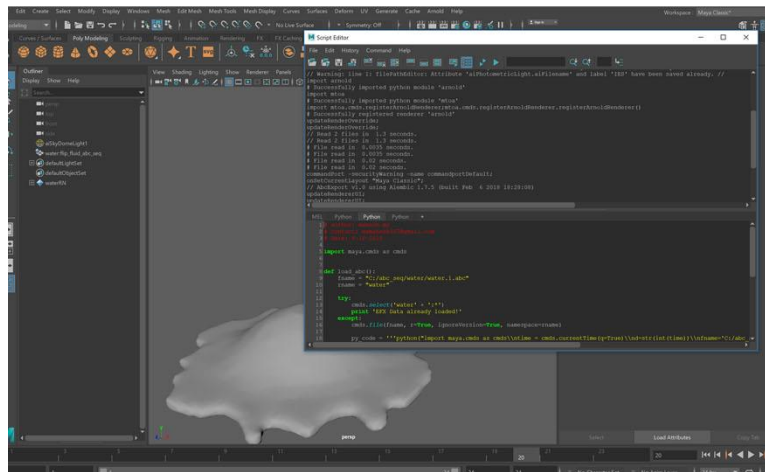
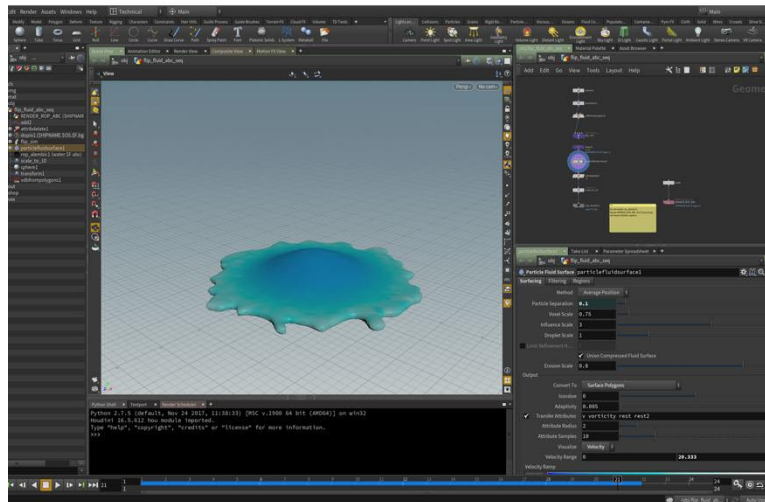




Alembic Sequence Files Houdini to Maya

Export abc sequence files from Houdini and import abc sequence files in Maya using Python.

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INTRO

Export Alembic Sequence files from Houdini to Maya for large scale simulation mesh.

For exporting abc sequence files from Houdini it's simple python pre-frame render script.

There are few methods to import abc sequence in maya, important thing is making sure to use pre-frame render Mel script to load abc sequence for rendering.

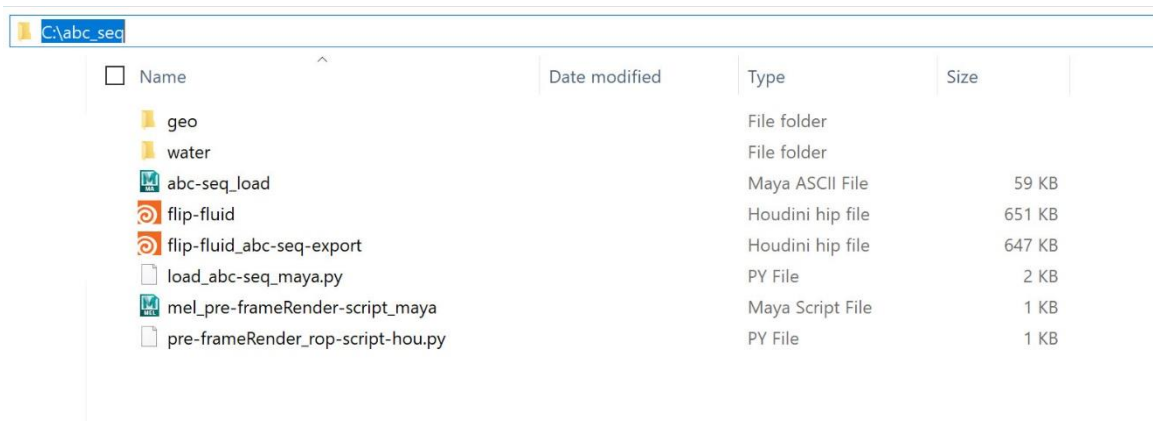
For the viewport update, we use script node to update abc sequence (python script job).

