OpenStudio Version 3.1.0

Release Notes - 10/16/2020

These release notes describe version 3.1.0 of the OpenStudio SDK developed by the National Renewable Energy Laboratory (NREL), Buildings and Thermal Sciences Center, Commercial Buildings Research Group, Tools Development Section, and associated collaborators. The notes are organized into the following sections:

- Overview
- Where to Find OpenStudio Documentation
- Installation Notes
- OpenStudio SDK: Changelog

Overview

As of April 2020, development and distribution of the OpenStudioApplication and the SketchUp plugin have transitioned to the OpenStudio Coalition, who is independently managing and distributing the software through its own openstudiocoalition/OpenStudioApplication repository. The OpenStudio SDK is continuing to be actively developed and distributed by NREL and is released two times per year, through a spring and a fall release.

Below is the list of components that is included in this SDK installer:

OpenStudio SDK 3.1.0 - EnergyPlus - Command Line Interface (CLI) - Radiance - Ruby API - C++ SDK

Note that PAT is not included in either the SDK or the OpenStudio Coalition's Application installers. You will need to install PAT separately which is distributed on the OpenStudio-PAT GitHub page.

Where to Find OpenStudio SDK Documentation

- OpenStudio SDK release documentation, including these release notes, tutorials, and other user documentation, is available at https://www.openstudio.net/
- C++ API documentation is available at https://openstudio-sdk-documentation.s3.amazonaws.com/index.html
- Measure development documentation is available at http://nrel.github.io/OpenStudio-user-documentation/reference/measure_writing_guide/
- A roadmap for planned features is available at http://nrel.github.io/OpenStudio-user-documentation/getting_started/roadmap/.

Installation Notes

OpenStudio SDK 3.1.0 is supported on 64-bit Windows 7 – 10, OS X 10.14 – 10.15, and Ubuntu 18.04.

OpenStudio SDK 3.1.0 supports EnergyPlus Release 9.4, which is bundled with the OpenStudio installer. It is no longer necessary to download and install EnergyPlus separately. Other builds of EnergyPlus are not supported by OpenStudio SDK 3.1.0.

OpenStudio SDK 3.1.0 supports Radiance 5.0.a.12, which is bundled with the OpenStudio installer; users no longer must install Radiance separately, and OpenStudio will use the included Radiance version regardless of any other versions that may be installed on the system. Other builds of Radiance are not supported by OpenStudio SDK 3.1.0.

OpenStudio SDK 3.x now uses **Ruby 2.5.5** as the supported version (2.2.4 previously).

As usual, you can refer to the **OpenStudio SDK Compatibility Matrix** for more information.

Installation Steps

- Download and install OpenStudio SDK and/or openstudiocoalition/OpenStudioApplication depending on your needs. Select components for installation. Note that OpenStudio Application is a standalone app and does not require you to install OpenStudio SDK.
- Setup a Building Component Library (BCL) account to access online building components and measures. View instructions on how to setup your account and configure the key in OpenStudio.
- The OpenStudio Application SketchUp Plug-in requires SketchUp 2019 (not available for Linux). The OpenStudio Application SketchUp Plug-in does not support older versions of SketchUp. SketchUp must be installed before OpenStudio Application to automatically activate the plugin. If you install SketchUp after OpenStudio Application, simply rerun the OpenStudio Application installer.

For help with common installation problems please visit, http://nrel.github.io/OpenStudio-user- documentation/help/troubleshooting/.

OpenStudio SDK: Changelog

The 3.1.0 is a major release. This update includes several new features, performance improvements, and bug fixes. You can find the list of Pull Requests that got into this release here.

New Features, Major Fixes and API-breaking changes

A number of API-breaking changes have been implemented in OpenStudio SDK 3.1.0:

