

Python Applications for RTDS

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MADRID, SPAIN



OUTLINE



- Overview
- What's new
- What's to come
- Demonstration

SCRIPTING OVERVIEW



- Automate simulation tasks
- Users can
 - Open, Save and Run Cases
 - Operate buttons, sliders, dials, etc.
 - Save plots
 - Change component parameters
 - Change case parameters

SCRIPTING OVERVIEW



- Scripting is a tool that can be used when many simulations need to be run
- Save time through automation
- Scripting has been available in RSCAD for many years.
- RSCAD scripting was C-based and is now referred to as legacy scripting.
- Legacy scripting has been replaced with Python.
- The RSCAD python API was officially released in RSCAD FX2.4

WHY PYTHON



- Widely used and accepted in industry
- Easy to read and write
- Leverage the capability of trusted 3rd party Python libraries



PYTHON vs LEGACY SCRIPTING

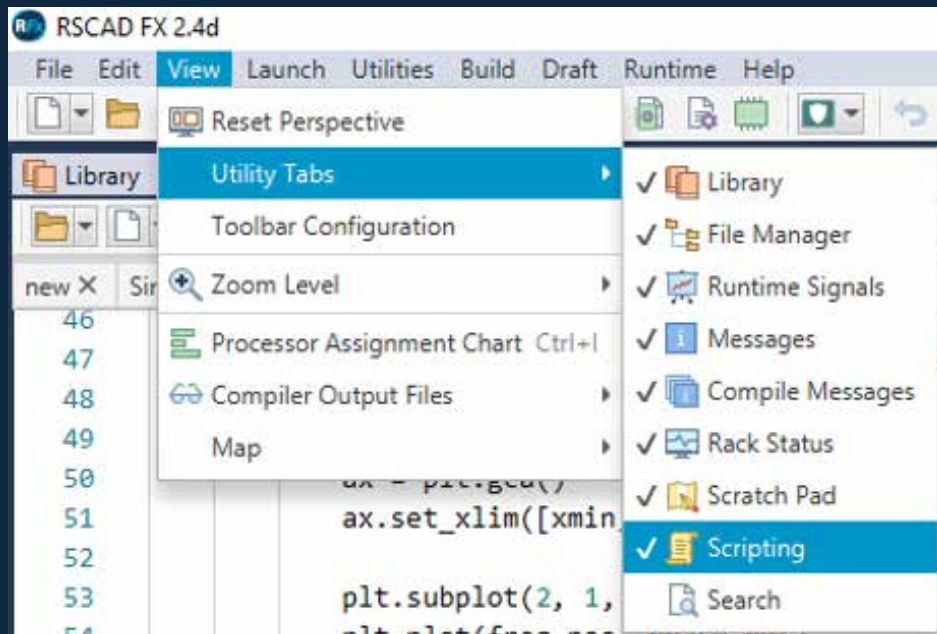
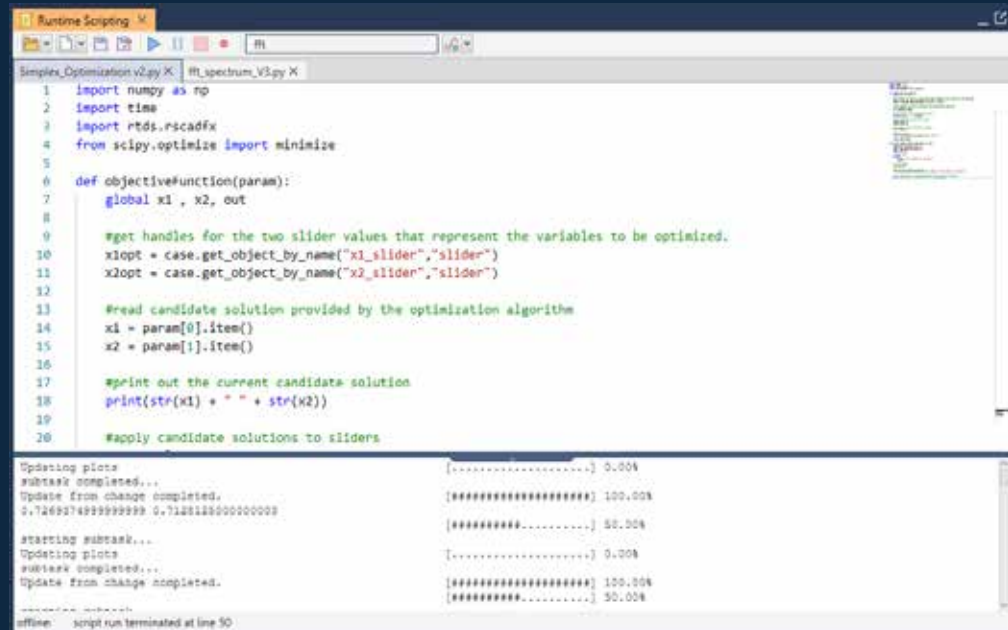


- RSCAD Python API can be installed and run in any external Python Interpreter with version >3.9. The launch and operation of RSCAD FX can be controlled from outside the RSCAD application.
- Direct modification of component parameters without using 'Draft' variables
- The placement of Draft/RunTime components can be automated
- Control of more properties such as time-step, rack number

