

# Measurement of Cell Density with KNIME and SiLA for Cell-culture

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# SiLA and KNIME – Join Forces to Break the Chain



Open source standard for data exchange and device control in the laboratory



Analyze and process data with an abundance of nodes in the KNIME ecosystem



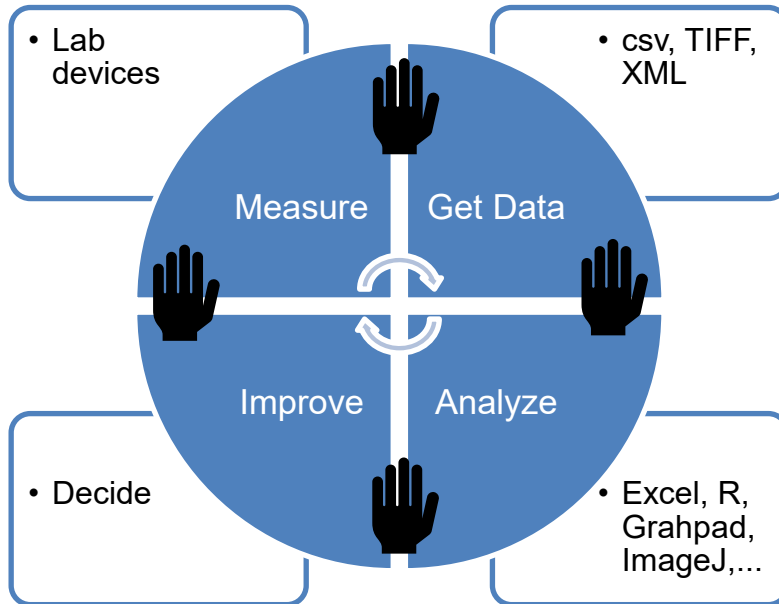
Use SiLA to connect KNIME to lab-data and -processes



Emancipation of Laboratory IT: Laboratory hard- and software has to be as easily combinable as consumer electronics !

# Experimental Cycle - Lab Automation

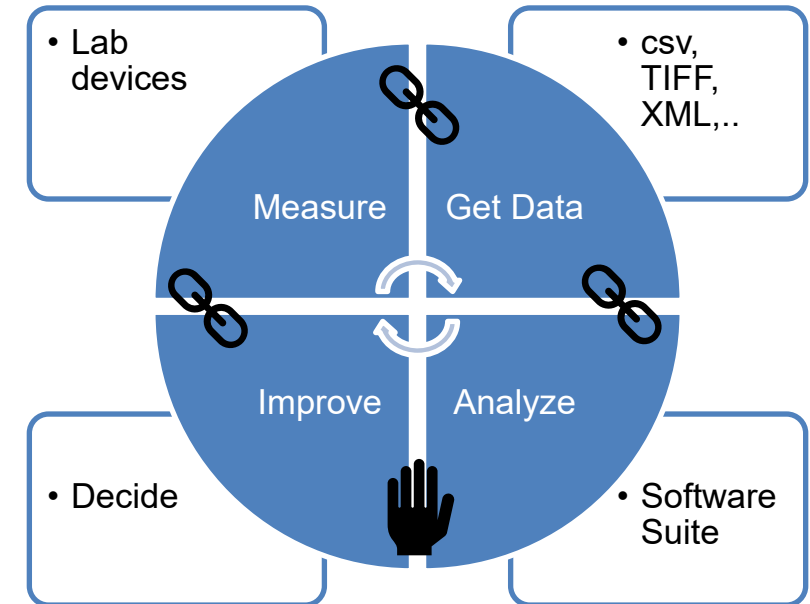
## „Manual‘ Toolchains



- + Flexibility
- + Invest costs
- Slow
- Error prone

1. Start Measurement
2. Get result data from device
3. (Convert data) and load in analysis software
4. Decide parameters for next experiment

