



Creating easy to use HPC portals with NICE EnginFrame and SLURM

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Summary

- About NICE
- Introduction to NICE EnginFrame
- Why a SLURM plugin for EnginFrame?
- The SLURM plugin and its current limitations
- Q&A

About NICE

■ Company

- Focus on technical computing since 1996
- HQ in Italy (offices in USA, GER, UK)
- Partners all around the world
- Always profitable and self-funded



■ Expertise

- Industry veterans around Grid & HPC solutions
- Vertical solutions, Cloud computing, Remote Visualization

■ Core business: *Access to Grid / HPC / Cloud solutions*

- Work, visualize, and collaborate in HPC
- EnginFrame and DCV product families

NICE Customers and Market Segments

Energy

Anadarko, AECL, Hess, Bayerngas, BHP Billiton, Beicip, British Gas, Centrica, Chevron, Conoco-Phillips, Dong, Dowell, DSC-Libya, ENI/Agip, GazPromNeft, GDF, Logelco, Maersk Oil, Marathon Oil, Nexen, National Oilwell Varco, Novatek, Papuan Oil, PetroChina, Rosneft, Schlumberger, Sinopec, Sonatrach, Statoil, Talisman Energy, TNK-BP, TNNC, TOTAL, WG

Life Sciences and Medical

Baxter, Bayer, Biolab, DEISA project, HHMI, Johnson&Johnson, Novartis, SIB, Partners Healthcare, Pharsight

Others

Accent, Samsung SDI, SensorDynamics, Bank of Italy, Deutsche Bank

Aerospace & Manufacturing

AIRBUS, Air Products and Chemicals, AVIC, Procter&Gamble, SelexGalileo, Goodrich Aerospace, Kimberly Clarke, Magellan Aerospace, NORDAM, Northrop Grumman, Raytheon, Sikorsky, Thales

Automotive & Industrial Equipment

3M, ABB, Altran, Audi, ARRK, BMW, Bridgestone, Bosch, Continental, Daimler, Delphi, Dow, Faurecia, Ferrari, Hyundai, JLR, Lear, Magneti Marelli, McLaren, PSA, RedBull, Tata Steel, Toyota, TRW, VW

Research & Education

Beihang U, Birmingham U, Buffalo U, CILEA, Georgia State U, INFN, Harvard U, Liverpool U, Messina U, Huazhong Normal U, TU Ilmenau, Yale U

What is NICE EnginFrame?

Enterprise Grid

Desktop Scavenging

Open Grid ASP

STATOIL GRID PORTAL @ TRONDHEIM

Enterprise Grid

Desktop Scavenging

powered by EnginFrame

DEISA

Schlumberger

ECLIPSE

Commercial | HPC ASP

HPC SaaS

HPC Clusters

HPC App. Portal

Accent Simulation Portal - Mozilla Firefox

ACCENT

your ideas made real

Simulation Portal

Status of DataBase

New Simulation

Processor

External Stimuli

powered by EnginFrame

Collaborative design

IBM Grid Computing

W3

GeoProbe

Start GeoProbe using the default remote visualization tool.

