



# Majisys

A web-based timeseries management system

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# Majisys - Motivation

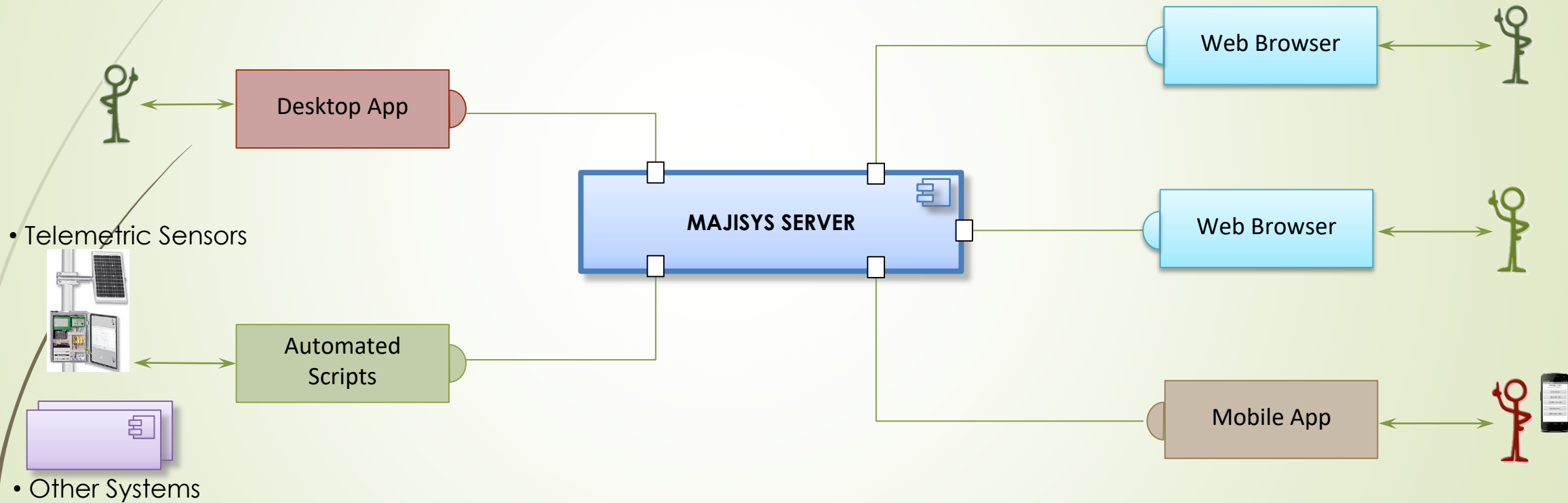
- Make it possible to non expert users to use an expert system. The expert system behind the scenes and the engine of majisys is [Delft-FEWS](#).
- Require zero-installation, using web-interface.
- Use a centralized database (avoid / un-stimulate the circulation of fragmented data on e.g. USB sticks and portable harddisks).
- Keep giving confidence to the users that they still own their data: the data can be extracted or edited with the same ease as it is entered into the system.



# Majisys - Functionality

- ▶ Collection of observations and geographical data
- ▶ Imports and exports via Excel, CSV, or JSON, or directly from telemetric loggers
- ▶ Generation of model inputs, e.g. ground water, surface water
- ▶ Hydrological Analysis, e.g. double mass curve, data density plot, flow duration curves
- ▶ Standardize access using web services and based on open standards
- ▶ Visualization through web applications using interactive maps and charts
- ▶ Presentation of results (reports, charts, posters)
- ▶ Easy configuration of time series parameters and locations
- ▶ Extend the data processing menu with your own Python routines
- ▶ Designed primarily for HydroMeteorological Services, but Majisys can also handle user-defined time series for other disciplines e.g. biodiversity data/species counts

# Majisys – The system





# Demo-server



# Software stack



# MAJISYS

# Edit measurement locations

MAJISYS - Time Series Management

Not secure | majisysdemo.itc.utwente.nl/majisys/#basedata

DEFINITION OF TIME SERIES COMPONENTS

Locations

Locations' Editor

ID ↑	Name	X (Longitude)	Y (Latitude)	Z	SRID
ITC_KEN_012	Delamere Farm 1 BR Station	36.41748	-0.67922	1918.00	4326
ITC_KEN_013	Mutubio Gate BR Station	36.6641	-0.52522	3153.00	4326
ITC_KEN_014	Nunjoro Farm BR Station	36.47928	-0.64395	2151.00	4326

Map showing measurement locations (ITC\_KEN\_012, ITC\_KEN\_013, ITC\_KEN\_014) and surrounding areas (Egerton, Kikopey, Naivasha, Kinungi, Njabini, Nyeri, Ndugamai, Abdera National Park).

Parameters

Logout

# Manual data input

The screenshot displays the MAJISYS web application interface for manual data entry. The browser address bar shows the URL `majisysdemo.itc.utwente.nl/majisys/#dataentry`. The left sidebar contains navigation options: HOME, BASE DATA, DATA ENTRY (highlighted), TIME SERIES, RATING CURVES, VISUALIZATION, and HELP. A Logout button is located at the bottom of the sidebar.

