

Interact UrbanSim Simulation with Travel Model

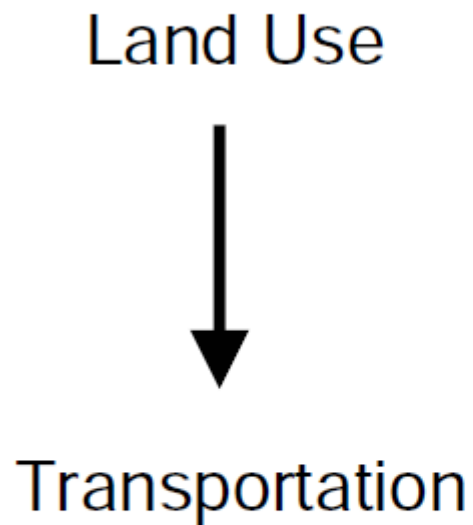
Liming Wang

European UrbanSim Workshop 2011

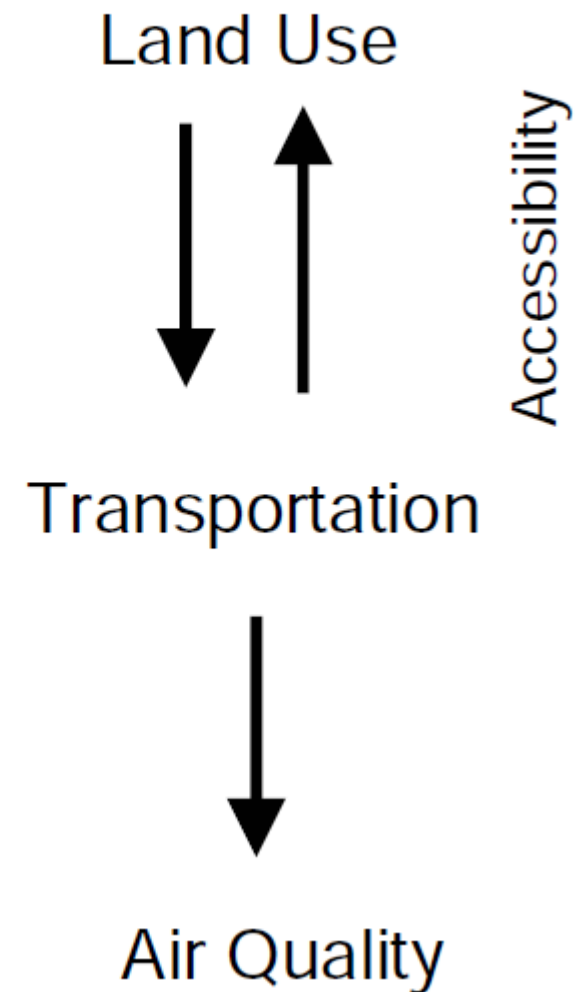
Athens, Greece July 4-6, 2011

Land Use – Transportation Interaction

Traditional Approach

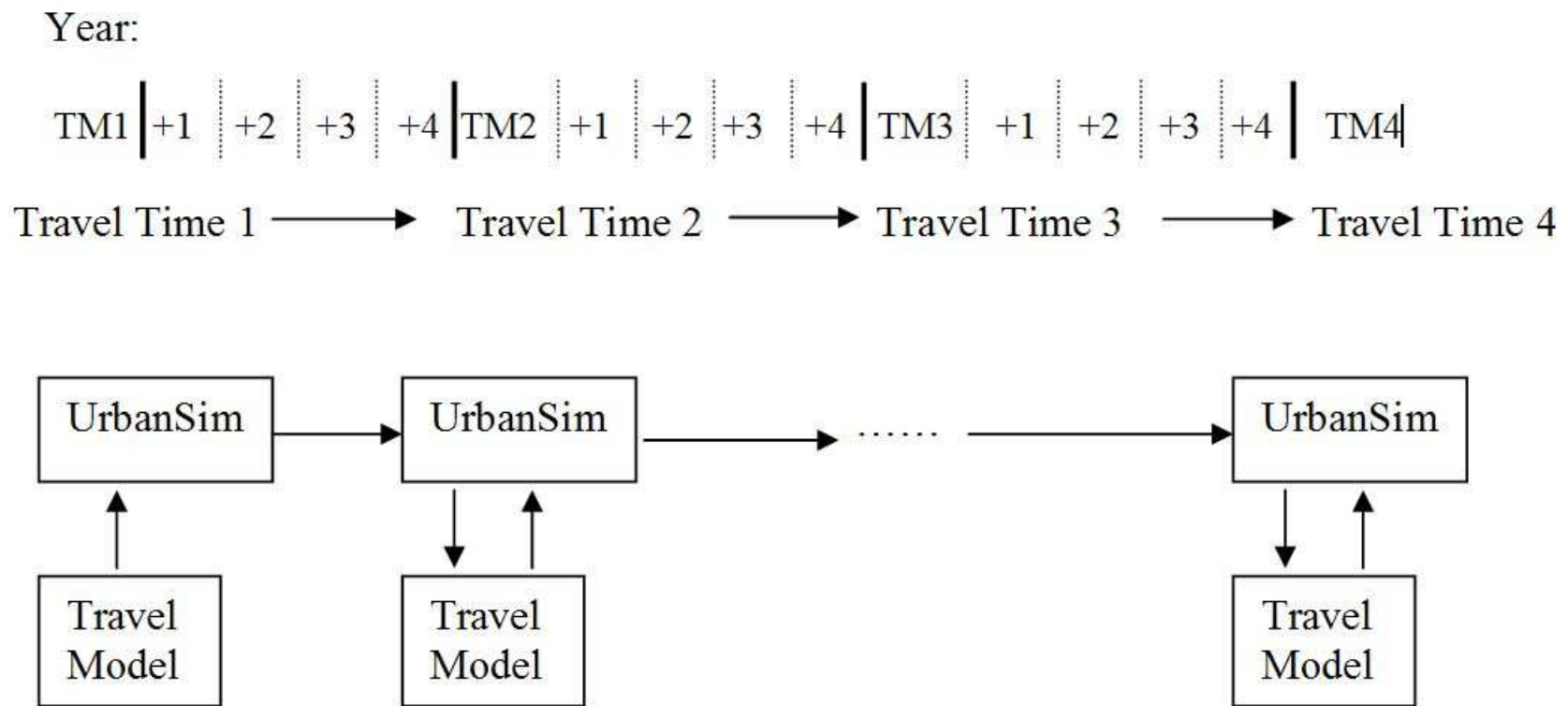


Integrated Modeling



Combined Simulation

- Diagram for UrbanSim – Travel model interaction



(TM = Travel Model Year)

Implemented Travel Model Interfaces

- opus_emme2
- opus_visum
- transcad
- opus_matsim

Structure of Travel Model Interface

```
opus_visum/  
|-- configs  
| |-- example_config_eugene_baseline_with_visum.py  
| |-- __init__.py  
| `-- visum_configuration.py  
|-- docs  
| |-- __init__.py  
| `-- opus_visum_doc.txt  
|-- __init__.py  
`-- models  
    |-- get_cache_data_into_visum.py  
    |-- get_visum_data_into_cache.py  
    |-- __init__.py  
    |-- run_travel_model.py  
    `-- visum_functions.py
```

Structure of Travel Model Interface

```
opus_emme2
|-- __init__.py
|-- data
|-- docs
| `-- index.html
|-- emission_emme2_macros
| |-- bank1
| | `-- tazvmt1.mac
| |-- bank2
| | `-- tazvmt2.mac
| `-- bank3
|   `-- tazvmt3.mac
|-- etc
|-- models
| |-- __init__.py
| |-- abstract_emme2_travel_model.py
| |-- get_cache_data_into_emme2.py
| |-- get_emme2_data_into_cache.py
| |-- run_emmission_emme2_macros.py
| `-- run_travel_model.py
|-- tests
|-- tools
`-- travel_model_output.py
```

Structure of Travel Model Interface

washtenaw/transcad/

|-- create_travel_model_configuration.py

|-- docs

| `-- index.html

|-- get_cache_data_into_transcad.py

|-- get_transcad_data_into_cache.py

|-- __init__.py

|-- run_semcog_travel_model.py

|-- run_transcad_macro.py

`-- set_project_ini_file.py

Setup the interface

- What variables get to pass from TM to UrbanSim
- What variables get to pass from UrbanSim to TM
- Travel Model scenarios: travel model directories; on which years the travel model runs
- Other interface specific settings

