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# MITK Tutorial


## Introduction

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# What and why is MITK

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## The Medical Imaging Interaction Toolkit (MITK)

The Medical Imaging Interaction Toolkit (MITK) is a free open-source software system for development of interactive medical image processing software. MITK combines the Insight Toolkit (ITK) and the Visualization Toolkit (VTK) with an application framework. As a toolkit, MITK offers those features that are relevant for the development of interactive medical imaging software covered neither by ITK nor VTK; see the [Toolkit Features](#) for details.

MITK can be used or integrated with existing solutions in several ways; see [Research Platform](#) for examples.

### Tools

- What links here
- Related changes
- Special pages
- Printable version
- Permanent link

## News

### MITK 2016.03 Releases

#### Workbench and Toolkit 2016.03

**April 2016**

[MITK 2016.03](#) has been released.

The minimum required versions for


- CMake is still version 3.2
- and for Qt version 5.0 - 5.5 (version 5.6 is not yet supported)

The minimum required versions of supported compilers haven't been changed:

- MSVC 2012 Update 4
- GNU 4.7.3
- Clang 3.4
- AppleClang 5.0

Read the [full release notes and a list of highlights](#).

You can [download an installer](#) containing the MITK Workbench application for Windows, Linux, and OS X.



# What and why is MITK

Total Lines :	2,208,698	Code Lines :	1,371,538	Percent Code Lines :	62.1%
Number of Languages :	16	Total Comment Lines :	440,222	Percent Comment Lines :	19.9%
		Total Blank Lines :	396,938	Percent Blank Lines :	18.0%

## Code, Comments and Blank Lines

Zoom 1yr 3yr 5yr 10yr **All**

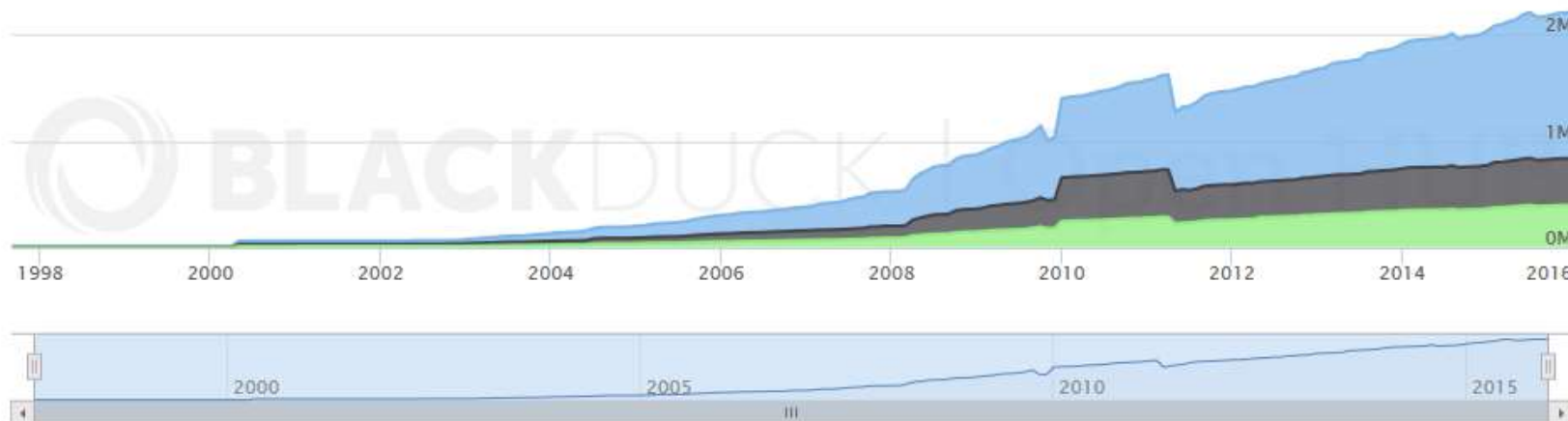





Image taken from <https://www.openhub.net/>

## What you expect from this tutorial

- experience some fancy ways to achieve interesting results with MITK
- detail about mitk libraries and plugins 
- learn basic components, learn how to build, learn how to use existing tools from command line
- getting to know the ropes, and how to make a good hello world program
- Learning about recent developments / directions / project transparency / contributions policy 
- to be more familiar with the plugin development and the major concepts of visualization and tracking 

# Agenda

- Introduction
  - Demo, Usage scenarios and license
- Theory
  - Build System and MITK architecture
- Practice
  - Exemplary implementation using MITK

# Workbench Demo

MITK can be used as

- Toolkit
- Application
- Application with custom extensions
- Software Framework for a custom application