- #3960 - Added support for building the C# bindings via `dotnet` CLI, including on Unix platforms
- #3966 - Closes #3945 - Support the EnergyPlus object SurfaceControl:MovableInsulation which can be used to add insulation surface(s) on top of opaque surfaces, such as a transparent coating that affects the radiative gains to a roof surface
- #3959 - Also included some improvements in the generated C# bindings by reducing build warnings and properly exposing some types via SWIG
  - `ScheduleTypeKey` (which is normally only use by OpenStudio internals in ScheduleTypeRegistry checks) previously mapped to a `std::pair<std::string, std::string>` which was SWIGed in ruby as an Array of strings of size two, but improperly exposed in C#. It now uses a dedicated helper class with two methods `ScheduleTypeKey::className()` and `ScheduleTypeKey::scheduleDisplayName()`
- #3987 - Closes #3907 - Support new Coil:Cooling:DX, Coil:Cooling:DX:CurveFit:Performance, Coil:Cooling:DX:CurveFit:OperatingMode, Coil:Cooling:DX:CurveFit:Speed objects
- #4009 - Closes #4006 - Add SwimmingPool:Indoor to SDK
- #4050 - Fixes #3921 - Some children of RefrigerationSystem can be added several times and produce a fatal when System is removed
  - `RefrigerationSystem` will now be enforcing unicity for all children. This was already the case for a few of the child objects such as Case and WalkIns, it is now the case for all objects (`RefrigerationCondenserCascade`, `RefrigerationSubcoolerMechanical` and `RefrigerationSubcoolerLiquidSuction`, etc.). What this means is that setter methods (or add methods in case of a list) will remove the child for any current RefrigerationSystem it is on first.
- #4066 - Multiple shading controls referenced by a single subsurface
  - `SubSurface` was historically the one referencing the `ShadingControl` object. Now it's a many-to-many relationship where `ShadingControl` has an extensible 'Sub Surface Name' field, and multiple `ShadingControl` objects can reference the same `SubSurface`. This is trickling down from a change introduced in EnergyPlus version 9.4, and specifically in PR NREL/EnergyPlus#8196
  - Methods in `SubSurface` have been deprecated but are kept for backward compatibility. They will be removed in a future version of OpenStudio:
    * `shadingControl()`: prefer `shadingControls()`
    * `setShadingControl(ShadingControl&)`: use `addShadingControl(SubSurface&)`, `addShadingControls(std::vector<SubSurface>&)` or

```
            setShadingControls(std::vector<SubSurface>&)
        * resetShadingControl(): use removeAllShadingControls()
          instead
```
  – All Shading Control Type values should now be supported. Refer to
    issue #4074 for more information
  – Fields 'Glare Control Is Active', 'Type of Slat Angle Control for
    Blinds', 'Slat Angle Schedule Name', 'Setpoint2', and 'Multiple Sur-
    face Control Type' are now implemented as well
- #4026 - Fix OpenStudio Windows crashed during save attempt
- #4028 - Fixes #3835 - Decrease overall load time of CLI and lazy load
  OpenStudio ruby bindings when possible
- #4059 - Add new OutputControl:Files object to SDK, which allows con-
  ditionally turning on/off output from EnergyPlus
- #4101 - Update EnergyPlus v940 official

Minor changes:

- #3961 - Update cmake to use included FindPython method and fix zlib's
  crypt.h
- #3970 - Update conan dependency fmt/6.2.0 and use option to define
  FMT_HEADER_ONLY
- #3979, #4004, #4071 - Update openstudio-gems to include openstudio-
  extension v0.3.0, openstudio-workflow v2.1.0, openstudio-standards
  v0.2.12, openstudio_measure_tester v0.2.3
- #4015, #4047- Updates the conan dependencies to try and pin version
  using hash
- #4027 - Include 64/32 bit universal nuget package in cmake build process.
- #4029 - Closes #3832 - Allow for silent install on windows
- #4055 - Closes #4054 - Add latitude, longitude, elevation accessors to
  FloorplanJS
- #4068 - Closes #4067 - Remove the ENV ruby bundle variables so the cli
  does not use them

Minor Bug Fixes

- #3957 - Fix for ruby bundle changes.
- #3971 - Fixes #3943 - ThreeJS should handle ConstructionAirBoundary
- #3973 - Fixes #3972 - ScheduleRuleset remove winterDD/summerDD/holiday
  ScheduleDay in reset.
- #3978 - Fixes #3976 - Add 'Minimum Outdoor Dry-Bulb Temperature
  for Compressor Operation' to all Coil:Cooling:DX:XXX objects
- #3980 - Fixes #2033 - Properly connected the secondary/induced air node
  for ATUs
- #3981 - Fixes #2977 - Make VAVReheat Method consistent with IDD
  and other objects

- #3983 - Fixes #1058 - Warn only if the file extension isn't OSM, OSC, IDF, IMF, or DDY
- #3985 - Fixes #3926, Fixes #3984 - Handle multiple AirLoopHVACs and assign the DSOA to all ControllerMechanicalVentilation objects. AirLoopHVAC translates the AirLoopHVACOutdoorAirSystem, which in turns translates the ControllerOutdoorAir
- #3986 - Fixes #2797 - Do not translate a ZoneHVACLowTempRadiant object if it doesn't have any surfaces with Internal Source
- #3988 - Fix bug in GenerateClass.rb
- #3989 - Fixes #3076 - Make openstudio::Vector "Enumerable" in ruby
- #3993 - Added logic to rejoin previously triangulated window geometry before calling computeTriangulation on the base surface. Fixed several bugs in joinAll and translation to ThreeJS format
- #3995 - Implements eql? and hash for UUID in Ruby so UUID can be used as a key in a Ruby Hash
- #3996 - Fixes #3990 - Add an API to CoilCoolingDXMultiSpeed to add/remove stages
- #3998 - Fixes #3997 - GbXMLReverseTranslator applies incorrect scaling to windows when unit isn't meter
- #3999 - Removes a "Propane deprecated" warning message that no longer makes sense
- #4000 - Fixes #3314 - GBXML translate spaces etc even if Facility and/or Building aren't isntantianted
- #4002 - Fixes #2100 - Remove if defaulted statements in ForwardTranslateThermalZone
- #4005 - Fixes #4001 - gbXML issue on ForwardTranslation - surfaceType attribute written twice for SlabOnGrade 3_bind* to ensure proper escaping of parameters such as Zone Names etc

