Prescient

Release 2.0.2

Prescient Developers

Dec 15, 2021

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USING PRESCIENT

1.1 Installation

Prescient is a python package with a number of dependencies and prerequisites.

To install Prescient, follow these steps:

- Install python
- Get Prescient source code
- Install dependencies
- Install a linear solver
- Install the Prescient python package
- Verify your installation

1.1.1 Install python

Prescient requires python 3.7 or later. We recommend installing Anaconda to manage python and other dependencies.

1.1.2 Get Prescient source code

The latest stable version of Prescient can be acquired as source from the Prescient github project, either by downloading a zip file of the source code or by cloning the *main* branch of the github repository.

1.1.3 Install dependencies

Prescient runs in a python environment that must include a number of python prerequisites. You may want to create a python environment specifically for Prescient. To create a new Anaconda environment that includes Prescient's prerequisites, issue the following command from the root folder of the Prescient source code:

conda env create -f environment.yml

The command above will create an environment named *prescient*. To use a different name for the environment, add the *-n* option to the command above:

conda env create -n nameOfYourChoice -f environment.yml

Once you have create the new environment, make it the active environment:

conda activate prescient

If you are using something other than Anaconda to manage your python environment, use the information in *environment.yml* to identify which packages to install.

1.1.4 Install a linear solver

Prescient requires a mixed-integer linear programming (MILP) solver that is compatible with Pyomo. Options include open source solvers such as CBC or GLPK, and commercial solvers such as CPLEX, Gurobi, or Xpress.

The specific mechanics of installing a solver is specific to the solver and/or the platform. An easy way to install an open source solver on Linux and Mac is to install the CBC Anaconda package into the current conda environment:

conda install -c conda-forge coincbc

Tip: Be sure to activate the correct python environment before running the command above.

Note that the CBC solver is used in most Prescient tests, so you may want to install it even if you intend to use another solver in your own runs.

1.1.5 Install the Prescient python package

The steps above configure a python environment with Prescient's prerequisites. Now we must install Prescient itself. From the prescient python environment, issue the following command:

pip install -e .

This will update the active python environment to include Prescient's source code. Any changes to Prescient source code will take affect each time Prescient is run.

This command will also install a few utilities that Prescient users may find useful, including *runner.py* (see *Running Prescient*).

1.1.6 Verify your installation

Prescient is packaged with tests to verify it has been set up correctly. To execute the tests, issue the following command:

python -m unittest tests/simulator_tests/test_sim_rts_mod.py

This command runs the tests using the CBC solver and will fail if you haven't installed CBC. The tests can take as long as 30 minutes to run, depending on your machine. If Prescient was installed correctly then all tests should pass.

1.2 Running Prescient

There are three ways to launch and run Prescient:

- With a configuration file, using runner.py
- With command line options, using the prescient module
- From python code, using in-code configuration

In all three cases, the analyst supplies configuration values that identify input data and dictate which options to use during the Prescient simulation. Configuration options can be specified in a configuration file, on the command line, in-code, or a combination of these methods, depending on how Prescient is launched.

To see what configuration options are available, see Configuration Options.

1.2.1 Launch with runner.py

Prescient can be run using *runner.py*, a utility which is installed along with Prescient (see *Install the Prescient python package*). Before executing *runner.py*, you must create a configuration file indicating how Prescient should be run. Here is an example of a configuration file that can be used with *runner.py*:

```
command/exec simulator.py
```

```
--data-directory=example_scenario_input
--output-directory=example_scenario_output
--input-format=rts-gmlc
--run-sced-with-persistent-forecast-errors
--start-date=07-11-2024
--num-days=7
--sced-horizon=1
--sced-frequency-minutes=10
--ruc-horizon=36
```

Because runner.py can potentially be used for more than launching Prescient, the first line of the configuration file must match the line shown in the example above. Otherwise runner.py won't know that you intend to run Prescient.

All subsequent lines set the value of a configuration option. Configuration options are described in *Configuration Options*.

Once you have the configuration file prepared, you can launch Prescient using the following command:

runner.py config.txt

where *config.txt* should be replaced with the name of your configuration file.

