD 1.0 packages and Enterprise Image Intelligence 7.0.x packages**

## **7.0.0 - 7.0.6**

A v7.0.x package can be hosted within an XD GRID. This allows customers to run 7.0.x analysis applications unchanged in the XD GRID.

An appropriate Enterprise Image Intelligence license is required to run these engines.

## **7.0.7-7.0.9**

A 7.0.7 package can be hosted within an XD GRID. This allows customers to run 7.0.7 analysis applications unchanged in the XD GRID.

When an engine is started it checks for a valid license. If a 7.0.7 engine is run it will first check for availability of an Enterprise Image Intelligence 7.0.7 engine license. If 7.0.7 license is not found a Definiens XD engine license will be consumed in place. This ensures that customers will not be required to maintain Enterprise Image Intelligence and XD licenses.

- **An Enterprise Image Intelligence 7.0.x client can submit jobs to an XD Grid.**

Enterprise Image Intelligence v7.0.x clients will be able to submit jobs to an XD GRID if the appropriate package has been uploaded and the appropriate licenses are available (See point 1 for licensing)

- **Definiens XD and Enterprise Image Intelligence Clients can be installed on the same PC**

Clients from both Definiens XD and Enterprise Image Intelligence can be installed on the same PC. These consume the appropriate license for this client software.

- **A Definiens XD Client can submit a 7.0.x rule set.**

An XD client can be used to submit an existing 7.0.x rule set. This will run on the GRID successfully if the required package is available and licenses are present. Results will be as per execution on 7.0.x GRID. The user will be required to adjust the advanced configuration settings which will default to XD values in order to do so.

- **An XD Client can load an 7.0.X rule set, if this rule set is then saved then the rule set is converted to XD**

Once saved the rule set is converted to XD format. The rule set should run as before. The results will only be viewable using an XD client. An XD license will be consumed. Since the conversion of the rule set is a one way process, therefore it is strongly recommended that 7.0.x rule sets are backed up before deploying XD products.

- **Definiens License Server**

As the license server component is shared between Enterprise Image Intelligence and XD your existing license server can be used to serve both the Enterprise Image Intelligence and XD product licenses.

For detailed information regarding the new capabilities of Definiens XD products please see the respective user guides. These also contain difference between XD and the 2D product range to assist with planning upgrades.

The Definiens services' team has built extensive experience planning migrations and upgrades for our customers. We recommend before planning a migration you consult with Definiens service team, who will be happy to provide insight into the migration process.

# New Features

Definiens XD 1.2 includes over 100 new features and a significant number of bug fixes that improve the stability and reliability of the Definiens XD products.

The highlights are:

- **Advanced Application Building**
  - Control Look & Feel
  - New widgets
  - Library to rule set communication
  - Object result review tool
- **TMA workflow enhancements**
- **Multi-user workflow support**
- **Enhanced Ruleset Development (CNL)**
  - Over 25 algorithm extensions and improvements, including
  - Map Manipulation Algorithms
  - Significantly improved handling of spatial relationships
  - Profiling tools for ruleset performance measurement and tuning
  - Range of New Features
- **Wider Connectivity**
  - **Additional Slide Scanner Support**
    - Olympus dotSlide
    - TissueGnostics
    - Seamless export of results in real units
  - **New 3D Connectivity**
    - Evotec Opera Z Stack Support
    - Zeiss ZVI
    - Leica LIF
    - DICOM PET Support and additional metadata levels
  - Linux and Windows Support for all image formats (Via Image Proxy Server)
- **Viewing Performance and Usability Improvements**
  - **Viewer Usability**
    - Ability to overlay features on Map displays
    - Multiple Select on Image Objects
    - Linked Views between Maps
    - Save restore view settings includes works with maps and splits
  - **Performance Improvements**



- Image Proxy Server provides
  - Automatic zoom cache creation using Image Proxy Server for fast viewing in background
  - Calculation and cache of Image statistics
  - Thumbnail creation in background processes
- Intelligent screen update - redraw image only if objects have changed
- **Improved Usability**
- **Platform and Processing Enhancements**

The individual features are described in more detail in the subsequent sections,

## Advanced Application Building

Definiens XD 1.2 brings many enhancements to the Definiens Developer Application Builder functionality. These allow you to build applications with greater usability and tighter integration between ruleset and the action libraries. These capabilities were developed and used to create the new Definiens Tissue Studio product and are available for the development of similar highly usable applications.