All these methods are tested in Houdini 16.5, Maya 2017 and Maya 2018 in Windows and Linux.

Here we only describe how to use these methods in windows environment.

Make sure the base directory is 'C:/abc_seq'

- Copy all the test files to 'C:/abc_seq'



☐ Name	Date modified	Type	Size
geo		File folder	
water		File folder	
abc-seq_load		Maya ASCII File	59 KB
flip-fluid		Houdini hip file	651 KB
flip-fluid_abc-seq-export		Houdini hip file	647 KB
load_abc-seq_maya.py		PY File	2 KB
mel_pre-frameRender-script_maya		Maya Script File	1 KB
pre-frameRender_rop-script-hou.py		PY File	1 KB

EXPORT ALEMBIC SEQUENCE FROM HOUDINI

Open 'flip-fluid_abc-seq-export.hip'.

Go to /obj/flip_fluid_abc_seq/

Select RENDER_ROP_ABC node, in this render rop node there is a pre-frame script setup for exporting abc sequences. Hit Save to Disk button on RENDER_ROP_ABC to export abc sequence.

By using this method, it's possible to use multiple computers in render farm to export abc sequence (submit RENDER_ROP_ABC to render farm to export abc sequence).

IMPORT ALEMBIC SEQUENCE IN MAYA

Open 'abc-seq_start.ma'

Set frame range to 1-24.

Open 'load_abc-seq_maya.py' in script editor and run the script, it will create a water alembic reference node and setup a script node for viewport update and Pre-render frame MEL script for rendering abc sequence files.

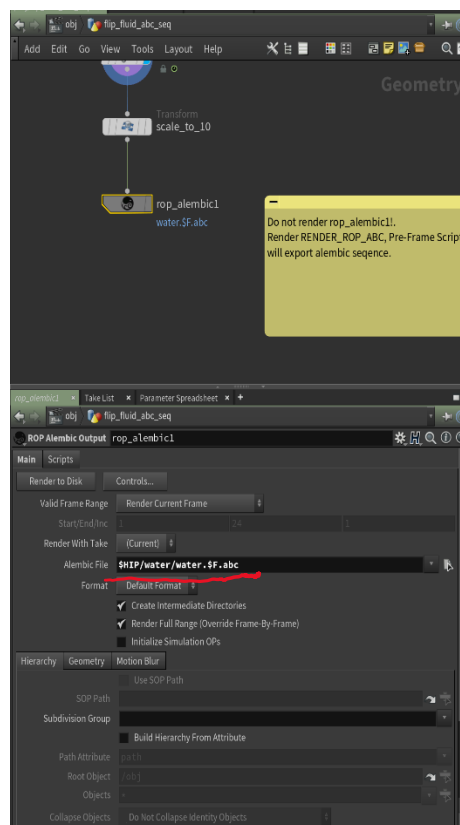
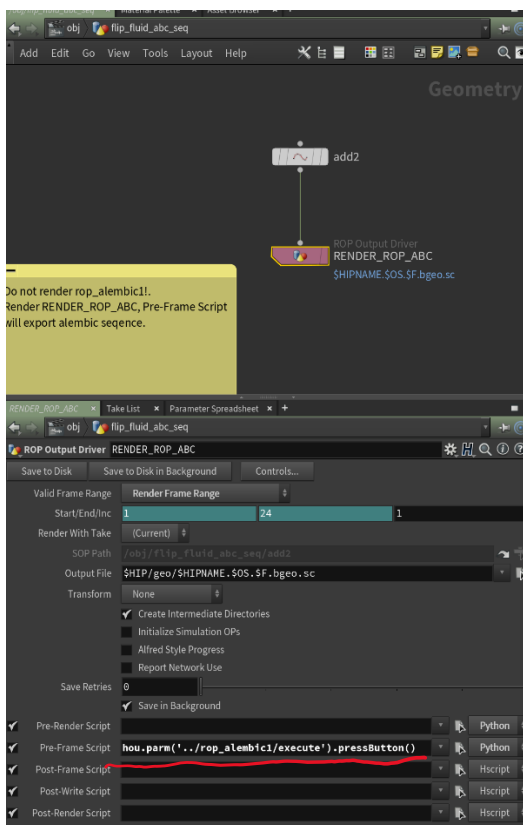
DETAIL EXPLANATION FOR PYTHON SCRIPT

Pre-Frame Script Houdini:

```
hou.parm('../rop_alembic1/execute').pressButton()
```

every time the frame changes this script will execute, in this case the script will press the button 'Render to Disk' on the 'rop_alembic1' node.

On 'rop_alembic1' node, we set the export path to '\$HIP/water/water.\$F.abc' (C:/abc_seq/water/water.\$F.abc). At render time \$F replace with current frame number.