1.2.2 Launch with the prescient module

Another way to run Prescient is to execute the prescient.simulator.prescient module:

python -m prescient.simulator.prescient <options>

where options specifies the configuration options for the run. An example might be something like this:

```
python -m prescient.simulator.prescient --data-directory=example_scenario_input --output-

→directory=example_scenario_output --input-format=rts-gmlc --run-sced-with-persistent-

→forecast-errors --start-date=07-11-2024 --num-days=7 --sced-horizon=1 --sced-frequency-

→minutes=10 --ruc-horizon=36
```

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Configuration options can also be specified in a configuration file:

```
python -m prescient.simulator.prescient --config-file=config.txt
```

Note that if you use the *-config-file* option, it must be the only option on the command line.

Running the *prescient* module allows you to run Prescient without explicitly installing it, as long as Prescient is found in the python module search path.

1.2.3 Running Prescient from python code

Prescient can be configured and launched from python code:

```
from prescient.simulator import Prescient
Prescient().simulate(
        data_path='deterministic_scenarios',
        simulate_out_of_sample=True,
        run_sced_with_persistent_forecast_errors=True,
        output_directory='deterministic_simulation_output',
        start_date='07-10-2020',
       num_days=7,
        sced_horizon=4,
        reserve_factor=0.0,
        deterministic_ruc_solver='cbc',
        sced_solver='cbc',
        sced_frequency_minutes=60,
        ruc_horizon=36,
        enforce_sced_shutdown_ramprate=True,
        no_startup_shutdown_curves=True)
```

The code example above creates an instance of the Prescient class and passes configuration options to its *simulate()* method. Another option is to set values on a configuration object, and then run the simulation after configuration is done:

```
from prescient.simulator import Prescient

p = Prescient()

config = p.config
config.data_path='deterministic_scenarios'
config.simulate_out_of_sample=True
config.run_sced_with_persistent_forecast_errors=True
config.output_directory='deterministic_simulation_output'
config.start_date='07-10-2020'
config.num_days=7
config.sced_horizon=4
config.reserve_factor=0.0
config.deterministic_ruc_solver='cbc'
config.sced_solver='cbc'
config.sced_frequency_minutes=60
```

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```
config.ruc_horizon=36
config.enforce_sced_shutdown_ramprate=True
config.no_startup_shutdown_curves=True
```

p.simulate()

Managing configuration in code is very flexible. The example below demonstrates a combination of approaches to configuring a prescient run:

```
from prescient.simulator import Prescient
simulator = Prescient()
# Set some configuration options using the simulator's config object
config = simulator.config
config.data_path='deterministic_scenarios'
config.simulate_out_of_sample=True
config.run_sced_with_persistent_forecast_errors=True
config.output_directory='deterministic_simulation_output'
# Others will be stored in a dictionary that can
# potentially be shared among multiple prescient runs
options = {
    'start_date':'07-10-2020',
    'sced_horizon':4.
    'reserve_factor':0.0,
    'deterministic_ruc_solver':'cbc',
    'sced_solver':'cbc',
    'sced_frequency_minutes':60,
    'ruc_horizon':36,
    'enforce_sced_shutdown_ramprate':True,
    'no_startup_shutdown_curves':True,
}
# And finally, pass the dictionary to the simulate() method,
# along with an additional function argument.
simulator.simulate(**options, num_days=7)
```

1.3 Configuration Options

