Data conversion for MCAS-S (Geo)

Overview

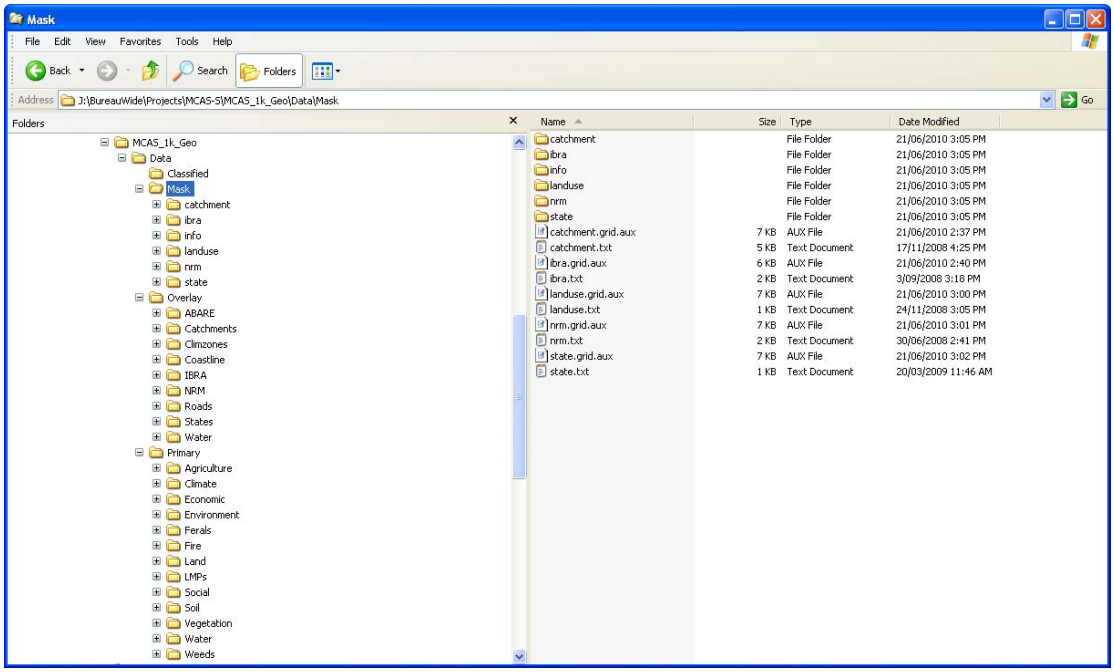
This document describes how to convert data for input into MCAS-S. Users should refer to the MCAS-S User guide for more details on MCAS-S functionality and use. The data conversion techniques are demonstrated in ArcView 3.3

MCAS-S is a spatial software shell which can display spatial data but does not have full GIS functionality. So data held within MCAS-S must conform in:

- spatial extent
- resolution, and
- projection.

The Toolkit data is available in Geographic coordinate system. This version has a nominal pixel size of 0.01 decimal degrees with 3618 rows and 4773 columns.

The data are in a folder called **MCAS_1k_Geo.** Within this folders is a **Data** folder which has the following sub-directories: **Classified**, **Mask**, **Overlay** and **Primary** (see below).



Software and hardware requirements

System requirements

The minimum requirements for running MCAS-S is Windows NT, 2000, XP or Vista, 1GB RAM, 1Ghz CPU and 1GB of disk space for the program.

Software requirements

The recommended software for converting data for MCAS-S is ArcGIS – the current version is 9.3.1 and requires the spatial analyst extension. ArcView 3.3 may be used to convert data and requires the Spatial Analyst extension.