## Toolkit

```
CMakeLists.txt | main.cpp
1  cmake_minimum_required(VERSION 3.2 FATAL_ERROR)
2
3  project(MyProject)
4
5  find_package(MITK 2016.03 REQUIRED)
6
7  add_executable(MyApp main.cpp)
8
9  target_link_libraries(MyApp MitkCore)
10
```

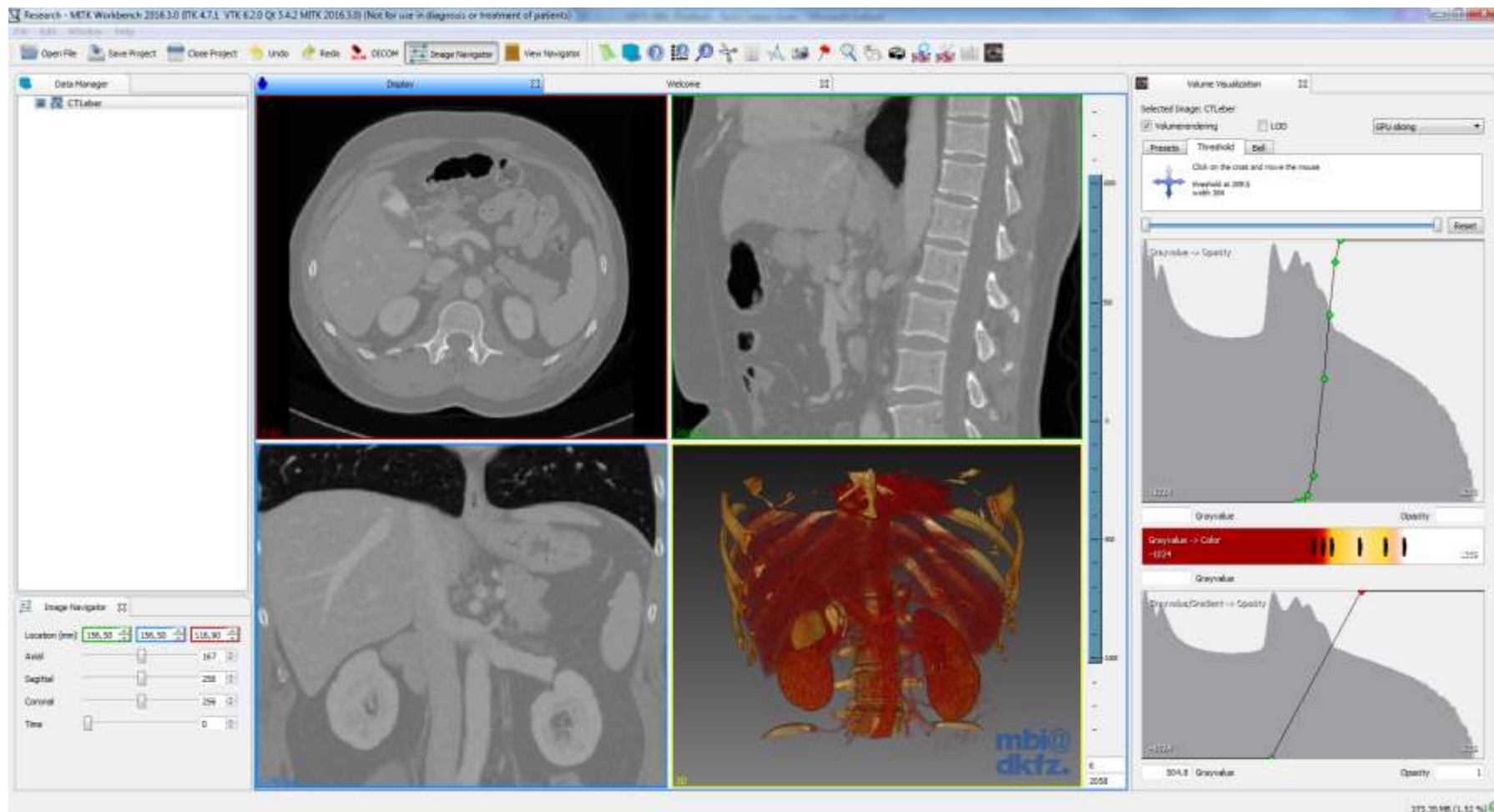
```
CMakeLists.txt | main.cpp
1  #include <iostream>
2  #include <mitkLogMacros.h>
3
4  int main() {
5      MITK_INFO << "Hello world!";
6      return 0;
7  }
```

```
C:\Windows\system32\cmd.exe
D:\goch\mitk_toolkit_project\bin\Release>MyApp.exe
Tue Apr 19 19:24:56 2016
0.00 Hello world!

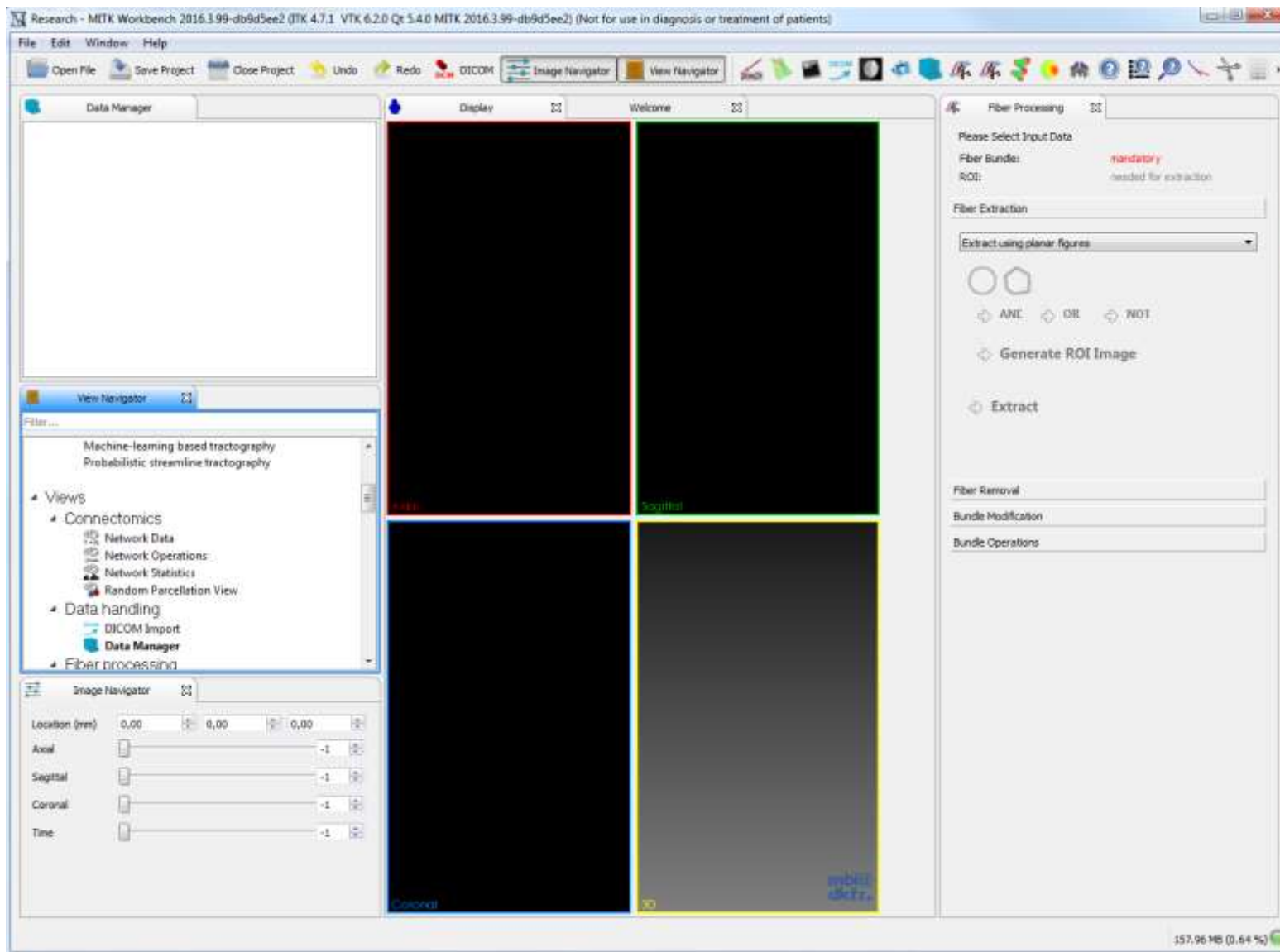
D:\goch\mitk_toolkit_project\bin\Release>
```