```
• Overview
```

- Option Data Types
- List of Configuration Options

1.3.1 Overview

Prescient configuration options are used to indicate how the Prescient simulation should be run. Configuration options can be specified on the command line, in a text configuration file, or in code, depending on how Prescient is launched (see *Running Prescient*).

Each configuration option has a name, a data type, and a default value. The name used on the command line and the name used in code vary slightly. For example, the number of days to simulate is specified as *--num-days* on the command line, and *num_days* in code.

1.3.2 Option Data Types

Most options use self-explanatory data types like *String*, *Integer*, and *Float*, but some data types require more explanation and may be specified in code in ways that are unavailable on the command line:

	• •	
Data type	Command-line/config file usage	In-code usage
Path	A text string that refers to a file or	Same as command-line
	folder	
Date	A string that can be converted to a	Either a string or a datetime object.
	date, such as 1776-07-04.	
Flag	Simply include the option to set it to	Set the option by assigning True or
	true. For example, the command be-	False:
	low sets <i>simulate_out_of_sample</i> to	config.simulate_out_of_
	true:	⇔sample = True
	runner.pysimulate-out-	-
	⊶of-sample	
Module	Refer to a python module in one of	In addition to the two string options
	the following ways:	available to the command-line, code
	• The name of a python	may also use a python module ob-
	module (such as pre-	ject. For example:
	scient.simulator.prescient)	import my custom data
	• The path to a python	→provider
	file (such as pre-	<pre>config.data_provider = my_</pre>
	scient/simulator/prescient.py)	→custom_data_provider
1		-

Table 1: Configuration Data Types

1.3.3 List of Configuration Options

The table below describes all available configuration options.

Command-line	In-Code Configu-	Argument	Description
Option	ration Property		
config-file	config_file	Path. Default=None.	Path to a file holding configuration op- tions. Can be absolute or relative. Cannot be set in code directly on a configuration object. If specified, no other command line options or func- tion arguments are allowed.
General Options	1 .		
start-date	start_date	Date. Default=2020-01- 01.	The start date for the simulation.
num-days	num_days	Integer. Default=7	The number of days to simulate.
Data Options	1 (1		
data-path or data-directory	data_path	Path. Default=input_data.	Path to a file or folder where input data is located. Whether it should be a file or a folder depends on the input for- mat. See <i>Input Data</i> .
input-format	input_format	String. Default=dat.	The format of the input data. Valid values are <i>dat</i> and <i>rts_gmlc</i> . Ignored when using a custom data provider. See <i>Input Data</i> .
data-provider	data_provider	Module. Default=No cus- tom data provider.	A python module with a custom data provider that will supply data to Pre- scient during the simulation. Don't specify this option unless you are using a custom data provider; use data_path and input_format instead. See <i>Custom Data Providers</i> .
output-directory	output_directory	Path. Default=outdir.	The path to the root directory to which all generated simulation output files and associated data are written.
RUC Options			
ruc_every-hours	ruc_every_hours	Integer. Default=24	How often a RUC is executed, in hours. Default is 24. Must be a divisor of 24.
ruc-execution- hour	ruc_execution_hour	Integer. Default=16	Specifies an hour of the day the RUC process is executed. If multiple RUCs are executed each day (because <i>ruc_every_hours</i> is less than 24), any of the execution times may be specified. Negative values indicate hours before midnight, positive after.
ruc-horizon	ruc_horizon	Integer. Default=48	The number of hours to include in each RUC. Must be >= <i>ruc_every_hours</i> and <= 48.
ruc-prescience- hour	ruc_prescience_hour	Integer. Default=0.	The number of initial hours of each RUC in which linear blending of fore- casts and actual values is done, mak- ing some near-term forecasts more ac- curate.

Command-line	In-Code Configu-	Argument	Description
Option	ration Property		
run-ruc-with-next-	run_ruc_with_next_da	ay <u>Etag</u> taDefault=false.	If false (the default), never use more
day-data			than 24 hours of forecast data even
			if the RUC horizon is longer than 24
			hours. Instead, infer values beyond 24
			hours.
			If true, use forecast data for the full
			RUC horizon.
simulate-out-of-	simu-	Flag. Default=false.	If false, use forecast input data as both
sample	late_out_of_sample		forecasts and actual values; the actual
			value input data is ignored.
			If true, values for the current sim-
			ulation time are taken from the ac-
			tual value input, and actual values
			are used to blend near-term values if
			<i>ruc_prescience_hour</i> is non-zero.
ruc-network-type	ruc_network_type	String. Default=ptdf.	Specifies how the network is repre-
			sented in RUC models. Choices are: *
			ptdf – power transfer distribution fac-
			tor representation * btheta – b-theta
		~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	representation