Python Script 'load_abc-seq_maya.py' in Maya:

```
1  # author: mahesh ms
2  # contact: msmahesh@live.com
3  # Date: 6-10-2018
4
5  import maya.cmds as cmds
6
7
8  def load_abc():
9      # setup alembic reference with a namespace 'water'
10     fname = "C:/abc_seq/water/water.1.abc"
11     rname = "water"
12
13     try:
14         cmds.select('water' + ':'*)
15         print 'EFX Data already loaded!'
16     except:
17         cmds.file(fname, r=True, ignoreVersion=True, namespace=rname)
18         # python code for pre frame mel script
19         py_code = '''python("import maya.cmds as cmds\\n
20         time = cmds.currentTime(
21             q=True)\\n
22         d=str(int(time))\\n
23         fname='C:/abc_seq/water/water.%s.abc'%d\\n
24         cmds.file(fname, loadReference='waterRN')");'''
25
26         # set pre frame mel script
27         cmds.setAttr('defaultRenderGlobals.preRenderMel', py_code, type='string')
28         #cmds.setAttr('defaultRenderGlobals.postRenderMel', py_code, type='string')
29
30         # python code for viewport update
31         myCode = '''
32
33 import maya.cmds as cmds
34
35 def on_time_changed():
36     time = cmds.currentTime(q=True)
37     d = str(int(time))
38     fname = "C:/abc_seq/water/water.%s.abc" %d
39     cmds.file(fname, loadReference="waterRN")
40
41 on_time_changed()
42 cmds.scriptJob(event=["timeChanged", "on_time_changed()"])
43 cmds.scriptJob(event=["SceneOpened", "on_time_changed()"])
44
45 on_time_changed()
46 '''
47
48     # create a script node and add mycode
49     nodeName = cmds.scriptNode(st=1, bs=myCode.replace("'''", '"'), n='
50         sn_abcChange', stp='python')
51     # run script node
52     cmds.scriptNode(nodeName, executeBefore=True)
53
54 # run the function load_abc()
55 load_abc()
```

In this script we create a function load_abc() for setup alembic reference node and update alembic sequence every time frame changes.

First the script creates alembic reference node with a namespace 'water' and load the first alembic file 'water.1.abc'.

```
fname = "C:/abc_seq/water/water.1.abc"
```

```
rname = "water"
```

```
cmds.file(fname, r=True, ignoreVersion=True, namespace=rname)
```

py_code is a mel code for pre-frame script MEL, every time the frame changes before rendering this code will replace abc file on the water reference node to current frame abc file.

```
cmds.setAttr('defaultRenderGlobals.preRenderMel', py_code, type='string')
```

this python code will set Pre-render frame MEL script to py_code.

myCode will create a scriptJob and it will run time changes in Maya.

Finally, we create a script node called 'sn_abcChange' and add myCode as a python script.

```
nodeName = cmds.scriptNode(st=1, bs=myCode.replace('"""', ''), n='sn_abcChange',  
stp='python')
```

Run the script node:

```
cmds.scriptNode(nodeName, executeBefore=True).
```

FINAL NOTES ON LOADING ABC SEQUENCE IN MAYA

For heavy meshes its better not to use viewport update, just create and load first alembic file in Maya then use a simple pre-frame render MEL to update abc file at render time.

Example:

Load abc reference:

```
fname = "C:/abc_seq/water/water.1.abc"
```

```
rname = "water"
```

```
cmds.file(fname, r=True, ignoreVersion=True, namespace=rname)
```

add Pre-frame render script MEL:

```
py_code = """python("import maya.cmds as cmds\nntime =  
cmds.currentTime(q=True)\nnd=str(int(time))\nfname='C:/abc_seq/water/water.%s.abc'\n%d\nncmds.file(fname, loadReference='waterRN')");"  
  
cmds.setAttr('defaultRenderGlobals.preRenderMel', py_code, type='string').
```

NOTES

Make sure to replace C:/abc/water/water.%s.abc in 'load_abc-seq_maya.py' for other projects.

This method is really useful for exporting large flip simulation mesh to Maya.

Since it stores every frame into separate alembic files, we get smaller files rather than a single large abc file.

From Houdini side using this technique to export abc, we can use multiple computer in the render farm for efficiency (tested in Thinkbox Deadline).

There is a known issue with Maya batch render (sometimes it output error, it can't find reference node), but there is no issue rendering with Thinkbox deadline.

All these scripts tested in a production pipeline.

Hope you find this helpful.

Feel free to contact me on msmahesh@live.com, for Houdini pipeline development and FX.

Thanks,

Mahesh MS.