



*iSchemaView, Inc.*

# **RAPID**

**Made by Experts for Experts**

# **User Manual**

**April 1, 2017 (RAPID 4.7)**

## Introduction

RAPID is a medical viewing, analysis and processing package developed with a view to ease of use and high performance. In addition to a wide range of basic image processing and analysis functions, RAPID provides comprehensive functionality for dynamic image analysis (e.g. perfusion) and processing /display of diffusion-weighted MRI (DWI) data.

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## Caution

**Federal law restricts this device to sale by or on the order of a physician.**

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## 1. Glossary

Term	Acronym	Definition
Apparent diffusion coefficient	ADC	Units of $10^{-6}$ mm <sup>2</sup> /seconds
Arterial Input Function	AIF	N/A
Diffusion attenuation factor	b/b-value	Units of seconds/mm <sup>2</sup>
Contrast Agent	CA	N/A
Cerebral Blood Flow	CBF	ml/min/100g
Cerebral Blood Volume	CBV	ml/100g or %
color Fractional Anisotropy	cFA	FA color modulated by the direction of the principal eigenvector
Computed Tomography	CT	N/A
CT Perfusion	CTP	N/A
Digital Imaging and Communications in Medicine	DICOM	N/A
Dynamic Susceptibility Contrast	DSC	N/A
Diffusion Tensor Imaging	DTI	N/A
Diffusion weighted MRI	DWI	N/A
Exponential ADC	eADC	N/A
Fractional Anisotropy	FA	A unitless number between 0.0 and 1.0
Fourier-based (deconvolution)	FB	N/A
Isotropically weighted DWI	isoDWI	N/A
Joint Photographics Experts Group	JPEG	N/A
Portable Network Graphics	PNG	N/A
Magnetic Resonance Imaging	MR/MRI	N/A
Mean Transit Time	MTT	Seconds
Picture Archiving and Communications System	PACS	N/A
Protected Health Information	PHI	N/A
Perfusion Weighted MRI	PWI	N/A
Rapid Processing of Perfusion and Diffusion	<i>RAPID</i>	N/A
Simple Mail Transfer Protocol	SMTP	N/A
Signal-to-Noise Ratio	SNR	N/A
Tissue Residue Function Time to Maximum	T <sub>max</sub>	Seconds
Transport Control Protocol/Internet Protocol	TCP/IP	N/A
Echo Time	TE	Milliseconds (ms)
Trace of the diffusion tensor	Trace	The sum of the three eigenvalues computed in a DTI study, or the sum of the x, y, and z ADC values in a 3 axis diffusion study.
Venous Output Function	VOF	N/A

## 2. RAPID Indications for Use

iSchemaView's RAPID is an image processing software package to be used by trained professionals, including but not limited to physicians and medical technicians. The software runs on a standard "off-the-shelf" computer, or, a virtual platform such as VMware, and, can be used to perform image viewing, processing and analysis of brain images. Data and images are acquired through DICOM compliant imaging devices.

iSchemaView's RAPID provides both viewing and analysis capabilities for functional and dynamic imaging datasets acquired with CT Perfusion and MRI including a Diffusion Weighted MRI (DWI) Module and a Dynamic Analysis Module (dynamic contrast enhanced imaging data for MRI and CT).

The DWI Module is used to visualize local water diffusion properties from the analysis of diffusion-weighted MRI data.