PYTHON SCRIPTING



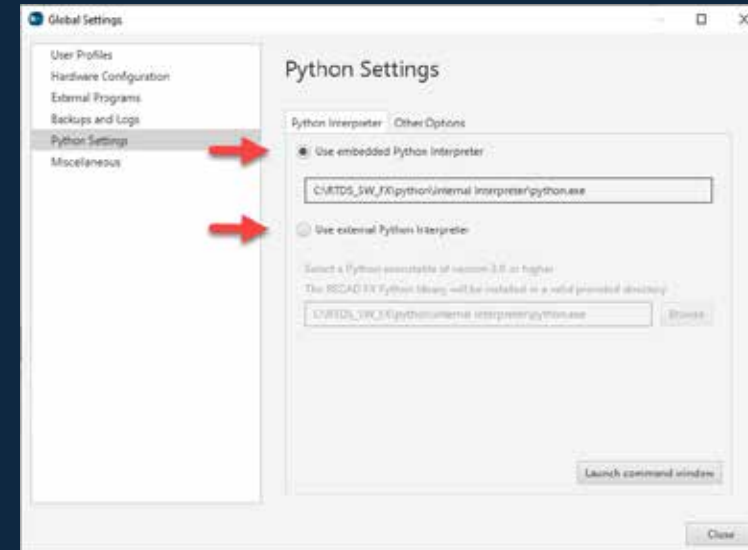
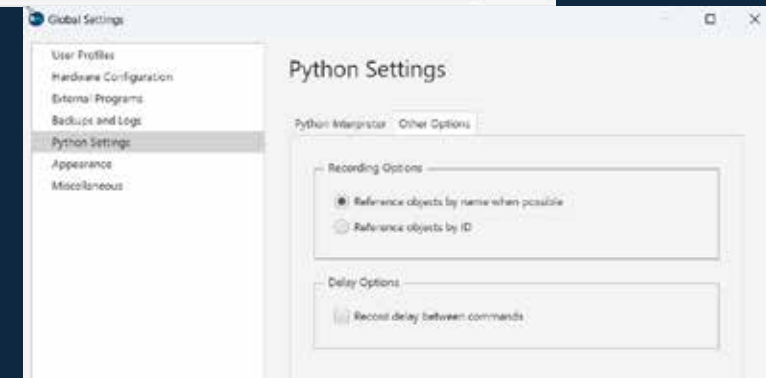
- Runtime Scripting Utility Tab
 - Used to record, modify and run scripts



PYTHON SCRIPTING



- Global settings
 - Use embedded interpreter or use a Python interpreter that exists outside of RSCAD
 - External development environments (IDE) can be used
 - Reference objects by their names or by their Unique ID #s
 - Optionally track the delays between recorded actions



RTDS PYTHON API



- What's new in RSCAD FX2.8

- Automate the placement of RunTime objects

```
runtime.insert_component("name", x, y, list[signal])
```

- Get data from the simulation into the Python script without metering or plotting the signal

```
ActiveSignals.add_recorded_signal(signal)
```

```
ActiveSignals.add_metered_signal(signal)
```

RTDS PYTHON API



- Under development
 - Frequency scan methods – provide the ability to automate the frequency scan process
 - Breakpoint mode methods – provide automation of debugging
 - Controller optimization – automation of running multiple simulations, comparing results and attempting to choose the best set of parameters
 - Webinar planned for mid-November

DEMONSTRATION



- Benchmark/validate a RSCAD simulation to a PSCAD simulation
- IEEE 9 Bus Case
 - 9 Buses
 - 3 Sources
 - 3 Transformers
 - 6 transmission lines
 - 3 loads

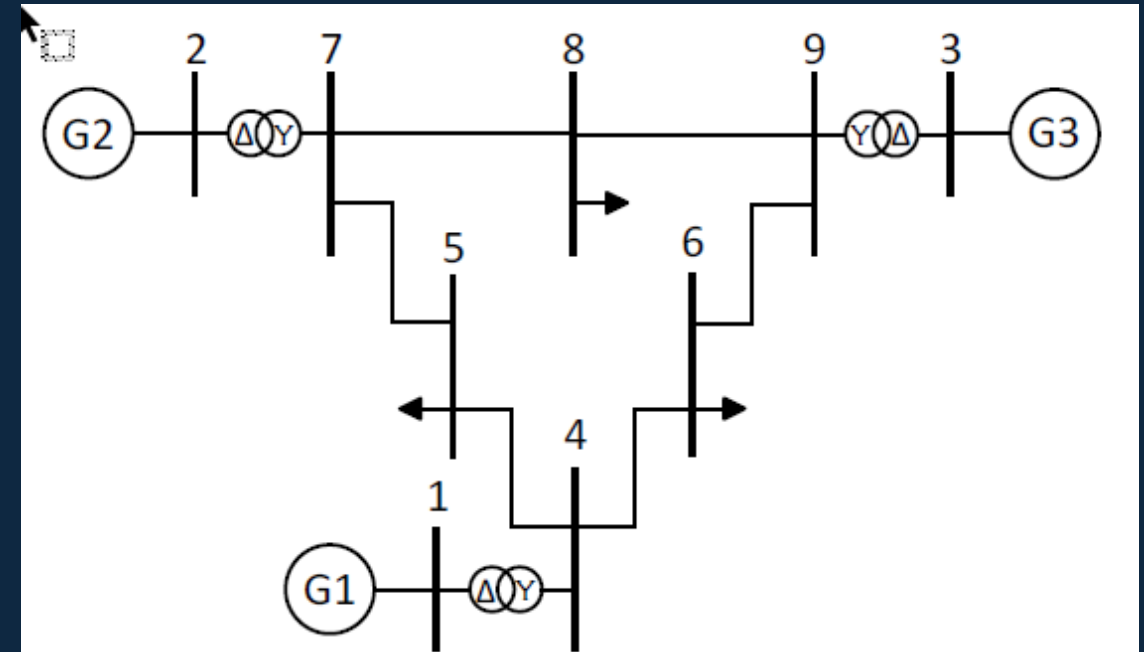


Figure 1 : One-Line Diagram of IEEE 9 Bus Power System

DEMONSTRATION



- Basic operation of the Python script