File Objects

Volume1.tamp.vol

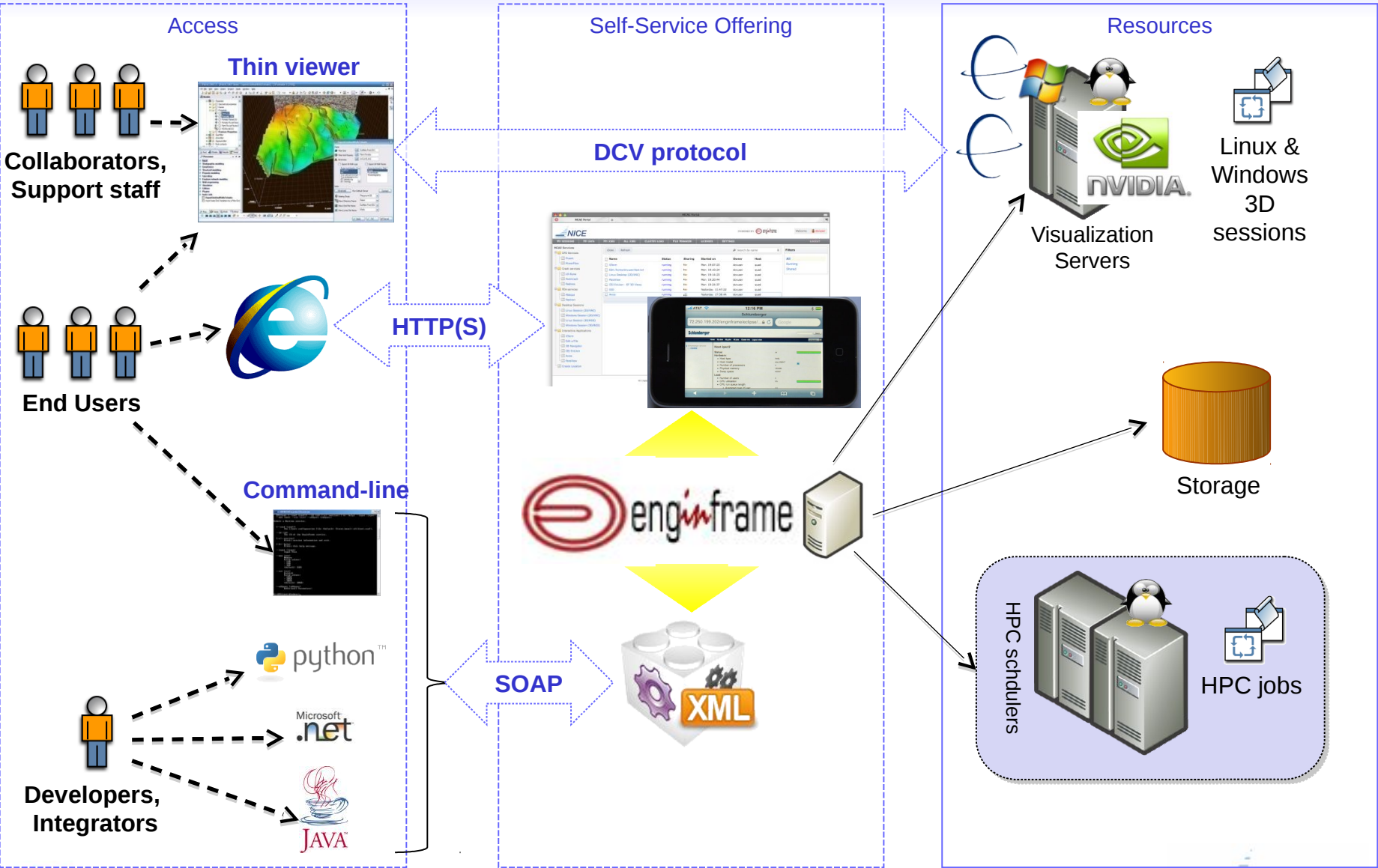
Visualization farm



EnginFrame Key Features

- User friendly Web based access to technical computing applications (batch and interactive)
- Flexible service offering for end users
 - Application-oriented HPC job submission and monitoring
 - Access to 2D / 3D remote desktops
- Support all major HPC schedulers: LSF, Grid Engine, PBS, Torque, Moab, OpenLava.... and SLURM
- Multiple remote display protocols support: RealVNC, Tiger/Turbo/TightVNC, NICE DCV, HP RGS, ...
- Data management
- Flexible authentication delegation (NIS, LDAP, AD, Kerberos, ...)
- Fine grained authorization system
- Accounting and monitoring of resource usage

Our Architecture



Batch Job / Workflow Submission

LS-Dyna

Welcome to LS-Dyna
Simulation data will be kept on scratch areas for a week

Job Name:

Project:

CPU time: min

Scratch size: GB

▶ Memory options

Computing queue:

Input file 1:

Input file 2:

Input file 3:

Restart:

Mail address:

Load profile:

*User friendly,
Application-oriented
Job submission*

*Hide complexity of
Underlying scheduler*

*Flexible and efficient
Input file management*

Monitoring

Jobs, Hosts, Queues, Licenses, ...