- #4008 - Fixes #1906 - Use sqlite
- #4010 - Fixes #4007 - Model objects returned in inconsistent order
- #4011 - Fixes #1675 - ForwardTranslate WaterHeater:Mixed when not on loop but has Peak Use Flow Rate (standalone operation)
- #4012 - Fixes #2895 - Extend the list of acceptable SubSurface types to include Skylight
- #4013 - Fixes 32867 - Sum of fraction radiant, fraction lost, etc can be > 1
- #4021 - Fixes #4014 - Extend download time to BCL
- #4023 - Fixes #3936 - SubSurface Type reset when assigned to surface
- #4030 - Fixes #4030 - AvailabilityManagerNightCycle: Ensure ModelObjectLists are handled in clone/remove
- #4032 - Fixes #4016 - Move VT from 2.9.0 to 3.0.0 for new fields at end of the ZoneHVAC:TerminalUnit:VariableRefrigerantFlow
- #4037 - Fixes #3369 - Add missing fields to AvailabilityManager:HybridVentilation
- #4044 - Fixes #4039 - Add field ' Design Return Air Flow Fraction of

Supply Air Flow' to AirLoopHVAC

- #4048 - Fixes #4036 - Don't create windows or doors for plenums when translating from FloorspaceJSON
- #4065 - Fixes #4033, Fixes #4034 - Fix AVMList clone between different models
- #4072 - Fixes #4064 - RunPeriodControlSpecialDays are not Forward Translated
- #4080 - Fixes #4079 - Install E+ pythonwrapper lib via CMake
- #4088 - Hotfix for sql queries
- #4093 - Fixes #4091 - Update FuelType/EndUseFuelType (and Sql) to match E+ 9.4.0
- #4097 - Fixes #4096 - RT error for ZoneControlThermostat
- #4099 - Fixes #4089 - Confirm if idf_output_requests still works in reporting measure template
- #4104 - Fixes #4102 - Fuel Type Renames in EMS Actuator Names
- #4155 - Fixes #4109 - Fixes ruby bindings issue on windows when working with Sqlite3 db

OpenStudio Standards v0.2.12

- added missing nonresidential construction properties to the ZE standards
- updated data center model
- changed the location for climate zone 0 and 1 weather files
- use common geometry templates
- ground refactor to use the FC-factor methodology for 90.1 prototype models
- bug fixes to align with the OpenStudio 3.0.1 API using Ruby 2.5
- bug fix to fuel type naming FuelOil#1 -> FuelOil No1 per a recent EnergyPlus change
- added more detailed logging for economizer logic
- switch tests to use Jenkins instead of CircleCI
- updates to central plant models for LargeOffices and Hospitals
- bug fix to schedule type limits
- updates to elevators
- additional support for other types of fluid coolers and cooling towers in the HVAC constructor logic
- added missing refrigerator case lookups
- added transformers to several prototypes
- moved heat recovery lookups to data .json files
- moved economizer lookups to data .json files
- bug fix to DCV logic
- added TallBuilding and SuperTallBuilding prototypes
- added draft College prototype. While this release includes data for colleges, this only an early draft and should not be used for anything other that early testing or work to improve the college prototype.
- removed old, central data .json files

OpenStudio Server v3.1.0

- #555 - Update Ruby gem envs in the openstudio_meta cli

- #561 - Fixes #560 - Fixes unzip method
- #563 - Add linux support for extracted gems.
- #564 - Remove hardcoded openstudio version and sha
- #566 - Make tmpname deprecate
- #571 - Make downloading files back to server optional
- #602 - Add algorithmic test suites
- #597 - Save the travis gem package artifacts
- #599 - Save the windows gem package artifacts
- #580 - add report capability to PSO
- #579 - Update nokogiri
- #585 - Update docker-compose version
- #589 - Use most recent rubocop rules

Issue Statistics Since Previous Release

- 70 new issues were filed since the 3.0.0 release of OpenStudio (not including opened pull requests)

- 143 issues were closed since the 3.0.0 release of OpenStudio (not including closed pull requests).