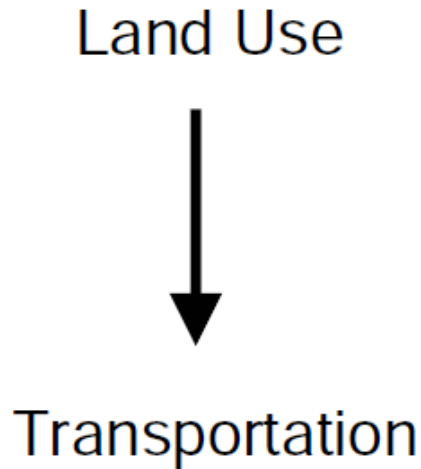


Interact UrbanSim Simulation with Travel Model

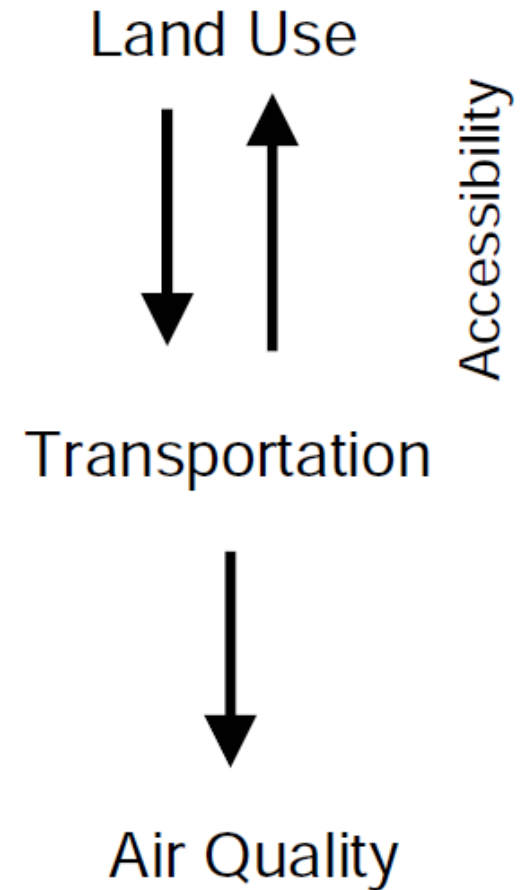
Liming Wang
05/26/2010

Land Use – Transportation Interaction

Traditional Approach

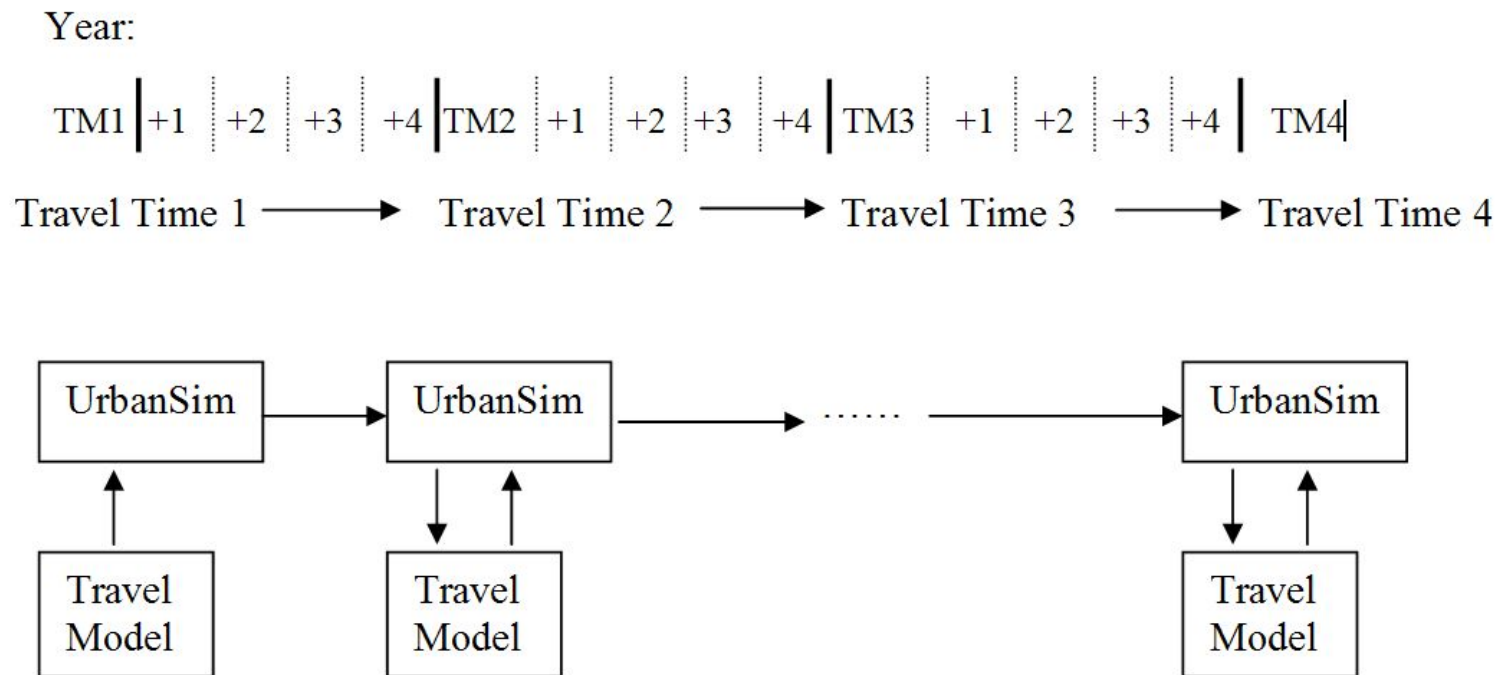


Integrated Modeling



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

- travel_model_configuration
 - transcad_binary C:\\Program Files\\TransCAD\\tcw.exe
 - project_ini C:\\Program Files\\TransCAD\\semcog.ini
 - travel_model_base_directory C:\\SEMCOG_baseline\\
 - ui_file macros\\semcog_ui
- urbansim_to_tm_variable_mapping
 - DataTable TAZ Data Table
 - JoinField ZoneID
 - variable_mapping
 - zone.zone_id ZoneID
 - urbansim_parcel.zone.population Population
 - urbansim_parcel.zone.number_of_households Households
 - urbansim_parcel.zone.number_of_jobs Total_Emp
 - zone.aggregate(urbansim.job.is_in_employment_sec... Basic
 - zone.aggregate(urbansim.job.is_in_employment_sec... NonBasic
 - urbansim_parcel.zone.number_of_jobs_of_sector_4 WholeSale
 - urbansim_parcel.zone.number_of_jobs_of_sector_5 Retail
- tm_to_urbansim_variable_mapping
 - row_index_name ZoneID
 - col_index_name ZoneID
 - AMHwySkims
 - Miles highway_distance
 - Trav_Time highway_travel_time
 - + • AMTransitSkim
- macro
 - get_cache_data_into_transcad SEMCOGImportTabFile
 - get_transcad_data_into_cache SEMCOGExportMatrices
 - run_semcoog_travel_model SEMCOG Run Loops
 - get_file_location SEMCOGGetFileLocation
- locations_to_disaggregate ['parcel', 'building']
- models
 - washtenaw.transcad.get_cache_data_into_transcad
 - washtenaw.transcad.run_semcoog_travel_model
 - washtenaw.transcad.get_transcad_data_into_cache

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 displays the UrbanSim software interface with a tree view of simulation scenarios. The 'washtenaw baseline with travel model' scenario 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 the following structure:

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	scad_e5
• ui_file	scad_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