Host Name	Status	Jobs	CPU	Memory	Swap
apras02	OK	0	0%	7.57 GB / 7.80 GB	2 GB / 2
apras03	OK	0	0%	7.57 GB / 7.80 GB	2 GB / 2
apras04	OK	0	0%	7.57 GB / 7.80 GB	2 GB / 2
stria03	OK	0	0%	7.10 GB / 7.80 GB	2 GB / 2
stria04	OK	0	0%	7.09 GB / 7.80 GB	2 GB / 2
stria02	OK	0	0%	7.07 GB / 7.80 GB	2 GB / 2
bruja43	OK	0	0%	6.85 GB / 7.80 GB	4 GB / 4
stria11	OK	0	0%	6.85 GB / 7.80 GB	7.90 GB
bruja26	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja38	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja27	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja04	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja25	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja06	OK	0	0%	6.84 GB / 7.80 GB	4 GB / 4
bruja09	OK	0	0%	6.83 GB / 7.80 GB	4 GB / 4
bruja34	OK	0	0%	6.83 GB / 7.80 GB	4 GB / 4
bruja35	OK	0	0%	6.83 GB / 7.80 GB	4 GB / 4
bruja08	OK	0	0%	6.83 GB / 7.80 GB	4 GB / 4
stria08	OK	0	0%	6.83 GB / 7.80 GB	7.90 GB
bruja31	OK	0	0%	6.82 GB / 7.80 GB	4 GB / 4
bruja03	OK	0	0%	6.82 GB / 7.80 GB	4 GB / 4

quad

Node	Status	Jobs	CPU	Memory
vizlin01	Ok	0	13%	3.89GB/5.84GB
vizlin02	Closed_Adm	0	--	414MB/498MB
vizwin01	Ok	0/1	8%	109MB/511MB
vizwin02	Unavail	0/1	--	--

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FEATURE	IN-USE/TOTAL [sort by: critical, in use, total, name, default]
eclipse	104/142
e300	25/25
compositional	39/100
rescoupling	9/120
parallel	3/12
cbm_template	0/100
cmt_template	0/17
coalbed	0/100
datacheck	1/100
eclipse4d	0/100
flux	1/124
foam	0/100



Web-based Interactive Session Management

The screenshot displays the MCAE Portal web interface, which is powered by Enginframe. The main navigation bar includes links for HOME, MY SESSIONS, MY DATA, MY JOBS, ALL JOBS, CLUSTER LOAD, FILE MANAGER, LICENSES, SETTINGS, and LOGOUT. A sidebar on the left lists various services such as CFD Services (Fluent, CFX), FEA services (ANSYS), Crash services (LS-Dyna, PamCrash, Radioss), Desktop Sessions (Linux and Windows), and Interactive Applications (ANSYS Workbench, ANSYS CFD Viewer, ANSYS FLUENT, 3D Navigator, CEI EnLiten, Avizo, ParaView, XTerm, Edit a File, Create Location).