# MITK as Application



# Extending MITK Applications



# Custom Applications & Projects

The screenshot shows a GitHub repository page for 'MITK-ProjectTemplate'. At the top, the branch is set to 'master' and the URL is 'https://github.com/MITK/...'. Below the repository name, there is a table of files and folders with their commit messages and dates. The 'README.markdown' file is selected, showing its content.

File/Folder	Commit Message	Time Ago
Apps	Remove last occurrences of Qt 4	5 days ago
CMake	Initial project commit.	5 years ago
CMakeExternals	Updated MITK version to release 2016.03	5 days ago
Documentation	Remove last occurrences of Qt 4	5 days ago
Modules	Adapt to changes from branch bug-17905-enable-mtk-image-itk-vecnorm...	2 years ago
Plugins	Add SliceNavigation Slice Selection	8 months ago
.gitignore	Added backup files to the ignore list	3 years ago
CMakeLists.txt	Updated MITK version to release 2016.03	5 days ago
Changelog.txt	Added an example implementation of a MITK render window editor.	4 years ago
Copyright.txt	Initial project commit.	5 years ago
README.markdown	Adapt Qt version requirements	5 days ago
SuperBuild.cmake	If set, pass QT5_DIR to AwesomeProject.	9 months ago

## The MITK Project Template

This project provides a complete CMake-based set-up to get easily started with using MITK and extending it via plug-ins and modules.