Ref #	Category	Feature
13576	Analysis Builder	Configurable load solution dialog
13475	Library to rule set communication	MOCT and Image Object Table: spatial sorting of image objects
13485	Library to rule set communication	Apply active action to variables
13375	Control Look and Feel	Ability to define priorities for actions to order appearance in add action dialog
13552	Control Look and Feel	Checkbox row for classes
13554	Control Look and Feel	Hide unused groups in read-only solutions
13285	Control Look and Feel	Support for multiple object selection
13094	Control Look and Feel	Ability to define colors for widget groups
14506	Control Look and Feel	Enable/disable widgets by process variable
13491	Control Look and Feel	Improved UI: snapping of widget area to actions, scrollbars and more
13621	Control Look and Feel	Sliders: add On Change call back process
13502	Library to rule set communication	Load rule sets from library during start up
13430	Library to rule set communication	Add call-backs to action definitions
13385	Library to rule set communication	General Settings support Ruleset
13429	Library to rule set communication	Rule set can query used actions
12894	New Widget	New widget radio button row and class editing
13229	New Widget	Feature Selector Widget: type options
13469	Object Review Result Tool	Manual Object Classification Widget

## TMA workflow enhancements

Several significant improvements to the TMA workflow are available

Ref #	Category	Feature
12826	TMA Workflow	Add core type ignore
12828	TMA Workflow	Added annotation support for cores and import from .csv file. Annotations are added as thematic layer "CoreROI" attributes for access in the ruleset
13364	TMA Workflow	Change TMA grid item naming to ensure correct sorting order

## Multi-user workflow support

Ref #	Category	Feature
13122	Multi.use workflow support	Support multi user access to single workspace. This allows steams working on the project in parallel. For example, pre-process 20 scenes.

## Enhanced Ruleset Development (CNL)

Definiens XD 1.2 includes many improvements to develop improved rulesets including:

- Over 25 algorithm extensions and improvements and Features
- Updated Map Manipulation Algorithms
- Significantly improved handling of spatial relationships
- Profiling tools for ruleset performance measurement and tuning

Ref #	Category	Feature
12909	Algorithm	Timer algorithm
12913	Algorithm	Pixel based Object resizing: min Obj Size Parameter to avoid efficiently disappearing of small objects.
13317	Algorithm	Pixel based shape processing: connector: improved performance, weight color/distance
13162	Algorithm	Pixel based shape processing: connector: works in 3D, absolute color mode
12790	Algorithm	Pixel filter sliding window
13305	Algorithm	Read statistics: do not read undefined
13490	Algorithm	Read subscene statistics: new parameter Output Type
13585	Algorithm	Read subscene statistics: Tiles of subset with prefix
13234	Algorithm	3D edge filter
13427	Algorithm	Read/Write Access to resolution and magnification. This allows a ruleset to read the current value of resolution and magnification and algorithm to modify them.
13034	Algorithm	If/then/else syntax added to CNL.
13044	Algorithm	Throw/catch framework for more effective exception management in CNL.
13245	Algorithm	Create scene subset: variable for scale and scene name
13431	Algorithm	Manual Classification: Added Brush Size Parameter
12931	Algorithm	Select input mode: manual classification brush mode
12996	Classes	Define Class Color based on parent class color
7647	Classification	Support Weights in Membership Functions
11939	CustomizedAlgorithm	New domain: from calling process (domain definition)

