



The CSDMS Basic Model Interface (BMI)

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1. What is a BMI?
2. Why is BMI useful?
3. How does BMI work?
4. Why would *you* want a BMI for *your* model?
5. How would you start?

What is a BMI?

**A BMI is a set of functions
used to access and control
the state of a model.**



BMI

initialize
update
update_frac
update_until
finalize

get_start_time
get_current_time
get_end_time
get_time_step
get_time_units

get_component_name
get_input_item_count
get_output_item_count
get_input_var_names
get_output_var_names

get_var_type
get_var_units
get_var_nbytes
get_var_itemsize
get_var_grid

get_grid_type
get_grid_rank
get_grid_size
get_grid_shape
get_grid_spacing
get_grid_origin
get_grid_x
get_grid_y
get_grid_z
get_grid_connectivity
get_grid_offset

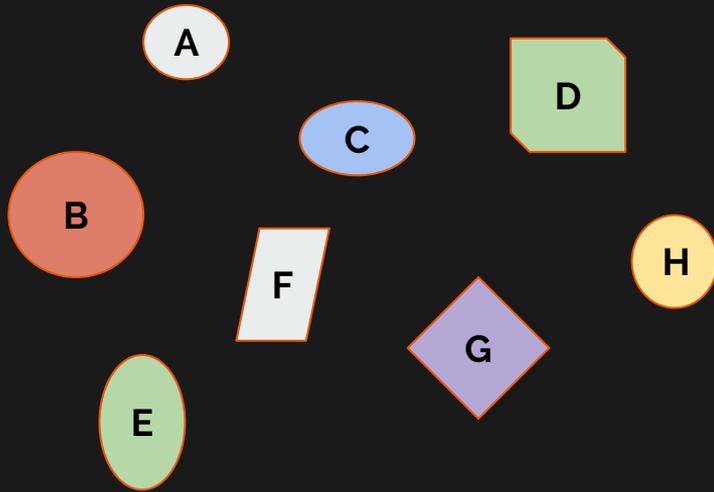
get_value
get_value_ptr
get_value_at_indices

set_value
set_value_at_indices

Why is a BMI useful?



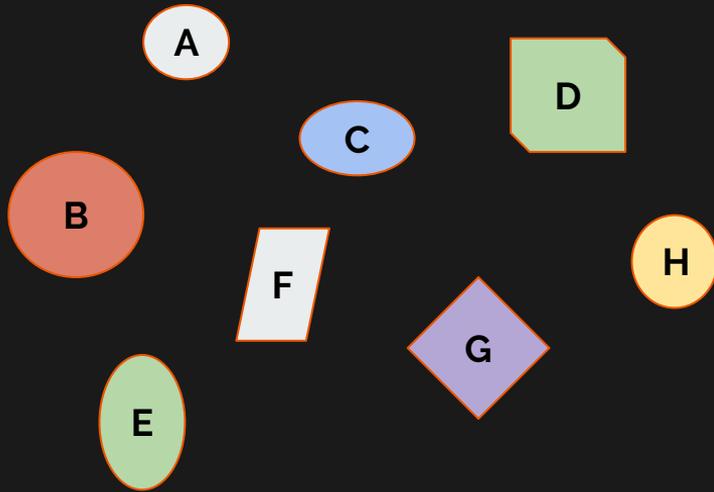
The CSDMS modeling philosophy



Step 1: Write models
Step 2: ???
Step 3: Science!



The CSDMS modeling philosophy



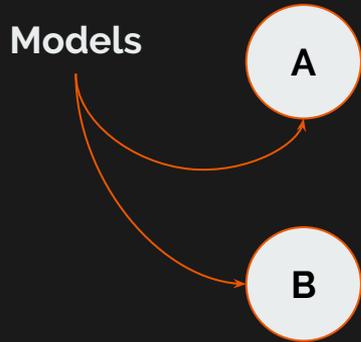
Step 1: Write models

Step 2: CSDMS Modeling Framework

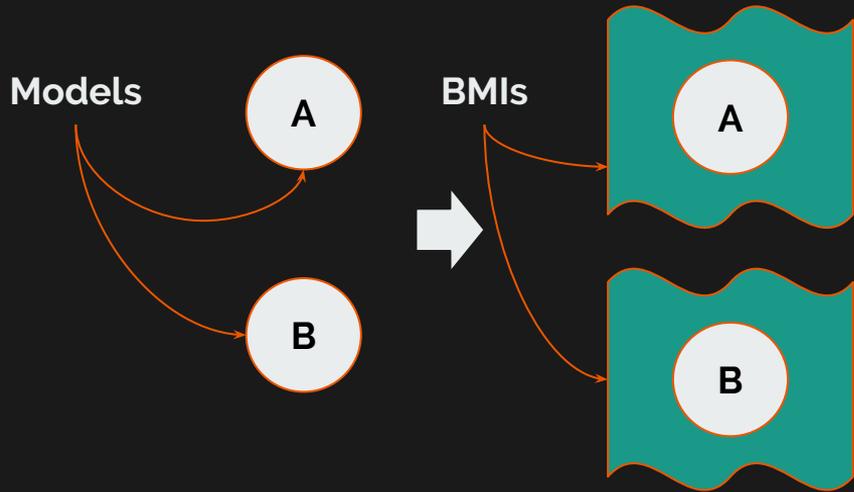
Step 3: Science!