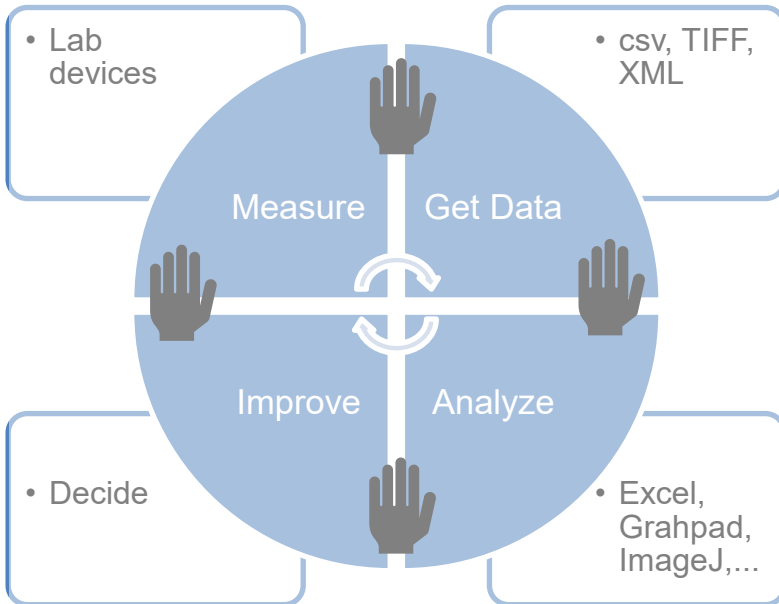
## Fully Integrated Systems



- + Speed
- + Quality
- Flexibility
- Invest costs

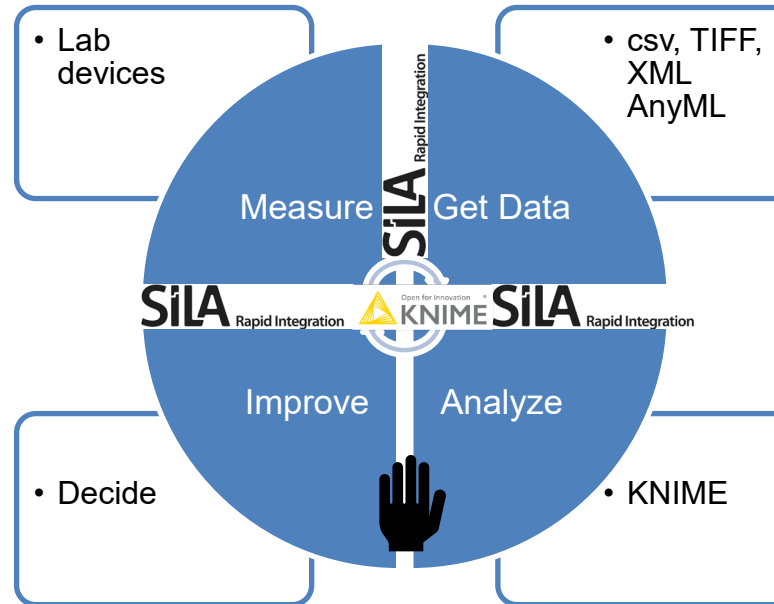
# Weave Your Own System

## „Manual“ toolchains

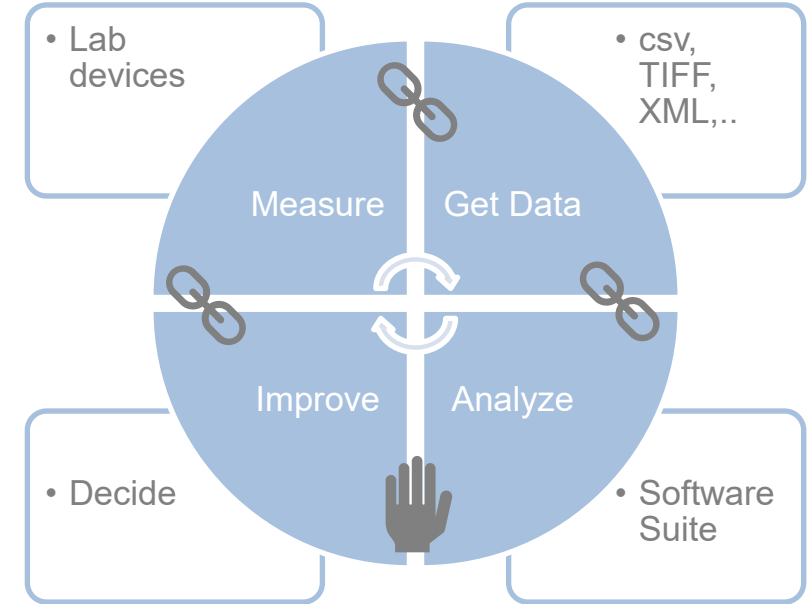


- + Flexibility
- + Invest costs
- Slow
- Error prone

## Fully integrated systems



- + Speed
- + Quality
- + Flexibility
- + Invest costs



- + Speed
- + Quality
- Flexibility
- Invest costs

# Determination of Cell Density – Counting Nuclei

Cell density is a relevant parameter in cell-based biological assays and is either determined by eye or via specialized cell-counting devices.

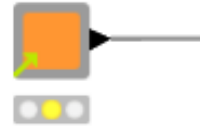
We show how SiLA can be used to connect microscope data to KNIME, enabling the evaluation of cell density via KNIME's Image analysis nodes.