ruc-slack-type	ruc_slack_type	String. Default=every-	Specifies the type of slack variables
		bus.	to use in the RUC model formulation.
			Choices are: * every-bus – slack vari-
			ables at every system bus * ref-bus-
			and-branches – slack variables at only
datampinistia mua	dotomoinia	String Default and	The name of the solver to use for
deterministic-ruc-	tic rue solver	String. Default=cbc.	PLICe
deterministic ruc	determinis	String Default-None	Solver options applied to all PUC
deterministic-ruc-	tic ruc solver option	String. Default=100lie.	solves
ruc-mingan	ruc_mingan	Float Default=0.01	The mingan for all deterministic RUC
rue mpgap	ruc_mpgap	Tiout. Delaun-0.01.	solves.
output-ruc-initial-	out-	Flag. Default=false.	Print initial conditions to stdout prior
conditions	put ruc initial condi	tions	to each RUC solve.
output-ruc-	out-	Flag. Default=false.	Print RUC solution to stdout after each
solutions	put_ruc_solutions		RUC solve.
write-	write_deterministic_r	ud <u>Flimstablefas</u> ult=false.	Save each individual RUC model to a
deterministic-			file. The date and time the RUC was
ruc-instances			executed is indicated in the file name.
deterministic-ruc-	determinis-	Module. Default=None.	If the user has an alternative method
solver-plugin	tic_ruc_solver_plugin		to solve RUCs, it should be specified
			here, e.g., my_special_plugin.py.
			Note: This option is ignored if
			simulator-plugin is used.
SCED Ontions			
	1	1	1

Table $2 - continued from previous page$	Table	2 - continued	from	previous	page
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Option ration Property	Command-line	In-Code Configu-	Argument	Description
seed-frequency-minuteInteger. Default=60. How often a SCED will be run, in minutes. Must divide evenly into 60, or be a multiple of 60. seed-horizon seed_horizon Integer. Default=1 The number of time periods to include in each SCED. Must be at least 1. run-seed-with-persistent-forecast-errors run-seed_with_persisteflag/orDafault=false. If true, then values in SCEDs use periods. Include for all time periods. Including future time periods. Including future time periods. See future Values in SCEDs. enforce-seed-shutdown-ramprate en- Flag. Default=false. Enforces shutdown ramp-rate constraints can be statisfied. seed-network-type sced_network_type String. Default=ptdf. Specifies how the network is representation * btheta - b-theta representation * btheta - b-theta representation * btheta - b-theta representation seed-solver sced_slack_type String. Default=eptdf. Specifies how transfer distribution fuctor representation * btheta - b-theta representation seed-solver sced_slover_options String. Default=lebc. The name of the solver to use for SCED solver to use for SCED solver to use for SCED solver. seed-solver sced_solver_options String. Default=false. Print results from SCED solver. seed-solver sced_solver_options Solver options applied to all SCED solve.	Option	ration Property		
minutes utes. Must divide venely into 60, or be seed-horizon sced_horizon Integer. Default=1 The number of time periods to include in each SCED. Must be at least 1. run-seed-with-persisteriors run_sced_with_persistefilgjorDafatjeridate. If true, then values in SCEDs use persistent forecast errors. enforce-seed-shutdown-ramprate en- Flag. Default=false. Enforces shutdown ramp-rate constraints can be statisfied. seed-network-type sced_network_type String. Default=ptdf. Specifies how the network is representation * bteta - b-theta representation seed-slack-type sced_slack_type String. Default=every-bus. Specifies the type of slack variables at every system bus * ref-bus-and-branches - slack variables at every system bus * ref-bus-and-branches - slack variables at every system bus * ref-bus-and-branches - slack variables at every system bus * ref-bus-and-branches - slack variables at every system bas * ref-bus-and-branches - slack variables at out; seed-solver sced_solver String. Default=every Solver options applied to all SCED solves to stdout prior to each solve. seed-solver sced_solver String. Default=every Solve options applied to all SCED solves to stdout prior to each solve. seed-solver sced_solver String. Default=false. The name of the solver to use for SCEDs. seed-solver sced_solver	sced-frequency-	sced_frequency_minu	teInteger. Default=60.	How often a SCED will be run, in min-
-sced-horizon sced_horizon Integer. Default=1 The number of time periods to include in each SCED. Must be at least 1. -run-sced-with- persistent-forecast- errors run_sced_with_persistefilagiofbafiatJerifatse. If true, hen values in SCEDs use per- sistent forecast errors. If false, all val- ues in SCEDs use actual values for all time periods, including future time pe- riods. See <i>Flattre Values in SCEDs</i> . -enforce-sced- shutdown-ramprate en- force_sced_shutdown_ramprate Flag. Default=false. Enforces shutdown ramp-rate con- straints in the SCED inabiling this option requires a long SCED look- ahead (at least an hour) to ensure the shutdown-ramp-rate constraints can be statisfied. sced-network-type sced_network_type String. Default=ptdf. Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation * btheta - b-theta representation sced-slack-type sced_slack_type String. Default=every- bus. Specifies the type of slack variables values and preference bus and each system branch sced-solver sced_solver String. Default=cbc. The name of the solver to use for SCEDs. -seced-solver- options sced_solver String. Default=false. Print sced variables at only reference bus and each system branch sced-solver- options put_sced_initial_conditions Flag. Default=false. Print SCED loads t	minutes			utes. Must divide evenly into 60, or be
