Data Representations: Cutting Planes

- Slice a plane through the data
  - Can apply additional visualization methods to resulting plane
Visualization of VERIFI Data with ParaView
Multi-case Temperature

CA: 11.5°aTDC

SOI -36°

SOI -35°

SOI -30°

SOI -24°
SOI-36 and SOI-24, Temperature & Equiv Ratio

CA: -14.5°aTDC

SOI -35°

SOI -24°

Droplet Radius [μm]

Temp [K]

Equiv. Ratio [-]
Post convert and Data sizes

- 4 cases (SIO -36, -35, -30, -24)
- Each case:
  - 330 time steps
  - Post files: ~400GB
  - VTK files: ~1.1TB
- Post_convert improvements for VTK
  - Access of values of parcel data
  - Addition of crank angle and time values in VTK files
  - Recommendation for partitioned binary files
    - Reduce data size
    - Increase I/O performance
Data decomposition by simulation rank
ParaView Demonstration
ParaView States and Scripting

- Choose File → Save State…
  - .pvsm (for restoring state in interactive mode)
  - saved on the client side

- Choose File → Save State…
  - .py (for use with pvbatch)
  - saved on the client side

- Edit .py script
  - short example, loop over time steps, saving images
ParaView States and Scripting

IMAGE_DIR=/projects/my_project/FRAMES/
IN_DATA_CELL_BASE=/projects/my_project/DATA/soi-24-
STEP_START=2
STEP_COUNT=330
STEP_INC=1

start_frame=int(sys.argv[1])
num_frames=int(sys.argv[2])

CELL_DATA_FILES = []

for i in range(STEP_START, STEP_START+(STEP_COUNT*STEP_INC), STEP_INC):
    TEMP_FILE="%s%06d%s" % (IN_DATA_CELL_BASE, i, "vtu")
    CELL_DATA_FILES.append(TEMP_FILE)
ParaView States and Scripting

... try: paraview.simple
  except: from paraview.simple import *
  paraview.simple._DisableFirstRenderCameraReset()

  RenderView1 = CreateRenderView()
  RenderView1.ViewSize = [1920, 1080]

... soi24000 = XMLUnstructuredGridReader(  
    guiName="soi-24-000*",  
    CellArrayStatus=['temp', 'equiv_ratio', 'rank'],  
    FileName=CELL_DATA_FILES)
ParaView States and Scripting

... #Render()

time_vals = soi24000.TimestepValues

for i in range(start_frame, start_frame+num_frames):
    RenderView1.ViewTime = time_vals[i]
    RenderView1.StillRender()

    IMAGE_FILE="%s/frame_%04d.png" % (IMAGE_DIR, i)
    print "saving: " + IMAGE_FILE
    WriteImage(IMAGE_FILE)
More info...

- **ParaView:**
  - www.paraview.org

- **Tukey user guide:**
  - www.alcf.anl.gov/user-guides/tukey

- **ParaView on Tukey:**
  - www.alcf.anl.gov/user-guides/paraview-tukey
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