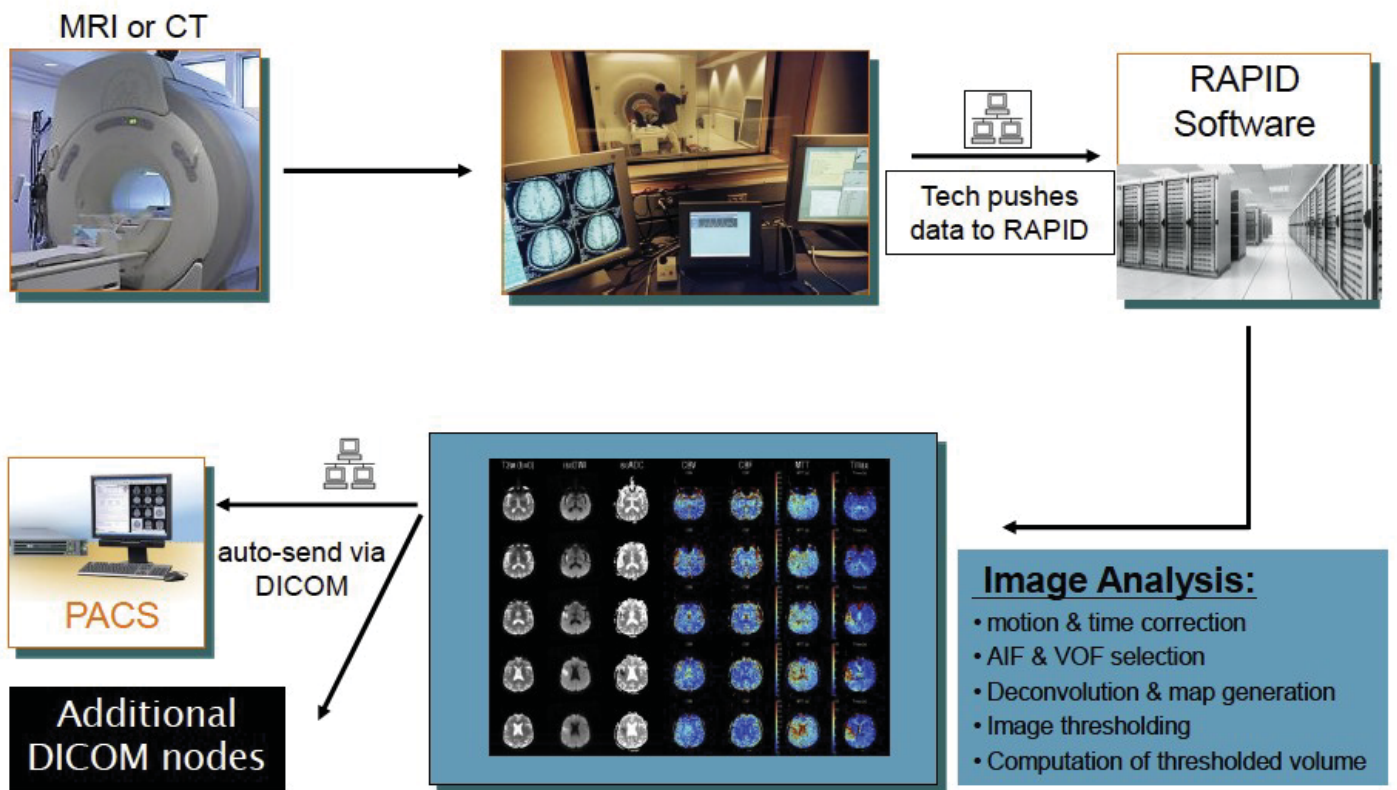
The Dynamic Analysis Module is used for visualization and analysis of dynamic imaging data, showing properties of changes in contrast over time. This functionality includes calculation of parameters related to tissue flow (perfusion) and tissue blood volume.

The RAPID CT Module is used to tilt-correct Head CT images and identify the ASPECT regions using a standardized grid, while the Hounsfield unit data for each region is shown in the table adjacent to the images.

### 3. Overview of the RAPID System

iSchemaView's mission is to assist health care professionals with performing their jobs easier and faster without any loss in quality. Building on several decades of experience in clinical work, medical image processing, and MR and CT image physics, we have put together a software package that is fully integrated into the clinical workflow.

iSchemaView's RAPID System focuses only on processing CT and MR perfusion and diffusion imaging data. RAPID has been designed to streamline medical image processing tasks that are time consuming. RAPID can be installed on a virtual machine running on a server within a hospital's network, and can be operated remotely and with minimal user interaction. The figure below shows the typical workflow of RAPID in a clinical setting. Once the CT or MR data are acquired, the physician selects RAPID as the target for sending the DICOM images. The physician then selects the study/series to be sent to RAPID and pushes the corresponding DICOM images to RAPID. Based on the type of incoming DICOM data, RAPID will identify them as CT or MRI data, and determine whether they are perfusion, diffusion or other scan types, for which a predefined RAPID processing protocol exists.



Once the 'dispatcher' application of RAPID recognizes a specific processing protocol, RAPID will commence the execution of all steps in the processing protocol as configured in the global processing settings for this protocol. After the data processing is complete, RAPID will return the DICOM images to the targets pre-specified by the user (e.g. to a PACS, MR, CT, or image processing workstation). Similarly, secure emails, devoid of any protected health information, can be sent to recipients if pre-specified in the configuration.