1. Microscope Images are sent to a KNIME workflow over a SiLA 'connector' (a SiLA Server)
2. KNIME receives the images over SiLA, counts the nuclei and reports this value back over SiLA
3. The SiLA connector can control further processes in the lab either directly or via a Lab automation software like Green Button Go, depending if the cell density is in the expected limits or not

# Find and Count Cell Nuclei in Microscope Images

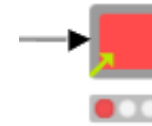


Get Binary Stream  
from SiLA Server

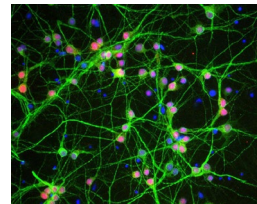


KNIME Image Processing

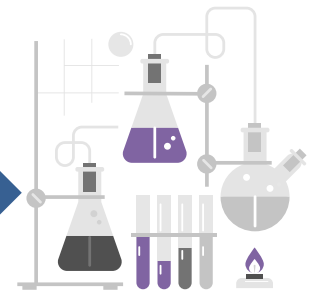
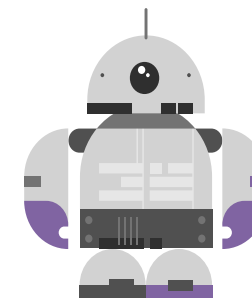
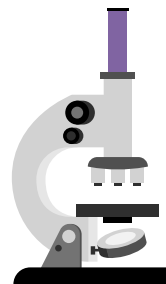
Send Results  
to SiLA Server



SiLA Rapid Integration



Lab

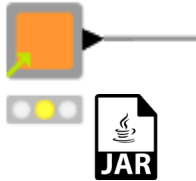


# Behind the Scenes



## Knime component

Get Binary Stream from SiLA Server

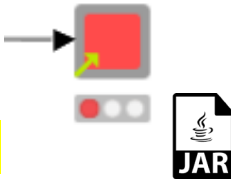


KNIME Image Processing

jar file used in workflow

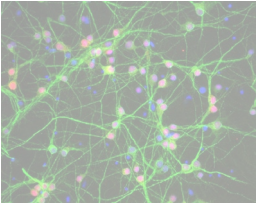
## Knime component

Send Results to SiLA Server



SiLA Rapid Integration

Send pictures

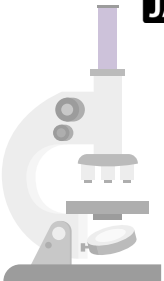


jar file executed on Lab device

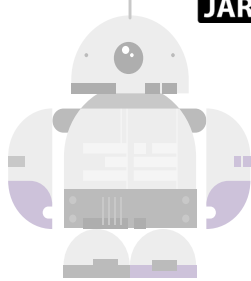


Send Data

Lab



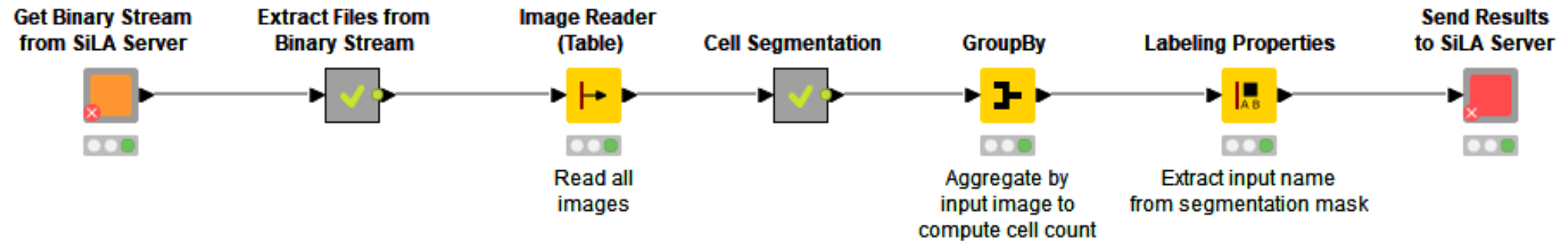
# cells < threshold



# cells > threshold



# Workflow to Count Nuclei – Live Demo



Get the all you need on the KNIME Hub (Workflow, Example Pictures, SiLA Server jar file)

[https://hub.knime.com/knime/spaces/Life%20Sciences/latest/Laboratory%20Data/SiLA%20Prototype/SiLA\\_Images~fg\\_6DabVKidCjels](https://hub.knime.com/knime/spaces/Life%20Sciences/latest/Laboratory%20Data/SiLA%20Prototype/SiLA_Images~fg_6DabVKidCjels)



# Thank you



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