12901	Engine	Add "active map" parameter for maps in domains
12963	Engine	Existing class descriptions are now overwritten when loading a rule set
13200	Engine	Feature list variable
12959	Engine	Image Object List Concept and Algorithm. Enables processing of objects using sort order. For example select largest objects first.
12890	Engine	Improved performance on resampled multimap images. Improves the performance particularly of large image access.
13915	Engine	Map visibility mechanism to hide maps in the UI. Includes a parameter in copy map function.
13965	Engine	Improve performance when handling of encrypted rule sets
1823	Engine	Save customized relational features with duf files to allow simpler ruleset exchange.
12878	Engine	Shape file export for disconnected objects
13395	Engine	When exporting local features skip prefix to make naming human readable,
13302	Algorithm	Export image algorithm. This can be used to create new images based on internal images, export filters, data conversion etc
13733	Algorithm	Export: should take variables for statistical operations yes/no
12943	Maps	Support Multiple Exports for Map based MultiScale Workflows
13148	Maps	Copy Map: added rotation parameter. This can be used for own linear registration workflows
12847	Maps	Copy map: support variable for scale parameter
13442	Maps	Display map name in auto names
12627	New Features	New feature # of brighter objects, # of darker objects used to compute color relations between neighbouring objects,
11002	New Features	Circular StdDev/Mean
12136	New Features	Relative Border to Image Border
12998	New Features	Number of maps
13045	Process	Second threshold in domains
11746	Spatial Relationships	Distance map for the computation and interpretation of spatial relationships.
13286	Process Editor	Keyboard shortcut for execute on selected object (F6). Allows to step through longer sequences with f6 as long objects do not get resegmented

## Wider Connectivity

Definiens XD 1.2 further extends connectivity for several new 3D image formats and additional Tissue Slide scanner formats.

Ref #	Category	Feature
	3D connectors	Analyze 7.5 and AVW formats that are common for non-invasive imaging in preclinical.
	3D connectors	Evotec Opera Z stack support
	3D connectors	Leica LIF
	3D connectors	Zeiss zvi driver
13070	3D connectors	DICOM: Support for additional metadata tags
	3D connectors	DICOM PET Support and additional metadata levels
13687	Cell Connectors	Native c01 file format support (beta)
13288	SDK	BDI Driver can popup driver specific dialog to specify file options
14022	Tissue Connectors	VDI Driver for Aperio Annotation Files (beta)
13361	Tissue Connectors	Magnification and resolution information is available for tissue drivers to enable export of results in real units' not just pixels.
	Image Proxy Server	All Image formats are now available for Linux eCognition Server using new Image Proxy Service (e.g. Zeiss Mirax)

## Viewing Performance and Usability Improvements

Definiens XD 12 contains some significant features that enable high performance viewing of large images, improved usability and control of the viewing environment by new or enhanced algorithms.

Ref #	Category	Feature
13903	Usability	Set custom view settings algorithm
12876	High Performance	Thumbnail creation is faster and no longer blocking as created by Image Proxy Server
12877	High Performance	Zoomcache creation is faster and no longer blocking as created by Image Proxy Server
12999	Usability	Define view layout: configure split state and display mode of views. This enables the Architect UI to be configured through an algorithm.
13280	Usability	Algorithm to save/restore view settings works with maps + splits
12883	Usability	Intelligent screen update. Redraw only if image objects get modified. Improves performance during ruleset development.
12966	Usability	Ability to display features in the map display
12881	Usability	Linked Views between maps
	Usability	Shift+left mouse: multiple select on image objects
13360	Usability	Display thumbnail rgb images without any equalization

## Usability

Ref #	Category	Feature
13074	Select Scale Dialog	Clearer explanation of which map scale relates to.
14044	Heatmap/Workspace	New list mode: Child Scenes. show only next level in workspace tree
12916	Data Import	Use Image filename as default project name
13607	Client	Display status of server components in status bar

## Platform

Ref #	Category	Feature
13367	Job Scheduler	Ability to define start index for job ids
13331	Platform	<p>Ability to start local servers direct from within the client without additional installations to support simpler deployment of Workstation like applications</p> <p><b>Note:</b> The Start Analysis Job dialog will by default have the job scheduler location as the local server. e.g. <a href="http://localhost:8186">http://localhost:8186</a> . To submit jobs to another Job Scheduler you will need to update both the name of the server and the port number will need to be changed to 8184. e.g. <a href="http://remoteservername:8184">http://remoteservername:8184</a>.</p>
13514	Installation	Separate installer for the command line client
	Image Proxy Server	New Image Proxy Server Component

## Image Proxy Server (IPS)

Definiens XD 1.2 includes a new infrastructure component the Image Proxy Server (IPS). The IPS is included with all clients and can also be setup as a centralized server component. The benefits of using the IPS are:-

- Improved caching and view performance
- Can serve windows only file formats to a linux eCognition Server

The Image Proxy Server is responsible for creating and maintaining cache data there is additional processing which is being executed. Please consult both the System Requirements and the Installation Guide for a detailed understanding of the Image Proxy Server and system requirements before upgrading.