<ul style="list-style-type: none"> travel_model_configuration <ul style="list-style-type: none"> transcad_binary project_ini travel_model_base_directory ui file 	<ul style="list-style-type: none"> C:\\Program Files\\TransCAD\\tcw.exe C:\\Program Files\\TransCAD\\semcog.ini C:\\SEMCOG_baseline\\ macros\\semcog ui
<ul style="list-style-type: none"> urbansim_to_tm_variable_mapping <ul style="list-style-type: none"> DataTable JoinField variable_mapping <ul style="list-style-type: none"> zone.zone_id urbansim_parcel.zone.population urbansim_parcel.zone.number_of_households urbansim_parcel.zone.number_of_jobs zone.aggregate(urbansim.job.is_in_employment_sec... zone.aggregate(urbansim.job.is_in_employment_sec... urbansim_parcel.zone.number_of_jobs_of_sector_4 urbansim_parcel.zone.number_of_jobs_of_sector_5 	<ul style="list-style-type: none"> TAZ Data Table ZoneID ZoneID Population Households Total_Emp Basic NonBasic WholeSale Retail
<ul style="list-style-type: none"> tm_to_urbansim_variable_mapping <ul style="list-style-type: none"> row_index_name col_index_name AMHwySkims <ul style="list-style-type: none"> Miles Trav_Time AMTransitSkim 	<ul style="list-style-type: none"> ZoneID ZoneID highway_distance highway_travel_time
<ul style="list-style-type: none"> macro <ul style="list-style-type: none"> get_cache_data_into_transcad get_transcad_data_into_cache run_semcoq_travel_model get_file_location locations_to_disaggregate models <ul style="list-style-type: none"> washtenaw.transcad.get_cache_data_into_transcad washtenaw.transcad.run_semcoq_travel_model washtenaw.transcad.get_transcad_data_into_cache 	<ul style="list-style-type: none"> SEMCOGImportTabFile SEMCOGExportMatrices SEMCOG Run Loops SEMCOGGetFileLocation ['parcel', 'building'] <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>

General Data Models Scenarios Results

Name	Value
+ urbansim_parcel_baseline	
+ washtenaw_baseline_test	
+ washtenaw_baseline	
- washtenaw_baseline_with_travel_model	
• parent	washtenaw_baseline
- travel_model_configuration	
• travel_model_base_directory	D:\transcad_e5
• ui_file	D:\transcad_e5\semcog_e5_ui
- years_to_run	
- • run_description	
• year	2000
• data_dir	
• data_exchange_dir	urbansim\\2001
- • run_description	
• year	2002
• data_dir	
• data_exchange_dir	urbansim\\2002
- • run_description	
• year	2005
• data_dir	
• data_exchange_dir	urbansim\\2005
+ • run_description	
+ • run_description	
+ • run_description	
+ • run_description	

Start a combined simulation

the same way as any UrbanSim simulation

The screenshot shows the UrbanSim software interface with a tree view of simulation scenarios. The 'Results' tab is active. A scenario named 'washtenaw_baseline with travel model' is selected, and a context menu is open over it. The menu options are: 'Run This Scenario' (checked), 'Duplicate', 'Rename', and 'Delete'. The tree view shows a hierarchy of scenarios, with 'washtenaw_baseline' expanded to show its sub-scenarios.

Name	Value
urbansim_parcel_baseline	
washtenaw_baseline_test	
washtenaw_baseline	
washtenaw_baseline with travel model	
• parent	washtenaw_baseline
• travel_model_configuration	
• travel_model_base_direct	nscad_e5
• ui_file	nscad_e5\semcog_e5_ui
• years_to_run	
• run_description	
• year	2000
• data_dir	
• data_exchange_dir	urbansim\\2001
• run_description	
• year	2002
• data_dir	
• data_exchange_dir	urbansim\\2002
• run_description	
• year	2005
• data_dir	
• data_exchange_dir	urbansim\\2005
• run_description	
• run_description	
• run_description	
• run_description	

Problem diagnosing and tips

- restart run with travel model

```
python opus_core/tools/restart_run.py -p  
<project_name> <run_id> 2005
```

- --skip-urbansim
- --skip-cache-cleanup
- Skim mode and null mode for testing

Combined Simulation on Two Different Computers

- runs UrbanSim on one computer, runs Travel Model on another computer
- challenge – controlling the other computer and passing data back and forth

Combined Simulation on Two Different Computers

- Requirements:
 - both computers set up to run combined simulations
 - ssh server installed and running on both computers
 - communicating through plink and pscp program or paramiko
- Tool scripts
 - start_remote_run or remote_runs script in urbansim/tools