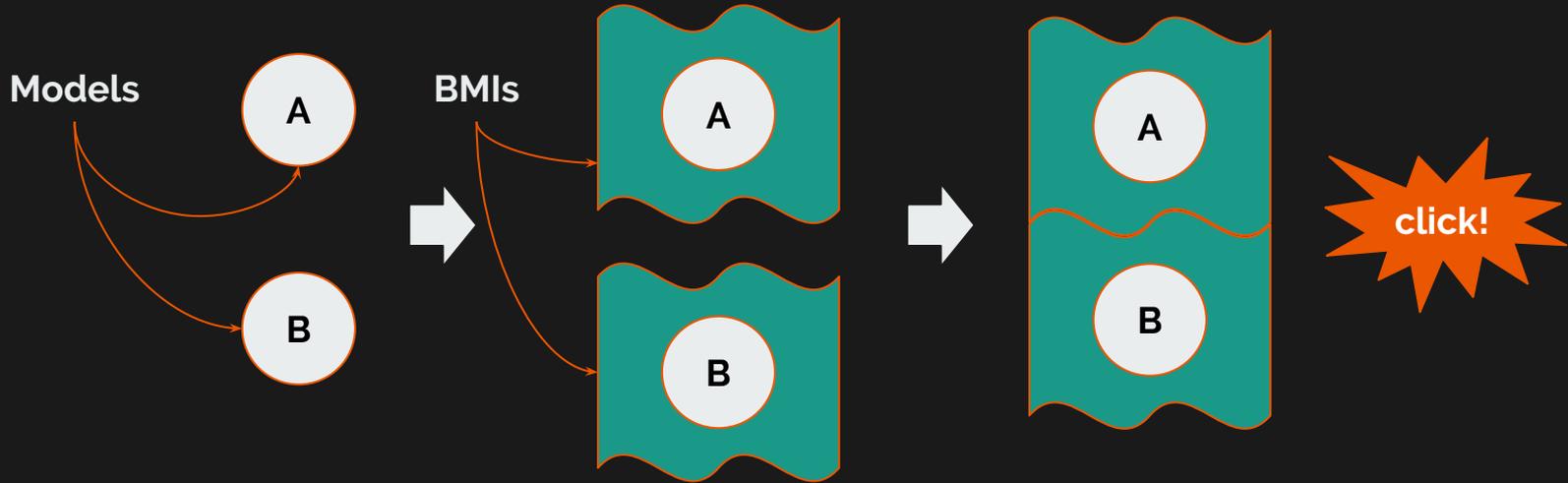
Basic Model Interface (BMI)



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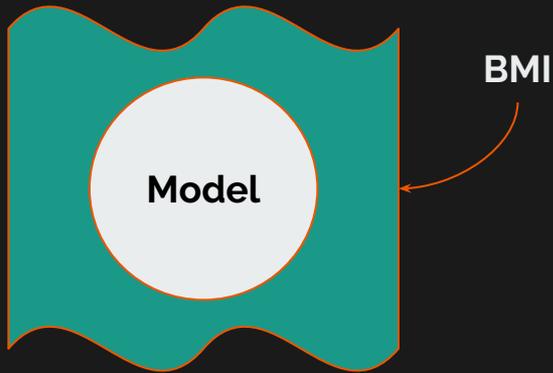


Basic Model Interface (BMI)



How does a BMI work?

Basic Model Interface (BMI)



```
def initialize(self, config_file):  
    pass  
  
def update(self):  
    pass  
  
def finalize(self):  
    pass
```

**Why would you
want to BMI your model?**

1. Standardized interface
2. Exposure
3. Good programming
4. Community
5. Science

**How would you start
to BMI your model?**

1. CSDMS wiki: https://csdms.colorado.edu/wiki/BMI_Description
2. BMI documentation: <https://bmi-spec.readthedocs.io>
3. BMI GitHub repository: <https://github.com/csdms/bmi>
4. BMI Live example: <https://github.com/csdms/bmi-live-2018>



Summary

When a model is equipped with a Basic Model Interface (BMI), it acquires a common set of functions for querying and evolving its state. When a BMI-enabled model is incorporated into a modeling framework, it can share information and couple with other models, possibly from other authors in different disciplines, which may in turn open new paths to scientific discovery.

Thank you!



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