seed_horizon seed_horizon Integer. Default=1 The number of number of least 1. run-seed-with- persistent-forecast- errors run_sced_with_persisteflagorDefault#riadse. If true, then values in SCEDs use per- sistent forecast errors. If false, all values for all time periods, including future time pe- riods. See Future Values for all time periods, including future time pe- riods. See Future Values in SCEDs. enforce-sced- shutdown-ramprate en- force_sced_shutdown_ramprate Flag. Default=false. Enforces shutdown ramp-rate con- straints in the SCED. Inabling this option requires a long SCED look- ahead (at least an hour) to ensure the shutdown ramp-rate constraints can be statisfied. sced-network-type sced_network_type String. Default=ptdf. Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation sced-slack-type sced_slack_type String. Default=every- bus. Specifies the type of slack variables to use in SCED models. Choices are: * every-bus - slack variables at every system bus * reference bus and each system branch sced-solver sced_solver_options String. Default=ebc. The name of the solver to use for SCEDs. write-sced- initial-conditions print_sced Flag. Default=false. Print SCED initial conditions to stdout prior to eac				a multiple of 60.
-run-sced-with- persistent-forecast- errorsrun_sced_with_persistefila@orDefaul#rfoxtse.If true, then values in SCEDs use per- sistent forecast errors. If false, all val- ues in SCEDs use actual values for all time periods, including future time pe- riods. See Future Values in SCEDsenforce-sced- shutdown-ramprateen- force_sced_shutdown ramprateFlag. Default=false. force_sced_shutdown ramp-rate con- straints in the SCED. Leabling this option requires a long SCED look- ahead (at least an hour) to ensure the shutdown ramp-rate constraints can be statisfiedsced-network-typesced_network_typeString. Default=ptdf.Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation * bheta - b-theta representation	sced-horizon	sced_horizon	Integer. Default=1	The number of time periods to include
-run_sced_wint_persistentagorematgereate. In true, ther values in SCEDs use per- sistent forecast errors. errors en- shutdown-ramprate en- force_sced_shutdown_ramprate Flag. Default=false. enforce-sced- shutdown-ramprate en- force_sced_shutdown_ramprate Enforces shutdown ramp-rate con- straints in the SCED. Enabling this option requires a long SCED look- shutdown ramp-rate constraints can be statisfied. sced-network-type sced_network_type String. Default=pldf. Specifies how the network is repre- sented in SCED models. Choices are: * p tdf - power transfer distribution factor representation * bheta – b-theta representation sced-slack-type sced_slack_type String. Default=every- bus. Specifies the type of slack variables to use in SCED models. Choices are: * every-bus – slack variables at only reference bus and each system branch sced-solver sced_solver String. Default=chc. The name of the solver to use for SCEDs. sced-solver sced_solver String. Default=false. Print results from SCED olves to std- out. output-sced- prions pnit_sced Flag. Default=false. Print results from SCED olves to std- out. output-sced- prions out_ put_sced_initial_conditions Flag. Default=false. Print SCED initial conditions to stdout prior to each solve. output-sced- prions out_ put_sced_initial_conditions Flag.	1	1 11 11	- El. C. D. C. 14. C. 1.	in each SCED. Must be at least 1.
peristent force stead en- force_sced_shutdown_ramprate en- force_sced_shutdown_ramprate Flag. Default=false. Enforces shutdown ramp-rate con- shutdown ramprate seed-network-type sced_network_type String. Default=ptdf. Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation * bhteta - b-theta statisfied. sced-network-type sced_network_type String. Default=ptdf. Specifies how the network is repre- sented in SCED models. Choices are: * ptdf - power transfer distribution factor representation sced-slack-type sced_slack_type String. Default=ptdf. Specifies the type of slack variables to use in SCED models. Choices are: * every-bus - Slack variables to use in SCED models. Choices are: * every-bus - Slack variables at only reference bus and each system branch sced-solver sced_solver String. Default=every- bus. Specifies the type of slack variables to use in SCED models. Choices are: * every-bus - slack variables at only reference bus and each system branch sced-solver sced_solver String. Default=chone. Solver options applied to all SCED solves. print-sced pnit_sced Flag. Default=false. Print SCED initial conditions to stdout initial-conditions output-sced-loads out	run-sced-with-	run_sced_with_persis	tentagonecasiulentarse.	if true, then values in SCEDs use per-
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	1		6	during execution.

Table	2 –	continued	from	previous	page