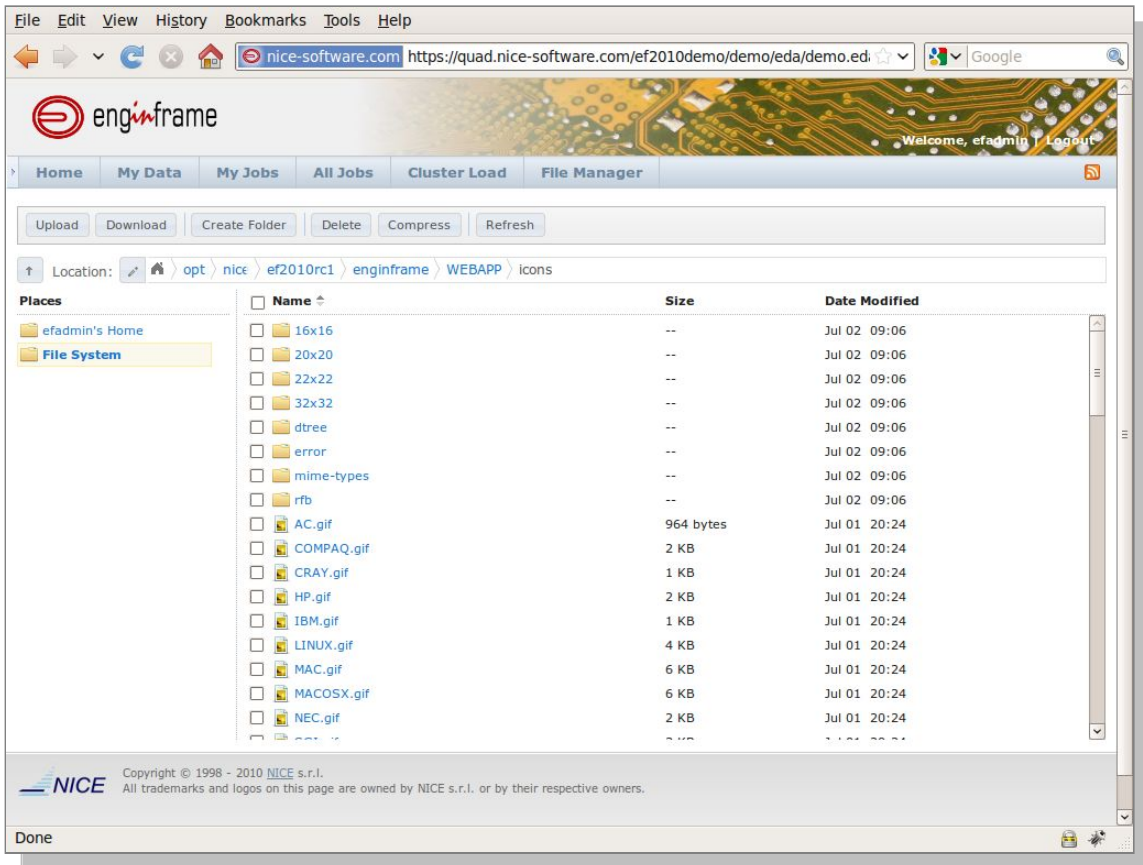
The central area shows a table of sessions with columns for Name, Status, Sharing, Started on, and Runnin. A search bar and filters are also present. Below the table, a 3D model viewer window titled "DM A: Geometry - DesignModeler" is open, displaying a 3D model of a mechanical part. The viewer includes a toolbar with various tools like File, Create, Concept, Tools, View, and Help, and a Tree Outline on the left.

In the bottom right corner, a "NICE DCV Console - e4" window is visible, showing a quality slider set to 80 and a bandwidth usage graph. The graph displays current, average, and peak bandwidth usage over a 60-second period.

Bandwidth Usage	Current	Average	Peak
Current	698.5 KiB		
Average		663.7 KiB	
Peak			1.4 MiB

Data Transfers & File Management

The file manager component allows to seamless navigate and access server-side files from the web browser



Job Data Management

Application data can be organized into projects

Application data can be marked as starred

Metadata can be associated to application data

The screenshot shows the 'enginframe' web interface for 'MDA Services'. The main content area displays a table of jobs with columns for Name, Project, Created on, and Delete on. The 'Project' column is highlighted with a red box. The 'Name' column also has a red box around the star icon for the 'Test 3' row. On the right side, there is a 'Filters' sidebar with a 'Projects' section, also highlighted with a red box, showing a list of projects and a pie chart.

Name	Project	Created on	Delete on
Abaqus	Car1	Today 12:16:47	Jul 24 12:16:47
Nastran	Default	Today 12:16:55	Jul 24 12:16:55
Fluent simulation	Default	Today 12:17:02	Jul 24 12:17:02
PowerFlow	Default	Today 12:17:12	Jul 24 12:17:12
Radioss	Default	Today 12:17:20	Jul 24 12:17:20
PamCrash	Default	Today 12:17:25	Jul 24 12:17:25
Dyna	Default	Today 12:17:30	Jul 24 12:17:30
Nastran Test 2	Car2	Today 12:17:48	Jul 24 12:17:48
Fluent Simulation 2	Car2	Today 12:18:17	Jul 24 12:18:17
Test 3	Car 3	Today 12:20:38	Jul 24 12:20:38

Projects

- Car1 (1)
- Car2 (2)
- Car 3 (1)
- Default (6)

CAE / HPC Workflow Integration

The screenshot displays the NICE web interface, which is powered by enginframe. The user is logged in as 'dcvuser'. The interface is divided into several sections:

- Navigation Menu (Left):**
 - MCAE Services
 - CFD Services: Fluent, PowerFlow
 - Crash services: LS-Dyna, PamCrash, Radioss
 - FEA services: Abaqus, Nastran
 - Desktop Sessions: Linux Session (2D/VNC), Windows Session (2D/VNC), Linux Session 3D, Windows Session (3D/DCV)
 - Interactive Applications: Create Location
- Top Navigation Bar:** HOME, MY SESSIONS, MY DATA, MY JOBS, ALL JOBS, CLUSTER LOAD, FILE MANAGER, LICENSES, SETTINGS, LOGOUT.
- Main Content Area:**
 - Buttons: Post processing with CEI EnLiten, Delete, Properties, Dependencies, Permissions, Design Points, Command Window, Simulation Details, Refresh.
 - Section: **Final crash**
 - Section: **Data**
 - Buttons: Upload, Download, Create Folder, Delete, Compress.
 - Location: /
 - File List:

Name	Size	Date Modified
binout0000	126 KB	Today 22:28
car.els	5.93 MB	Today 22:28
d3dump01.0000	251 KB	Today 22:28
d3dump01.0001	22 KB	Today 22:28
d3full01	126 KB	Today 22:28
d3plot	126 KB	Today 22:28
d3plot01	126 KB	Today 22:28
 - Context Menu (over 'car.els'): Delete, Rename..., Compress..., Open with EnLiten.
 - Section: **Jobs**
 - Buttons: Kill, Suspend, Resume.
 - Search: Search by job name
 - Job List:

ID	Status	Queue	Submission Time	Running on	Job Name
1297	Done	normal	Today 22:28:00	quad	Final crash
 - Page: Page 1 of 1. View 1 - 1 of 1.

HPC + Visualization Workflows

MCAE Services

- CFD Services
- Crash services
 - LS-Dyna
 - PamCrash
 - Radloss
- FEA services
 - Abaqus
 - Nastran
- Desktop Sessions
- Interactive Applications
- Create Location

LS-Dyna

Welcome to LS-Dyna
Simulation data will be kept on scratch areas for a week

Job Name: **Dummy crash**

Project: **Test**

CPU time: **90** min

Scratch size: **20** GB

Memory options

Computing queue: **priority (Active, 0 jobs, 0 running)**

Input file 1: **sdyna/input/airbag.k**

Input file 2:

Input file 3:

Restart: **No**

Mail address:

EnLiten Pro by CEI, Inc. (car)

File Edit Scenarios Views Options Help

Time = 0.23 seconds

plastic

0.014
0.010
0.007
0.003
0.000

Maximum plastic vs. Time

plastic

Time

Post processing with CEI EnLiten Delete Refresh

★ **Dummy crash**

Data

Upload Download Create Folder Delete Compress

Location:

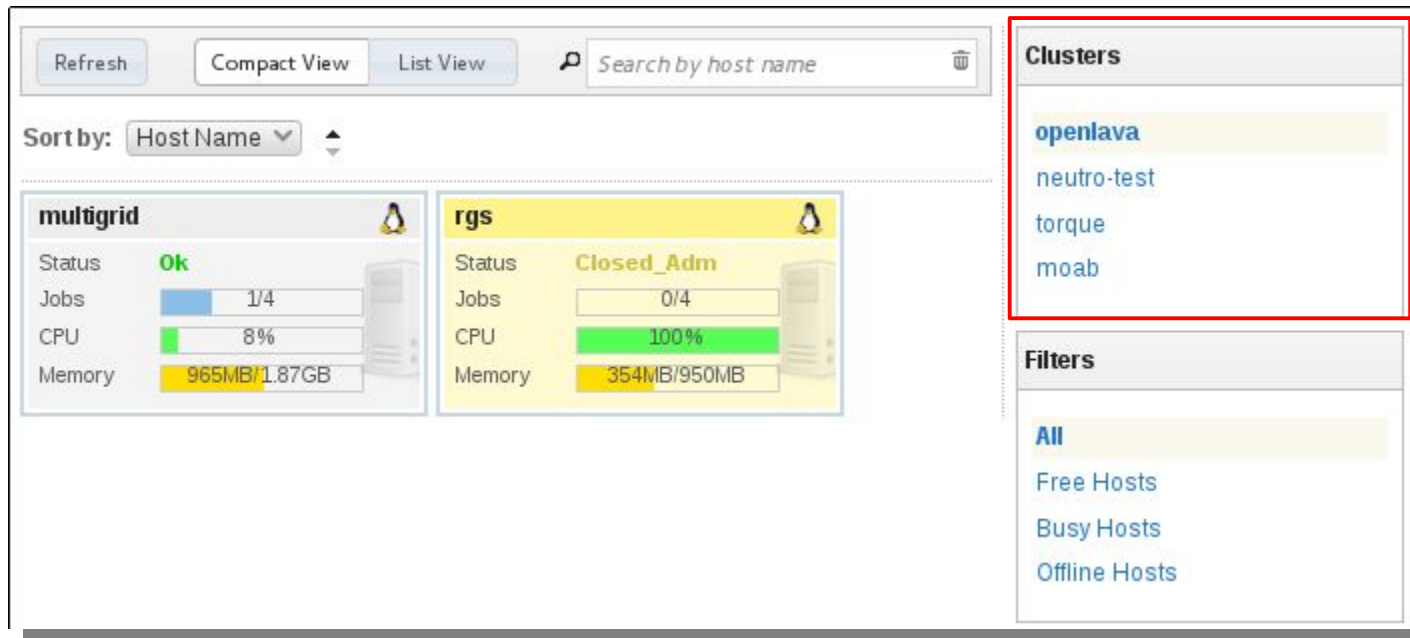
Name	Size	Date Modified
adptmp	0 bytes	Today 01:05
airbag.k	411 KB	Today 01:05
car.els	5.93 MB	Today 01:05
d3dump01.0000	7 KB	Today 01:05
d3dump01.0001	10 KB	Today 01:05
d3hsp	0 bytes	Today 01:05
d3plot	7 KB	Today 01:05
d3plot01	7 KB	Today 01:05
glistat	6 KB	Today 01:05

Jobs

Delete Rename... Compress... Open with EnLiten

Multiple Clusters/Schedulers

- Submit/monitor jobs on multiple HPC schedulers through a single EnginFrame instance



The screenshot displays the EnginFrame web interface. At the top, there are controls for 'Refresh', 'Compact View', 'List View', and a search bar labeled 'Search by host name'. Below this, a 'Sort by:' dropdown is set to 'Host Name'. The main area shows two cluster cards: 'multigrid' with a status of 'Ok' and 'rgs' with a status of 'Closed_Adm'. The 'rgs' card is highlighted in yellow. To the right, a 'Clusters' sidebar lists 'openlava', 'neuro-test', 'torque', and 'moab', with 'openlava' selected. Below the clusters is a 'Filters' section with options for 'All', 'Free Hosts', 'Busy Hosts', and 'Offline Hosts'.

Cluster Name	Status	Jobs	CPU	Memory
multigrid	Ok	1/4	8%	965MB/1.87GB
rgs	Closed_Adm	0/4	100%	354MB/950MB