Data formats

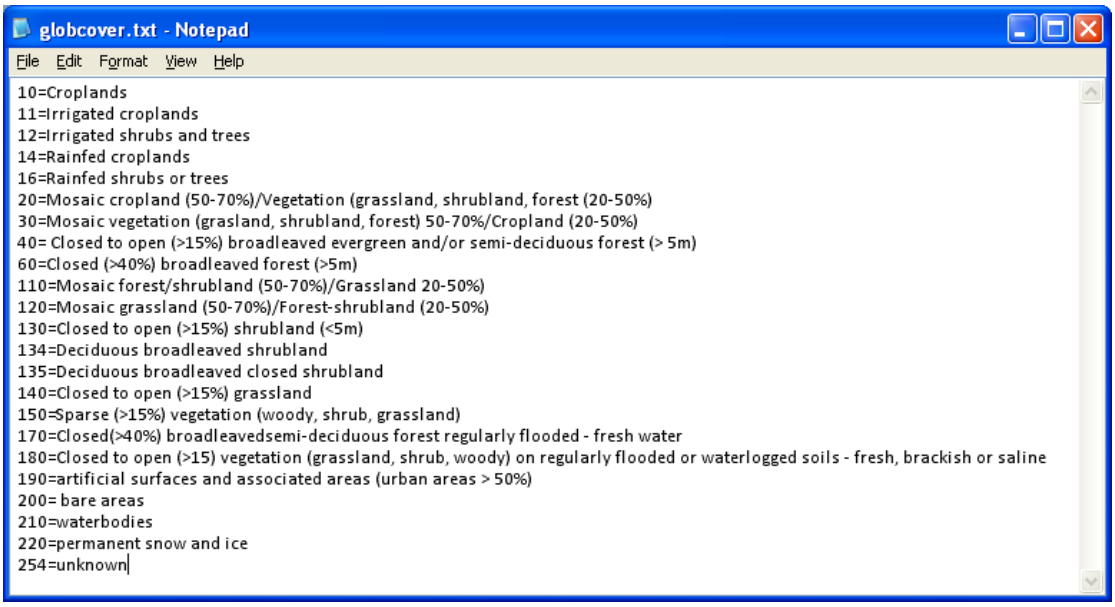
MCAS-S software is currently at version 2.1 and supports the following formats:

1. Raster for **Primary** data
    a. ArcInfo Grids and Float
    b. BIL
    c. GeoTIFF
    d. IDRISI
2. Mask data should be in Arc Grid format.
3. Polygon for **Overlays**
    a. ESRI shapefiles

Data conversion

This section describes the data conversion process for **Primary** datasets, these are used for analysis and must be in a raster format. The underlying principles of data conversion are:

- datasets must be consistently captured and complete for the region of interest
  - If data are missing for certain areas, the value of -9999 can be used as 'no data'
  - If data are inconsistently captured then it is better to create separate layers and merge them in MCAS-S
- consider whether the data should be input as **Primary** data, **Overlays** or **Masks**; the same raster data can be used for both primary and mask layers
- while GIS data formats can generally support multiple attributes, MCAS-S can only use one. The value field will be used by MCAS-S and so should contain numbers that either directly represent the dataset (continuous) or are a class code (categorical)
- data should be as "raw" as possible, if you wish to classify the data; then use MCAS-S to do this. For example, slope data should be input as percent or degrees rather than slope classes such as 'flat' or 'steep'
- categorical data such as land use or vegetation types need to have a unique numeric identifier and an accompanying text file given exactly the same name as the dataset eg Primary/Land/globcover.txt and the format:



- minimise the number of processing steps as this will lead to resampling errors.

Pre-processing

This section outlines how to convert data to the same format as the data provided in Datapack_5k.

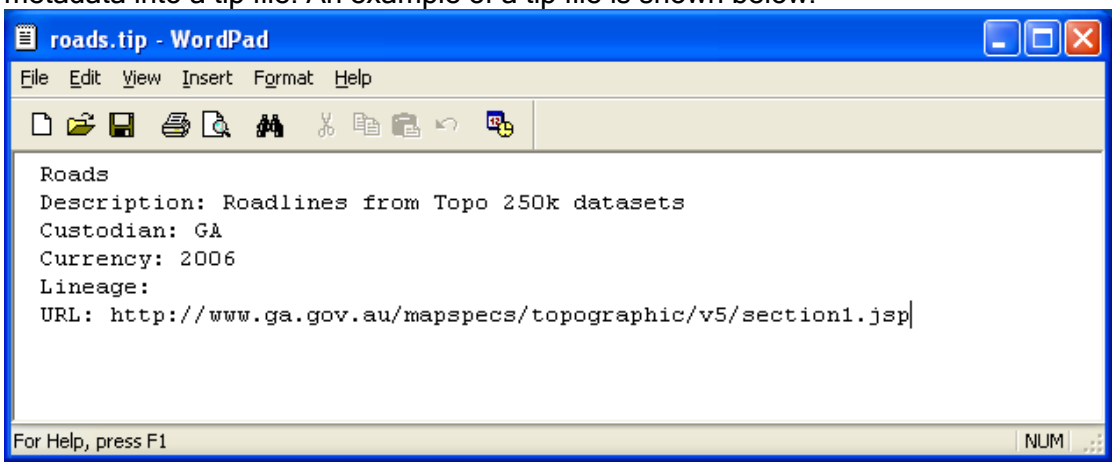
As examples, we have four datasets which require conversion:

Data	Format	Projection
placenames	point	GCS_WGS_1984
roads	line	GCS_GDA_1994
local government areas	polygon	Albers GDA 1994
globcover	Raster (tif)	Plate Caree WGS84

Set up a data processing folder structure, such as

- raw
- working
- final

Copy the input dataset into **raw**. Ensure the projection is defined and capture the metadata into a tip file. An example of a tip file is shown below.



The tip file captures essential information about the dataset such as the name, currency, units, custodian and links to the metadata. A lineage field describes how

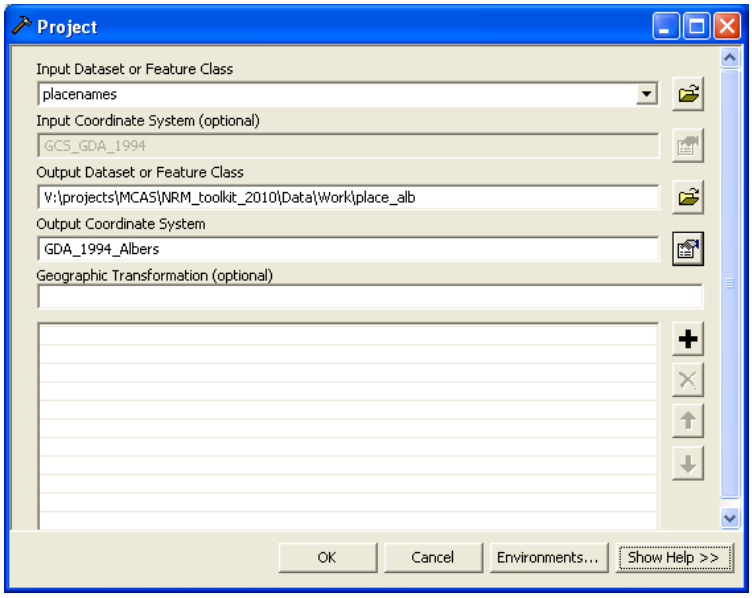
the original data were processed. The tip file is created in Notepad or Word and saved as a txt file with exactly the same name of the dataset and an extension *.tip*. The first line of a tip file appears in MCAS-S when you hover the mouse over the dataset; hence ensuring that the first line holds a useful description of the data.

1) Re-project the data

This section focuses on **Primary** data and outlines how to convert different datasets to the correct raster format. The first step in data conversion is to project the data into a common projection, in this case Geographic; datum WQS84. **This cannot be done in ArcView and you will need to do this in ArcMAP** – the commands for re-projecting raster and vector data are as follows:

1A) Vector

In ArcCatalog select *ArcToolbox>Data Management Tools>Projections and Transformations>Feature>Project*

