



# **An AJAX Web Application for CO2 Sequestration Computations**

COMP 670

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## OVERVIEW

- Introduction
- AJAX Implementation
- Conclusion and Future Work

# Introduction

- CO2 Sequestration
  - Sim.8
  - Need for easy-to-use GUI
  - AJAX Advantages
    - Universal compatibility
    - Can run computations on large expensive machines from low-end devices (netbooks, iphones, etc)
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- Mobility

# AJAX Implementation

- A work in progress
  - Current task: plotting results
  - Plan: Run UNIX script on server to parse output and generate plot, then reference plot image in browser
  - Status: Works!
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# AJAX Implementation

Users Web Browser (javascript)

Server (java)

Upload sdb file

Request plot  
(midrun OK)

Display data and  
set src on plot  
image

SOAP Request: RUN SIM.8

SOAP Request: PLOT DATA


SOAP Response: DATA

Exec(Sim.8)

Exec(script.sh)  
(runs view1d  
and gnuplot)  
Read data file,  
send back.

```
#!/bin/bash
cd /opt/glassfish/domains/domain1/applications/j2ee-modules/rmc_Sim8/sdb/
BASENAME=`/bin/basename $1 .sdb`
FILE="OUTPUT/$BASENAME"
if [ ! -f $FILE.dout ]; then
    echo "file $BASENAME.dout not found in the OUTPUT directory"
    exit -1
fi
/usr/local/bin/view1d <<!
$FILE
0
1
2
3
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92
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96
97
98
99
!
XFILE="xsp2.*d.t3.*dxy3.*dz3.*d.xgraph"
if [ -f $XFILE ]; then
    /bin/mv $XFILE ${FILE}_${2}_${3}.xgraph
else
    echo "file xsp2.*d.t3.*dxy3.*dz3.*d.xgraph not found"
    exit -2
fi
PLOTFILEIN="\${FILE}_${2}_${3}.xgraph\"
PLOTFILEOUT="\${FILE}_${2}_${3}.jpg\"
#PLOTFILE="\OUTPUT/testdata\"
#PLOTFILE="\OUTPUT/cs1d10_60_1.xgraph\"
/usr/bin/gnuplot <<!
set terminal jpeg
set output $PLOTFILEOUT
set size ratio .63662
plot $PLOTFILEIN title "Data" w lines
quit
!
```

Inside SOAP response  
function (javascript) for  
plot load



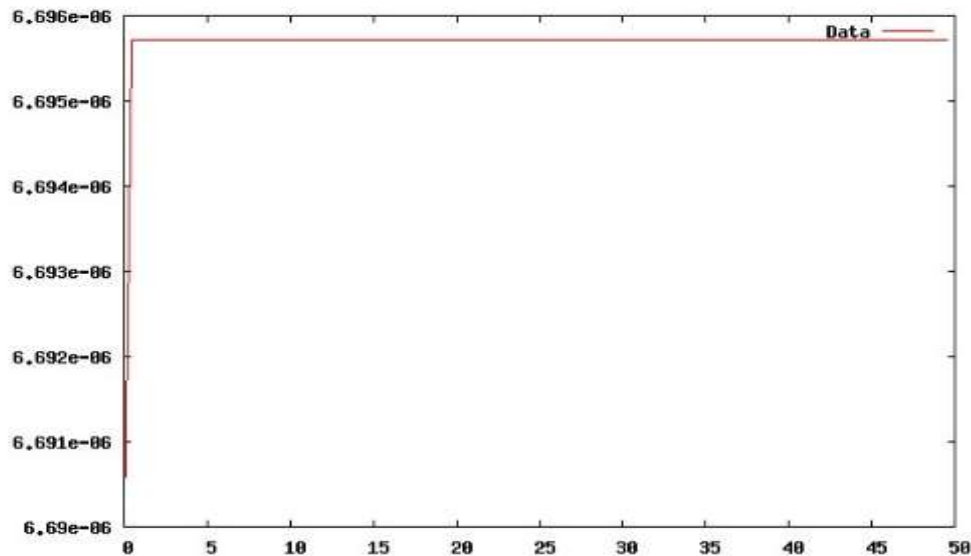
```
textbox = document.getElementById("ResultData");
textbox.innerHTML = returnData;
var imagesrc = 'http://co2seq.sdsu.edu/rmc_Sim8/sdb/OUTPUT/'+
    filename.substring(0, filename.length - 4)+
    '_' + parameter + '_' + timestep + '.jpg';
oThis.refreshImage("MainImage", imagesrc);
```

Many more options  
for gnuplot possible



Upload .sdb file...

- Desktop
- Console
- Constants
- Mineral Kinetics
- Equilibrium
- Mineral Properties
- Calculation
- Results



" sp. 59 c h+ Molar : t 1, 0 my; ix 0, iy 1, iz 1 "  
# data from output file [ OUTPUT/cs1d10 ]

```
# [ c h+ Molar ]  
0 6.69002e-06  
0.5 6.69571e-06  
1 6.69571e-06  
1.5 6.69571e-06  
2 6.69571e-06  
2.5 6.69571e-06  
3 6.69571e-06  
3.5 6.69571e-06  
4 6.69571e-06  
4.5 6.69571e-06  
5 6.69571e-06  
5.5 6.69571e-06  
6 6.69571e-06  
6.5 6.69571e-06  
7 6.69571e-06
```

## Conclusion and Future Work

- Web interface works
  - Development time versus benefits
  - Lots more to implement (error checking, process termination, GUI parameters, better plots, load balancing on multiple machines, etc.)
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