### Provided Features

- Superbuild: Let your project download, configure, and build its dependencies automatically.
- CTK Plug-ins: Easily integrate new CTK-based plug-ins.
- Deployment: Create deployable packages of your project

<https://github.com/MITK/MITK-ProjectTemplate>

## MitkCommandLine module

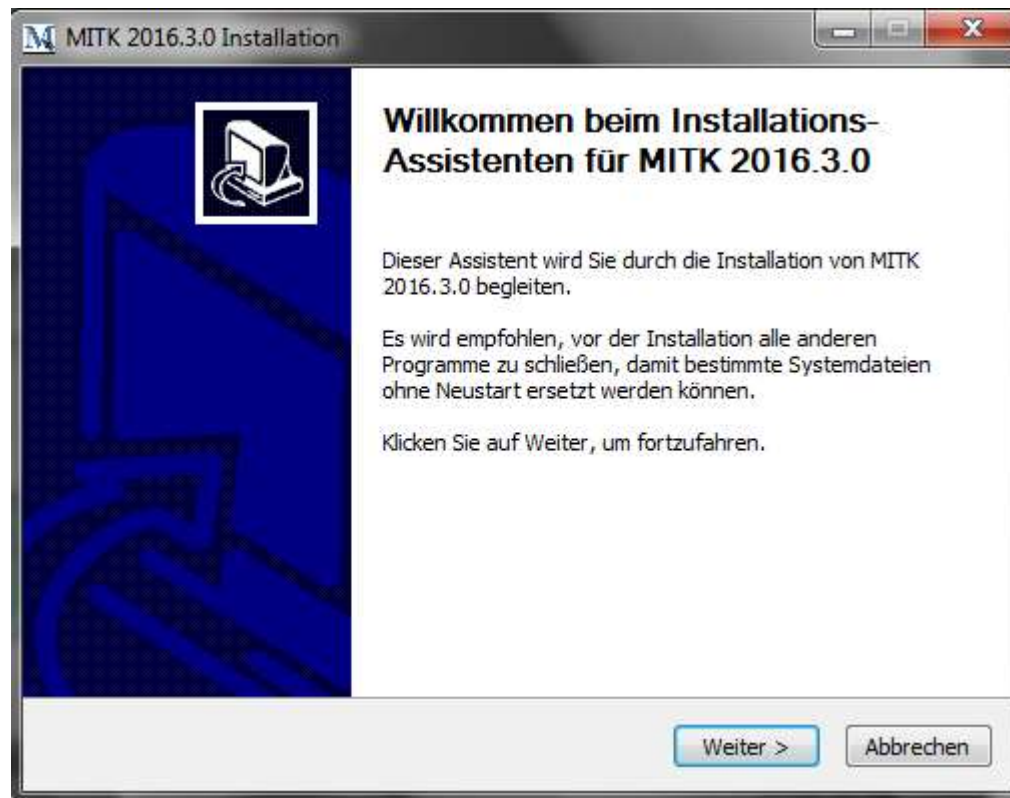
```
D:\bug\MITK-build\bin\Release>MitkNetworkStatistics.exe
Command Line Utility *Network Statistics* in Category *Connectomics*

MBI

Use --xml to generate an XML description parsable as a CTK Command Line Module Plugin.
-i, --inputNetwork, input connectomics network (.cnf)
-o, --outputFile, name of output file
-g, --noGlobalStatistics, Do not calculate global statistics (optional)
-I, --createConnectivityMatriximage, Write connectivity matrix image (optional)
-b, --binaryConnectivity, Whether to create a binary connectivity matrix (optional)
-r, --rescaleConnectivity, Whether to rescale the connectivity matrix (optional)
-L, --localStatistics, Provide a list of node labels for local statistics (optional)
-R, --regionList, A space separated list of regions. Each region has the format
regionname;label1;label2;...;labelN (optional)
-gr, --granularity, How finely to test the density range and how many thresholds to consider (optional), (default: 1)
-d, --startDensity, Largest density for the range (optional), (default: 1)
-t, --thresholdStepSize, Distance of two adjacent thresholds (optional), (default: 3)
```

# Deployment

- Installer build on Windows, Linux, and OS X
  - Build PACKAGE project
  - Via CPack (using NSIS 2 on Windows)



- BSD 3 clause like license
  - Not GPL compatible
  - LGPL compatible via dynamic linking
- Be aware of Qt licensing model
  - No superbuid integration partly due to this

Thank you for  
your attention!

Further  
information  
on [www.dkfz.de](http://www.dkfz.de)

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