**Note:** The Image Proxy Server uses new algorithms for down sampling. This may result in different results being obtained that in previous versions. If you wish to get identical results you should configure your environment not utilize the IPS for these formats. For additional information on backwards compatibility please see the following support note in the support knowledge base.  
<https://definiens.zendesk.com/forums/24419/entries/70057>

## Bug Fixes

Definiens XD 1.2 contains a significant number of bug fixes (200+) over Definiens XD 1.1.2 that improves stability and reliability of the Definiens XD products. The most significant of these bug fixes are detailed below.

Ref #	Category	Description
8528	Algorithm	Delete tiles/subsets: should delete folders as well
9817	Algorithm	Line extraction: it doesn't work as expected
10069	Algorithm	Export Vector Layer: Storage location is ignored when exporting shp files in server mode
10297	Algorithm	Custom Features: relational feature: sub objects unclassified
10358	Algorithm	Feature: HSI: Create for all layers: Creates features with randomly selected layers
10488	Algorithm	Layer arithmetics: does not work as expected. There is a new version of layer arithmetics algorithm, which has explicit input and output layers.
10763	Algorithm	Feature: HSI transformation gives wrong Hue results for red objects
11946	Algorithm	Segmentation: 32bit values: low values are not correctly segmented
12291	Algorithm	Image object domain Linked objects: Max. distance doesn't accept variables
12311	Algorithm	Convert to sub-objects doesn't update the neighbours of the neighbour objects of the object
12472	Algorithm	Export Vector Layers: attribute alias change back to default if adding a new attribute
12626	Algorithm	Find enclosed by class: finds all with rel. border in 3D
12650	Algorithm	Copy map: thematic layers are not copied
12765	Algorithm	"img obj. to smpl." does not take parameter or class variable
12835	Algorithm	Pixel-based object resizing: autonaming is missing resulting classes
12841	Algorithm	Merge Region: Very slow when merging 3d objects with 2d objects
12856	Algorithm	Compose Text: CRASH when using From Feature
12860	Algorithm	Copy Map: CRASH when cancelling processing
12969	Algorithm	Update Region: Mode Resize: extent online description for better understanding
13053	Algorithm	Create temporary layer: returns multiple error messages: undefined detected
13055	Algorithm	Layer Arithmetics: Expression parser does not function with local scene variables inside a CA
13126	Algorithm	Create links: target level is not accepted on target map
13128	Algorithm	CRASH: when executing pixel grow on multiple maps
13130	Algorithm	CRASH: when executing lee sigma filter
13179	Algorithm	Copy Map: Layer aliases are lost when copying map
13248	Algorithm	Layer arithmetics: should work on second image object level
13287	Algorithm	Layer arithmetic should support object variables as output value
13332	Algorithm	CopyMap reverses physical layer order in comparison to original map
13354	Algorithm	Crash in Haralick Features
13407	Algorithm	Multithreshold merges objects after cutting
13441	Algorithm	set input mode by process: does not work on other maps
13463	Algorithm	Copy Map: when using Smooth resampling image layer size doesn't match object level extend
13538	Algorithm	Create scene subset does not support local object domains and maps
13549	Algorithm	submit tiles recursively: sequential instead of parallel processing