The main content area is titled "MANUAL DATA ENTRY" and includes the following fields and controls:

- Observation Type: (dropdown menu)
- Location: 14022403
- Feature: Surface Water
- Parameter: Water Level - [cm]
- Comment: Time series description (64 chars)
- Observation Frequency:  Daily  Monthly
- Start: 17-Sep-2018 End: 20-Sep-2018
- Generate Data Entry Grid button

A line graph on the right side of the interface shows the data points for the selected observation. The y-axis represents water level in centimeters, ranging from 110 to 130. The x-axis shows time slots for each day from 12:00 PM to 12:00 AM. The data points are: 120.00 at 09:00 on 17-Sep-2018, 130.00 at 16:00 on 17-Sep-2018, 110.00 at 09:00 on 18-Sep-2018, and 115.00 at 16:00 on 18-Sep-2018. The 16:00 slot for 19-Sep-2018 is currently empty and highlighted in yellow.

No.	Date	09:00	16:00	Quality
1	17-Sep-2018	120.00	130.00	
2	18-Sep-2018	110.00	115.00	
3	19-Sep-2018	115.00		
4	20-Sep-2018			

At the bottom of the main content area, there is a Submit values to the database button.



# Manipulate timeseries

The screenshot displays the MAJISYS Time Series Management interface. The browser address bar shows the URL `majisysdemo.itc.utwente.nl/majisys/#timeseries`. The left sidebar contains navigation options: HOME, BASE DATA, DATA ENTRY, TIME SERIES (highlighted), RATING CURVES, VISUALIZATION, and HELP, along with a Logout button.

The main content area is titled "TIME SERIES MANAGEMENT" and features a table with the following data:

	✓	Series ID	Location ID	Parameter	From	To	No. Ent
...	<input checked="" type="checkbox"/>	26	CRSM	Volumetric Water Conten...	22-Nov-2017 19:19	19-Sep-2018 14:37	:
...	<input checked="" type="checkbox"/>	27	CRSM	Volumetric Water Conten...	22-Nov-2017 19:19	19-Sep-2018 14:37	:
	<input type="checkbox"/>	35	CRSM	Relative Humidity	22-Nov-2017 19:19	19-Sep-2018 14:37	:
	<input type="checkbox"/>	36	CRSM	Air Temperature	22-Nov-2017 19:19	19-Sep-2018 14:37	:
	<input type="checkbox"/>	29	CRSM	Volumetric Water Conten...	22-Nov-2017 19:19	19-Sep-2018 14:37	:

Below the table, there are filters for "Location Filter: All Locations" and "Parameter Filter: All Parameters", along with icons for visualization, editing, deletion, and an "Import CSV" button.

Two time-series plots are shown below the filters. The top plot displays data points (red and orange circles) connected by lines, showing a clear seasonal cycle with peaks in the summer months (May/June) and troughs in the winter months (December/January). The y-axis ranges from 0 to 45. The x-axis shows months from December 2018 to July.

The bottom plot shows a similar data series but with a different seasonal pattern, also featuring peaks and troughs over the same time period.

# Analysis

The screenshot displays the MAJISYS web application interface. The browser address bar shows the URL `majisysdemo.itc.utwente.nl/majisys/#analysis`. The main header is titled "FUNCTIONAL ANALYSIS OF TIME SERIES" and includes buttons for "Show Labels", "Add WMS Layers", and "Layer Switcher".

The left sidebar contains a navigation menu with the following items: MAJISYS, BASE DATA, DATA ENTRY, TIME SERIES, RATING CURVES, VISUALIZATION, ANALYSIS, CROSSTABS, and HELP. A "Logout" button is located at the bottom of the sidebar.

The central map area shows a map of Lake Naivasha with several locations marked: Green Park Airport, Loldia Airport, Naivasha, 2GD-Lake, Naivasha Airport, and Oseranaani. The "2GD-Lake" location is highlighted with a blue circle.

Below the map, a section titled "Probability Density Function — 2GD-Lake ( W..." displays two line graphs. The top graph shows a probability density function curve with a peak around 1.0, and the bottom graph shows a similar curve with a peak around 0.8. Both graphs have an x-axis ranging from 1.000 to 2.000 and a y-axis ranging from 0.0 to 1.2.

On the right side, the "Parameters List" section includes a dropdown menu with the following options: Water Temp, Volumetric Water Content 3, Water Level (selected), and Water Level (m+ND). Below this, the "Locations" field is set to "2GD-Lake". The "Analysis Period" is defined by two date pickers: "16-Feb-2016" and "10-Sep-2017".

The "Functions List" section contains a list of functions with expand/collapse icons (+/-):

- Multiply by factor
- Timeseries Aggregation
- Double Mass Curve\*
- Probability Density Function (selected)
- Frequency Duration Curve\*
- Residual Curve
- Time series
- Data Availability



# Links

- ▶ <http://majisysdemo.itc.utwente.nl/majisys>
- ▶ User (read-only access): demo, password: demo
- ▶ User (read-write access): demo\_contributor, password: demo