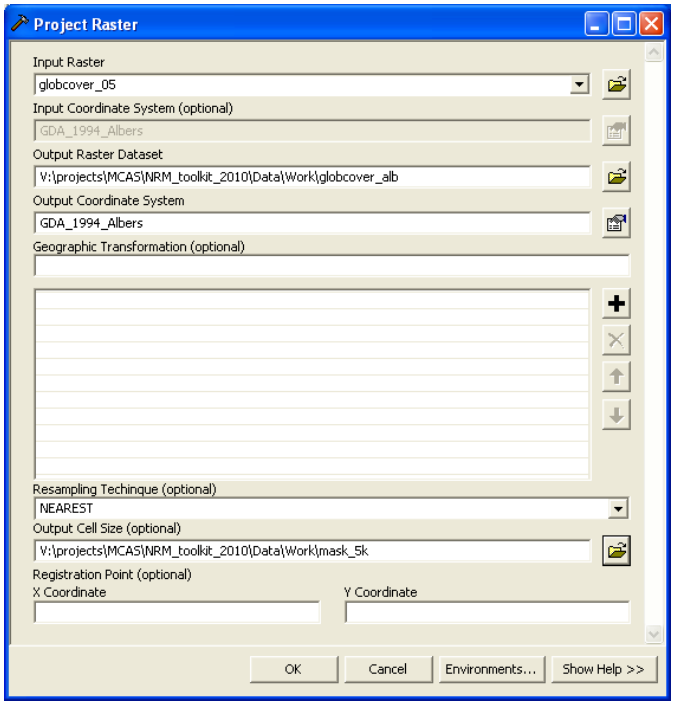


Save to **working** directory

Import projection from Datapack_5k/Data/ **Primary/Agriculture/ beef_dse**

1B) Raster

In *ArcCatalog* select *ArcToolbox>Data Management Tools>Projections and Transformations>Raster>Project Raster* function

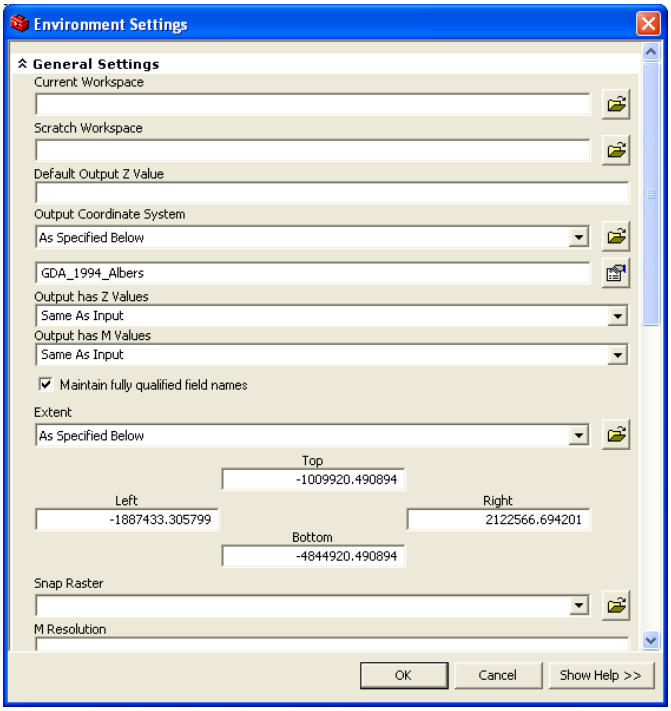


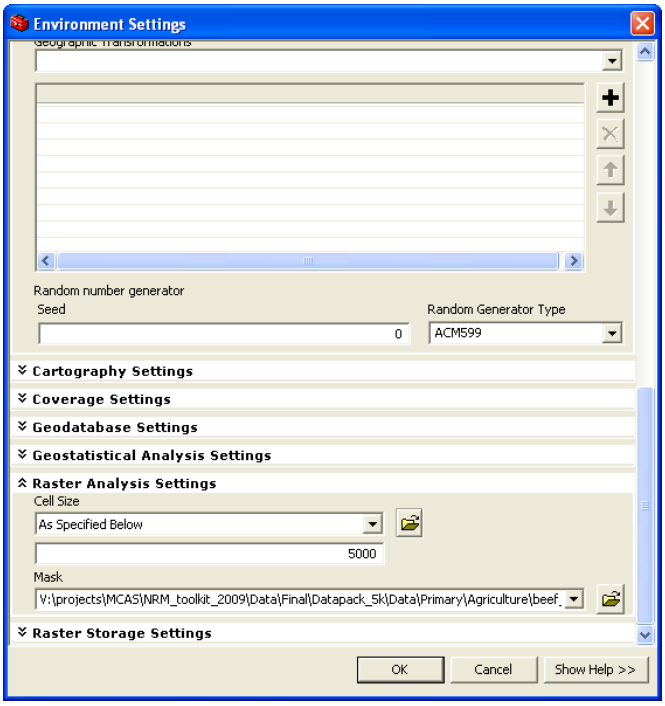
Select *Environments...*
Set *General Settings* to *beef_dse*:

- Output Coordinate System
- Extent

Set R*aster Analysis Settings* to *beef_dse*:

- Cellsize
- Mask



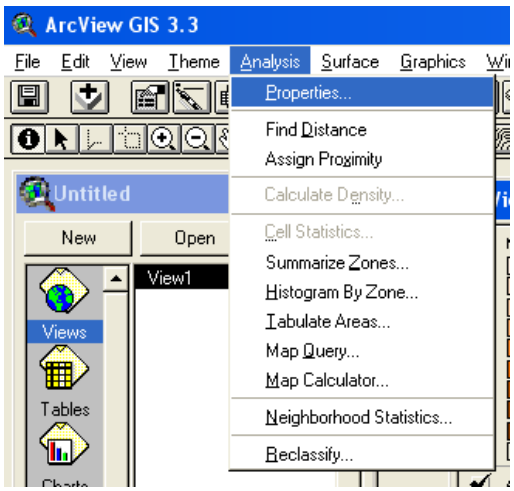


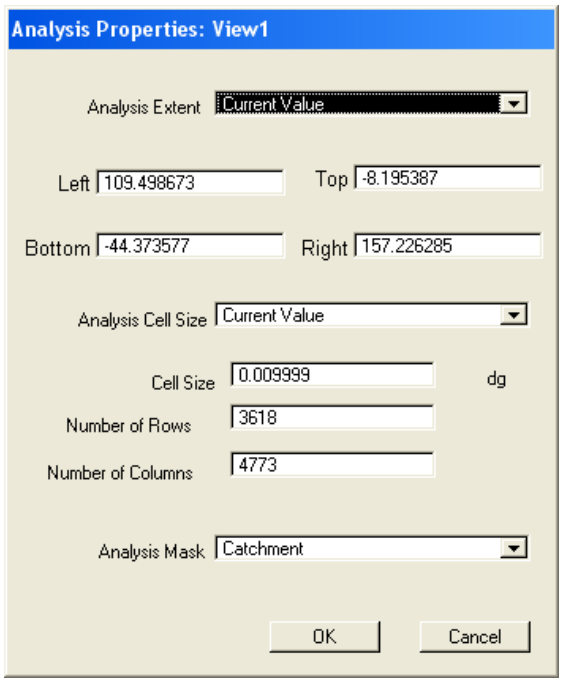
2) Convert the data to rasters

The next step is to convert the data into a raster - this can be done using Theme > Convert to grid.

Open ArcView and load the polygon data.

Load a template raster to set the analysis properties for example in Mask/ABARE select the **abare** raster.
Select the Analysis Properties option on the menu bar and choose a template dataset for setting the extent, resolution and mask (use *abare* to set these).





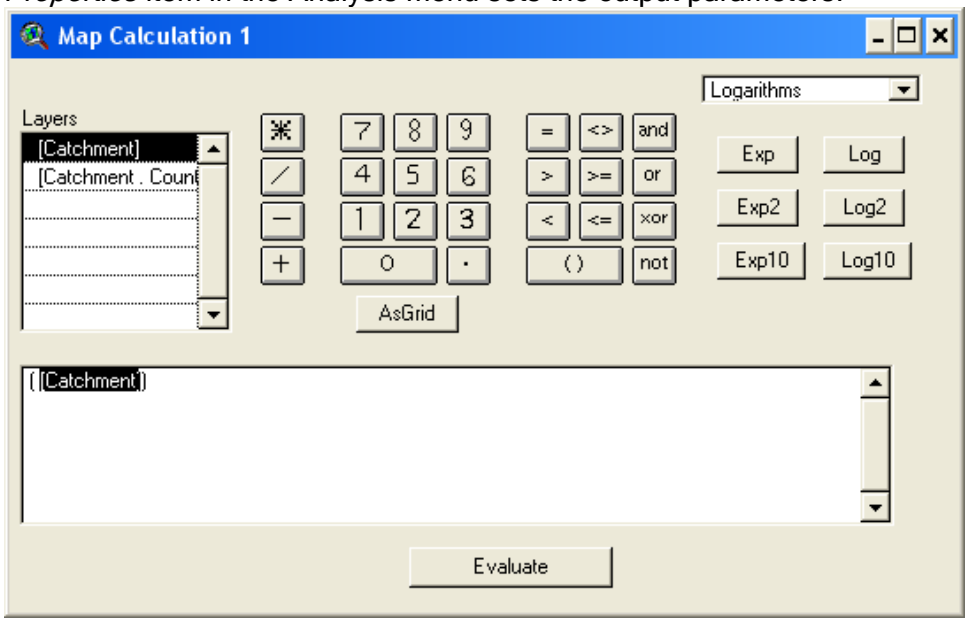
2A) Converting polygons

It should be remembered that Arc rasters uses a numeric attribute. If you do not have one, this should first be created in ArcView by opening the attribute table and adding a field (from Table>Start editing then Edit>Add field). In Field definition box choose a field name, Type should be Number, then set the Width and Decimal places. Open Field Calculator to populate the field.