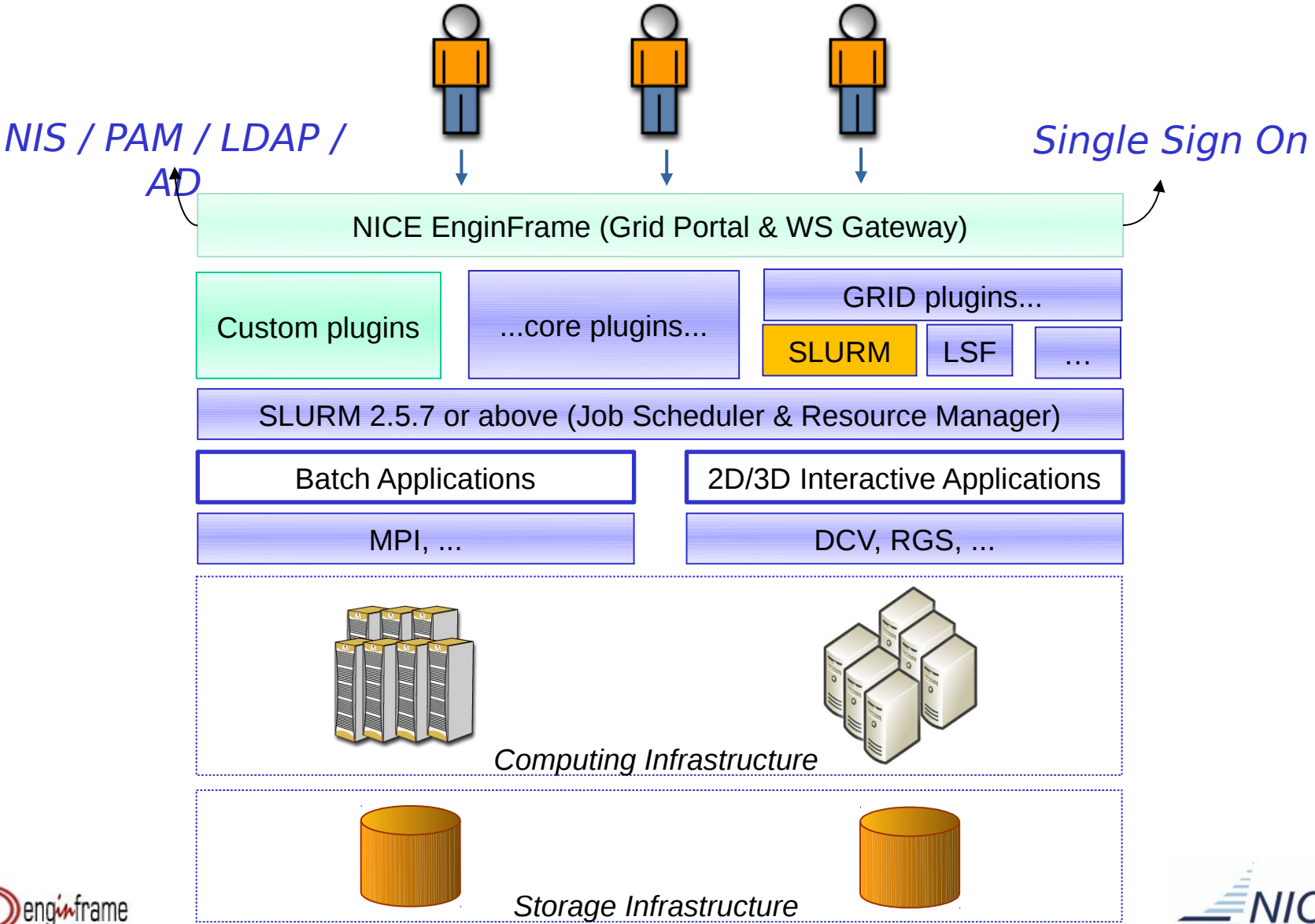
Thanks to the EnginFrame modular architecture, support for new HPC schedulers can be added with no changes to the EnginFrame core.

Why a SLURM plugin for EnginFrame?

- In the last year we observed a growing number of requests related to our capability to support SLURM (both from academy and industry)
- SLURM popularity seems to grow more and more
- There is an active and dedicated community
- We are getting very positive feedbacks about SLURM
- We have internal persons that like to play with new technologies
- We found a customer that got us access to its SLURM cluster and help us for testing activities (many thanks to the guys from Buffalo University)
- We all love David ;)

Development started !

Software Stack



The SLURM Plugin

- The SLURM plugin has been developed as a backend for the EnginFrame GRID plugin
- Interaction with SLURM happens at the command line level:
 - SLURM CLI commands are invoked (**sbatch**, **scontrol**, ...)
 - The output of the command is parsed and translated into XML documents (GridML)
- Feature parity with all the other major supported schedulers:
 - HPC job submission and monitoring
 - Resource monitoring
 - Submission and managing of interactive sessions