Ref #	Category	Description
13580	Algorithm	Read subscene statistics: Only read from first column if project consists of just one tile
13814	Algorithm	copy map: removed user warning "geocoding projection unknown"
13858	Algorithm	Compute Statistical Value: Auto Naming: Mode Number" should not display feature name
13959	Algorithm	Synchronize Map: using Target region does not synchronize at all
14033	Algorithm	customized relational feature bug - position feature Y direction
14177	Algorithm	merge region: optimized performance when used when very large fractal objects exist
14183	Algorithm	Copy Map: Scale: set Magnification does not behave as absolute value
14285	Algorithm	Synchronize Map: synchronization to main shows object shift
14337	Algorithm	Algorithm: remove objects: does not remove objects when upper level exist
10557	Analysis Builder	Update action from parameter set does not work as expected
13082	Analysis Builder	Radio Button: on release process is not called when other button is selected.
13362	Analysis Builder	display becomes black when a certain Architect Action is executed
13907	Analysis Builder	dropdown: added support for special characters
13368	API	JobScheduler: WDSL does not work
12688	Connector	Mirax-cropped crashes without Mira viewer
12734	Connector	Customized Import: Metadata Import from DSIF is not working
12937	Connector	DICOM: Slice Distance of Project is wrong
12946	Connector	Mirax: Background value 128 only in certain areas
13424	Connector	Improved Performance of Ariol driver
14287	Customized Algorithms	Work correctly when feature variable is used as parameter
8714	Developer	multiple open windows and thematic layer display leads to CRASH
8737	Developer	Undo: crash after reaching memory limit
10360	Developer	Create Project opens Haralick Feature in Feature View
12044	Developer	Customized Algorithms: Copy and paste can create duplicate local variables
12249	Developer	Feature View not working if it's undocked
12496	Developer	Certain manipulation of windows causes Class Hierarchy to stop functioning
12554	Developer	Viewer Display: Shift with different resolutions
12715	Developer	Incorrect resampling or crash during drawing of XZ projection for a project with different size layers.
12900	Developer	Undo on processed image: causes endless processing
13002	Developer	Process Tree: user cannot remove Breakpoint from algorithm without icon
13090	Developer	Add Map: 2nd map disables ability to view yz and xz projections due to wrong handling of geocoding

Ref #	Category	Description
13349	Developer	Find and Replace: In text search mode 'return' works only after pressing twice
13370	Developer	Create project dialog: wrong magnification for image with both magnification and resolution defined
13422	Developer	Image object table: up and down keys do not function when focus is in image viewer
13440	Developer	Classes can not be deleted when they have sub classes used in the hierarchy
13583	Developer	Renaming variable deletes condition occurrences
13736	Developer	Sometimes context menus do not appear when switching perspectives very often
13781	Developer	Customized Import: Can't deal with copy and paste of path information
13782	Developer	Customized Import: Does not work when leading blanks in search string are present
12598	Engine	Fixed issues arising from submitting tiles or subsets recursively
12830	Engine	Path of attribute files for thematic layers if not correctly updated when moving the images
13400	Engine	Crash when loading rule sets with different number of layers
13487	Engine	Crash during loading of ruleset
13085	Export	create project statistics: empty file is created when threshold condition is not met
13320	Export	export feature variables should export the name of the value not the variable name
13038	Feature	Autonaming of "Number of maps"
12875	Linux	Cannot stop ControlService
13196	Linux	Worker nodes did not respect maximum file size of DIAControlService.log
13091	Loading	Feature Space: error messages to be removed when loading project
13173	Samples	Samples: Sample Brush: CRASH when collecting samples
12552	SDK	Using CancelJob() with C# leads to hanging Application
13300	SDK	DIAMkWksp: Workspace not created using customized import
13778	SDK	Crashes when shutting down the engine with DICOM images
12525	Workspace	Skipped tiles and of type "Skipped" when using more than one level in the folder hierarchy
13372	Workspace	Closes when creating two folders of the same name
13511	Workspace	Selection does not change to new created project when opening MultiMap Project from several scenes
13787	Workspace	Moving Workspace: Error Message when meta data is used
13856	Workspace	Crash when importing existing project
14390	Workspace	Temp. layers are not stored with the WS using save as



# Known Issues and Limitations

## Installation and Operation

- 9693     Installation: uninstall Grid does not delete all folders.
- 9694     Configuration: 'central storage location' needs to be set manually on linux.

## Late Changes

None.

## Documentation Errata

None.

## Additional Information

For additional information please contact [support@definiens.com](mailto:support@definiens.com)