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			page
Command-line Option	In-Code Configu- ration Property	Argument	Description
Miscellaneous Op-			
tions			
reserve-factor	reserve factor	Float, Default=0.0.	The reserve factor, expressed as a con-
			stant fraction of demand for spinning
			reserves at each time period of the sim
			Teserves at each time period of the sim-
			ulation. Applies to boin KUC and
			SCED models.
no-startup-	no_startup_shutdown	_chilages Default=False.	If true, then do not infer
shutdown-curves			startup/shutdown ramping curves
			when starting-up and shutting-down
			thermal generators.
symbolic-solver-	svm-	Flag. Default=False.	Whether to use symbol names derived
labels	bolic solver labels		from the model when interfacing with
100015	bone_solver_habels		the solver
anable quick	an	Flag Default-False	Whether to allow quick start genera
eliable-quick-	cli-	Flag. Delaun-Faise.	tore to be committed if load shedding
start-generator-	able_quick_start_gene	rator_commitment	tors to be committed if load shedding
commitment			would otherwise occur.
Market and Pric-			
ing Options			
compute-market-	com-	Flag. Default=False.	Whether to solve a day-ahead market
settlements	pute_market_settleme	nts	as well as real-time market and re-
			port the daily profit for each generator
			based on the computed prices.
day-ahead-pricing	day ahead pricing	String. Default=aCHP.	The pricing mechanism to use for the
		C C	dav-ahead market. Choices are: *
			LMP – locational marginal price *
			ELMP – enhanced locational marginal
			price * aCHP approximated convey
			bull price
price threshold	price threshold	Float Default-10000.0	Maximum possible value the price con
price-uneshold	price_unesnoid	Float. Default=10000.0.	take. If the price can this value
			take. If the price exceeds this value
			due to Load Mismatch, then it is set
			to this value.
reserve-price-	re-	Float. Default=10000.0.	Maximum possible value the reserve
threshold	serve_price_threshold		price can take. If the reserve price ex-
			ceeds this value, then it is set to this
			value.
Plugin Options			
plugin	plugin	Module. Default=None.	Python plugins are analyst-provided
			code that Prescient calls at various
			points in the simulation process. See
			Customizing Prescient with Pluoins
			for details
			After Prescient has been initialized
			the configuration object's plugin mean
			arty holds plugin specific setting val
			erty notus prugin-specific setting val-
			ues.

Table 2 – continued from previous page	Table	2 - continued	from	previous	page
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Command-line	In-Code Configu-	Argument	Description
Option	ration Property		
simulator-plugin	simulator_plugin	Module. Default=None.	A module that implements the engine
			interface. Use this option to replace
			methods that setup and solve RUC and
			SCED models with custom implemen-
			tations.

Table 2 - continued from previous page

1.4 Input Data

1.4.1 Custom Data Providers

1.5 Results and Statistics Output

Under Construction

Documentation coming soon

1.6 Customizing Prescient with Plugins

Under Construction

Documentation coming soon

MODELING CONCEPTS

2.1 The Prescient Simulation Cycle

Note: This was taken from a previous write-up and needs to be revisited.

Prescient simulates the operation of the network throughout a study horizon, finding the set of operational choices that satisfy demand at the lowest possible cost.

Prescient loops through two repeating phases, the reliability unit commitment (RUC) phase and the security constrained economic dispatch (SCED) phase. The RUC phase determines which dispatchable generators will be active in upcoming operational time periods. For each operational period within a RUC cycle, the SCED phase selects the dispatch level of each committed thermal generator.

The RUC phase occurs one or more times per day. Each time the RUC phase occurs, Prescient generates a unit commitment schedule that indicates which generators will be brought online or taken offline within the RUC's time horizon. The SCED phase occurs one or more times per hour. Each SCED selects a thermal dispatch level for each committed generator.

2.1.1 The RUC Phase

More detailed description of the RUC...

The RUC phase occurs one or more times per day. Each time the RUC phase occurs, Prescient generates a unit commitment schedule that indicates which generators will be brought online or taken offline within the RUC's time horizon. The RUC schedule may begin immediately, or it may begin a number of hours after the RUC is generated.

2.1.2 The SCED Phase

More detailed description of the SCED, including a high level description of the optimization problem being solved, and possibly a conversational description of some things that can be tweaked (such as how often a SCED runs).

Future Values in SCEDs

Warning: Coming soon.

2.2 Reserves and Ancillary Services

2.3 Energy Markets and Pricing

THREE

EXAMPLES AND TUTORIALS

FOUR

REFERENCE

4.1 File Formats

4.1.1 RTS-GMLC

This is the main input format.

4.1.2 Pyomo DAT Files

Old way to do it.

4.2 Python Classes and Functions

FIVE

INDICES AND TABLES

- genindex
- modindex
- search