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DevKitchen 2018
Python in Cinema 4D R20

Python in R20

Changes

New Console

c4dpy

MAXON API

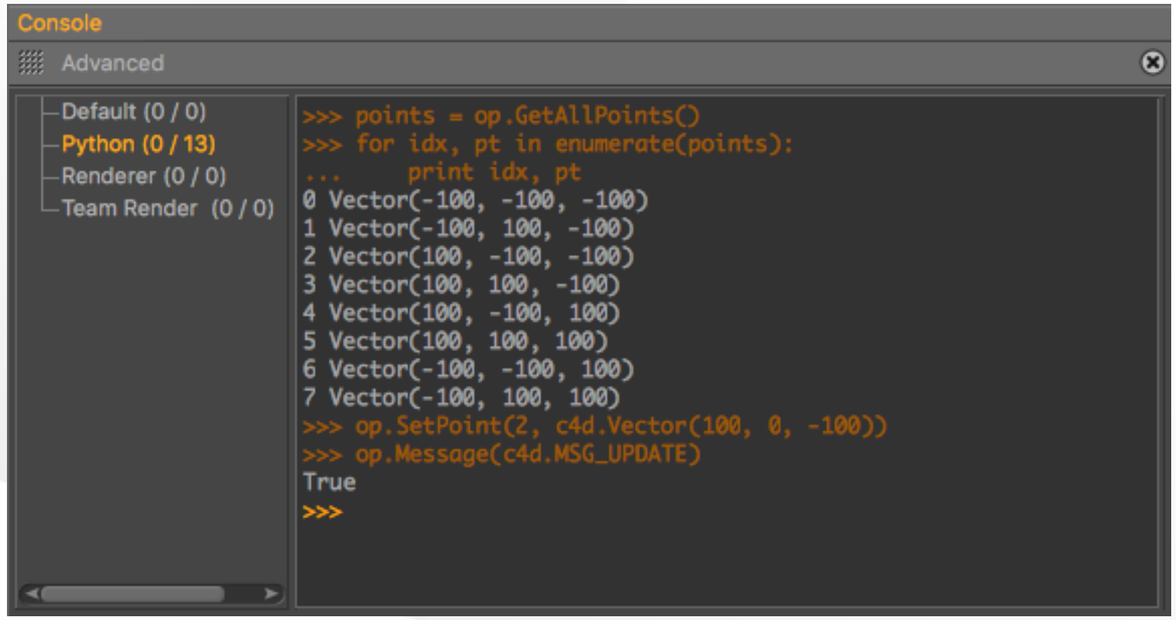
- Python API not affected by C++ API backward compatibility break
- See Python SDK documentation for the API changes in R20

  Pages What is New and API Changelist R20
- Python version 2.7.14
- Preferences

  Removed loading at startup of *python_init.py* from *prefs\python*

  Moved 3rd party modules/packages location to *python27\libs*

Python in R20 – New Console



- Python logger
- Improved text selection
- Drag&drop parameters
- Multi-line statements: for, while, if
- Save console output to text file

  Advanced ► Logger Settings… ► Write To File
- Command line field still available

  Advanced ► Command Line...

- c4dpy = Cinema 4D + Python interpreter
  - Cinema 4D running in command line mode (no GUI operations)
  - Python command line and interactive
- app/exe distributed on developers.maxon.net Downloads
  - The version of Cinema 4D and c4dpy must match
  - Get pip and install modules/packages
- Greatly improves Python development for Cinema 4D
  - Write, run and debug Python code in external editors
- Python SDK documentation c4dpy page

Python in R20 – c4dpy Command Line

```
E:\CINEMA\R20>c4dpy --version
Python 2.7.14

E:\CINEMA\R20>c4dpy -c "print('Hello!')"
Hello!

E:\CINEMA\R20>c4dpy E:\Scripts\cinemaversion.py
20028

E:\CINEMA\R20>
```

- Arguments:

  Print Python version: `c4dpy -V or --version`

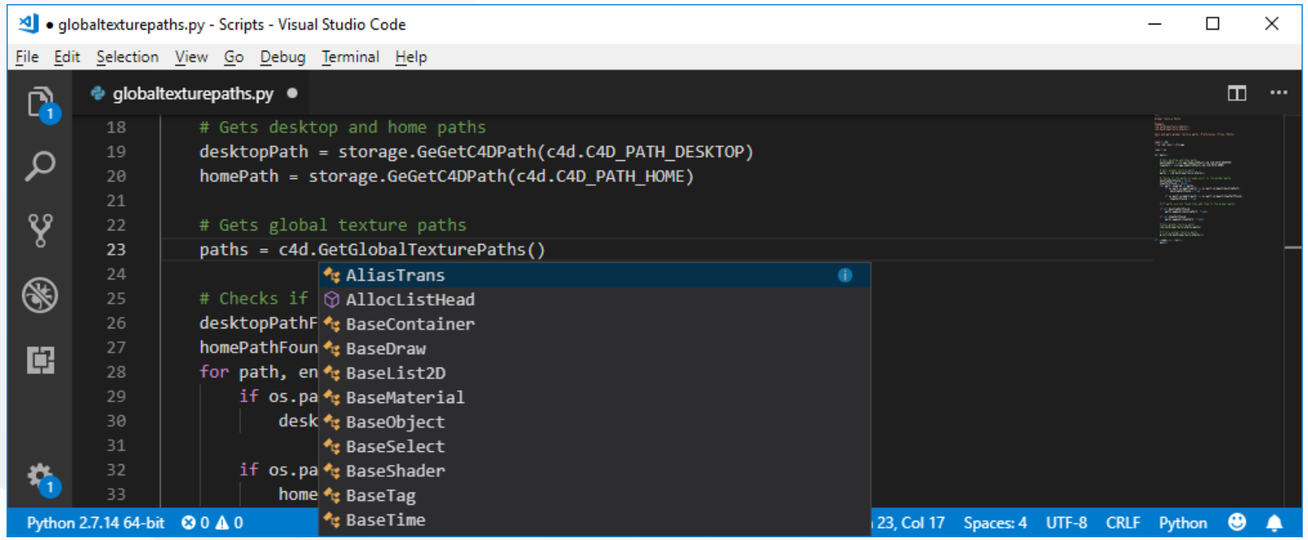
  Execute code: `c4dpy -c 'some code'`

  Run script: `c4dpy script.py`

  Invoke module: `c4dpy -m module`

- No argument: interactive mode

Python in R20 – c4dpy and Code Editors



- Supported Editors
  - Visual Studio Code
    - Install Python extension
  - PyCharm

- Workspaces/projects
- Auto-completion
- Debug scripts

Python MAXON API

Introduction

Goals

Package / Frameworks

Datatypes Conversion

From C++ To Python

- First exposure in R20
- Still considered in beta stage (almost stable, but lacking features)
- Architecture based on *python.framework*
- No documentation

Python MAXON API – Goals

- Use any MAXON_COMPONENT in Python as you do in C++
- Exposure from C++ to Python mostly automatic
- Integrate concepts of the new core
- Easier maintenance and testing

Python MAXON API – Package

- Located in *{INSTALL}/resource/modules/python/libs/python27/maxon*
- Python *maxon* module = C++ *maxon.core* framework
- To know what's available take a look at *__init__.py*
- Some interfaces are not fully exposed e.g. BaseArray.Append()

- Located in *frameworks* package subfolder
- One Python file per framework
- In R20 exposed C++ API frameworks: *mesh_misc.py* and *volume.py*
- Third party frameworks can also be exposed!

- Datatypes convertible with maxon.MaxonConvert()
  - int to maxon.Int
  - float to maxon.Float
  - bool to maxon.Bool
  - str / Unicode to maxon.String

- Datatypes manual conversion
  - list to maxon.BaseArray
  - dict to maxon.DataDictionary
  - tuple to maxon.Tuple / maxon.Pair
  - maxon.BaseArray can be converted to list/set/tuple
  - maxon.DataDictionary can be converted to list/set/tuple of tuple

list to maxon.BaseArray

```
import maxon

pyList = [1, 2, 3, 5, 7]
mArray = maxon.BaseArray(maxon.Int32)
mArray.Resize(len(pyList))

for idx, value in enumerate(pyList):
    mArray[idx] = value
```

tuple to maxon.Tuple

```
import maxon

pyTuple = ('test', 2, 4)
mTuple = maxon.Tuple((maxon.String, maxon.Int32, maxon.Int32))

for idx, value in enumerate(pyTuple):
    mTuple.Set(idx, value)
```

dict to maxon.DataDictionary

```
import maxon

pyDict = {'foo':1, 'something':20.05, 'test':'A string'}
mDict = maxon.DataDictionary()

for key, value in pyDict.iteritems():
    mDict.Set(key, value)
```

- Supported MAXON_COMPONENT
  - MAXON_INTERFACE
  - MAXON_REFERENCE
  - MAXON_ATTRIBUTE
  - MAXON_ENUMS_FLAGS

    exported automatically to *maxon* module
  - MAXON_CONFIGURATION

    exported automatically to *maxon.config module*

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Questions?

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