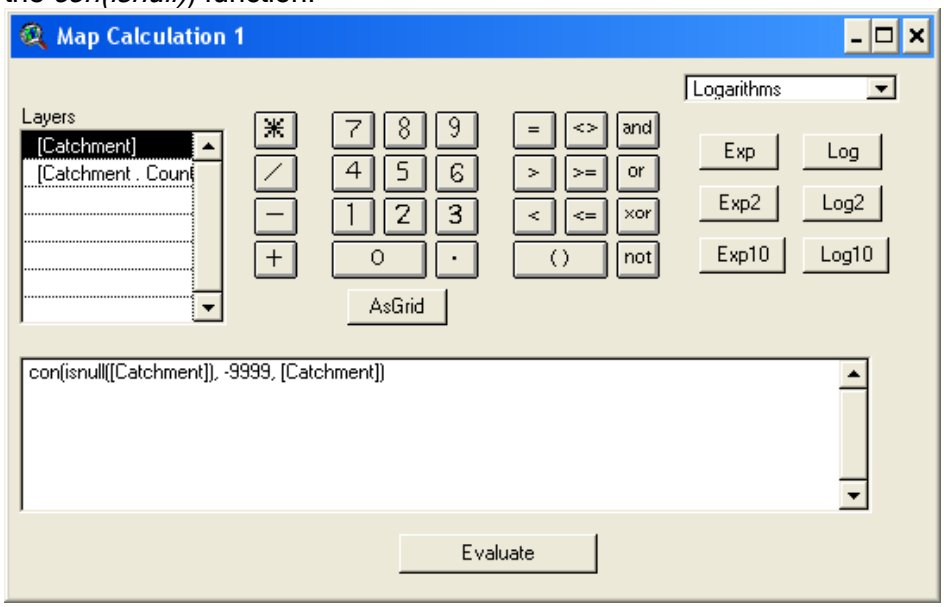
To convert the numeric field, use Theme>Convert to grid. A box will open allowing you to save the grid to a directory. Save the grid to Data/Primary/*folder.* **Note you may need to create this first in Windows Explorer.**

2B) Converting grids

The simplest way to resample data is to use the Analysis>Map calculator. The *Properties* item in the Analysis menu sets the output parameters.



Furthermore, you can use the Map Calculator to set 'No data' values to -9999 using the *con(isnull)*) function:



The output of the Raster Calculator is a temporary raster that you will need to save permanently by selecting the raster, Theme>Save Data set. Save to Data/Primary/*folder*.

The raster calculator uses nearest neighbour technique for resampling. This technique is appropriate if the data is categorical. If the data is continuous, bilinear interpolation or cubic convolution is preferred.

If you require more flexibility in resampling, you should also use the *Resample* tool in ArcMap.

Help

The most common problems in converting the data are that the extent, resolution or projection of the data in MCAS-S does not conform. If the dataset doesn't show up in the Primary, Overlay or Mask drop down menus, or is the wrong place on the mapping window then the data have different extents, cell sizes or projections and you will need to re-create the data.

You should also check that each dataset contains the same number of pixels using the Layer Properties - 1246 columns and 916 rows in the examples used here. The origin should also be exactly the same for all datasets.

If when you open a saved project, you get a big red X instead of a data layer – this usually means that you have moved a dataset, renamed it or the data has been corrupted. If the dataset has changed names or moved you can navigate to it by right-clicking and selecting *Change Source…* If the dataset has been deleted or corrupted, you will need to re-create the data.

If MCAS-S slows down or freezes then you may have too much data. Try removing some of the datasets from the window. Another reason may be that your data are in floating point format, which makes the dataset very large; the solution is to convert the data to integers. For example if you have elevation data, you may wish to create integers to the nearest 1m. In Raster Calculator enter *int(elevation).*

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