Example: Job Details (scontrol output)

```
$ scontrol show jobs 351395
JobId=351395 Name=jB11c16
  UserId=ajs42(142404) GroupId=kofke(45550)
  Priority=52967 Account=kofke QOS=normal
  JobState=COMPLETED Reason=None Dependency=(null)
  Requeue=0 Restarts=0 BatchFlag=1 ExitCode=0:0
  RunTime=1-08:27:18 TimeLimit=1-16:00:00 TimeMin=N/A
  SubmitTime=2013-09-01T17:40:20 EligibleTime=2013-09-01T17:40:20
  StartTime=2013-09-09T05:44:08 EndTime=2013-09-10T14:11:26
  PreemptTime=None SuspendTime=None SecsPreSuspend=0
  Partition=general-compute AllocNode:Sid=f07n05:62117
  ReqNodeList=(null) ExcNodeList=(null)
  NodeList=k07n27
  BatchHost=k07n27
  NumNodes=1 NumCPUs=16 CPUs/Task=1 ReqS:C:T=*:*:~
  MinCPUsNode=16 MinMemoryCPU=3000M MinTmpDiskNode=0
  Features=(null) Gres=(null) Reservation=(null)
  Shared=OK Contiguous=0 Licenses=(null) Network=(null)
  Command=/ifs/projects/kofke/ajs42/virial/hs/B11/jB11c16
  WorkDir=/ifs/projects/kofke/ajs42/virial/hs/B11
```

Example: Job Details (GridML)

```
<grid:job-list type="slurm" filtered="true" sorted="true" paginated="true"
filter="" sort-by="" max-results="1" start-index="1" results="1"
total-results="1">
```

```
<grid:job id="351395" type="slurm">
  <grid:name>jB11c16</grid:name>
  <grid:owner>ajs42</grid:owner>
  <grid:account>kofke</grid:account>
  <grid:status ef="Running" grid="RUNNING">RUN</grid:status>
  <grid:total-cpu-usage>1-08:15:06</grid:total-cpu-usage>
  <grid:submission-time>2013-09-01T17:40:20</grid:submission-time>
  <grid:execution-time>2013-09-09T05:44:08</grid:execution-time>
  <grid:queue>general-compute</grid:queue>
  <grid:execution-host>k07n27</grid:execution-host>
  <grid:parallel max="16" min="16"/>
  <grid:swap-usage>0</grid:swap-usage>
  <grid:execution-directory>/ifs/projects/kofke/ajs42/virial/hs/B11
</grid:execution-directory>
  <grid:submission-directory>/ifs/projects/kofke/ajs42/virial/hs/B11
</grid:submission-directory>
</grid:job>
```

```
</grid:job-list>
```

Example: Job Details

NICE EnginFrame Technology Showcase - Mozilla Firefox

File Edit View History Bookmarks Tools Help

NICE EnginFrame Technology S...

https://viz01.ccr.buffalo.edu/enginframe/demo/showcase/showcase.xml?_uri=//com.enginframe.grid/job.inl

enginframe

Welcome, albertof | Settings | Administration | Logout

ShowCase Services Home My Data My Sessions All Sessions My Jobs All Jobs Cluster Load File Manager

Basic Concepts
Hello World
Execution Environment
HTML/XML Results
Simple Job Submission
Session Variables

Playing with Options
Data Management
Advanced Actions
Scheduled Services
Interactive Services
Desktop Session
Interactive Application
Advanced Options

Charting
Access Control

Kill Hold Release Display History Refresh

Job 351395
jB11c16

User: ajs42
Project: kofke
Status: **Running (RUN)**
Queue: general-compute
Command: -

Execution

Time	Sep 09, 2013 05:44:08
Host	k07n27
Directory	/ifs/projects/kofke/ajs42/virial/hs/B11

Resource consumption

Cpu usage	1-08:14:42
Memory usage	-
Swap usage	0
Threads	-
Pgid	-
Pids	-

Known limitation:
some job details not available at writing time

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Example: All Jobs

NICE EnginFrame Technology Showcase - Mozilla Firefox

File Edit View History Bookmarks Tools Help

NICE EnginFrame Technology S...

viz01.ccr.buffalo.edu:9090/enginframe/demo/showcase/showcase.xml?_uri=/com.enginframe.grid/list.all.jobs

enginframe

Welcome, albertof | Settings | Administration | Logout

ShowCase Services Home My Data My Sessions All Sessions My Jobs All Jobs Cluster Load File Manager

Basic Concepts
Playing with Options
Data Management
Advanced Actions
Scheduled Services
Interactive Services
Charting
Access Control

Refresh Search by job name

ID	Status	Owner	Queue	Submission Time	Running on	Job Name
<input type="checkbox"/> 142764	Running	tesfayea	general-c...	Sat 16:52:30	15 Slots	CuSeph
<input type="checkbox"/> 142771	Running	tesfayea	general-c...	Sat 17:00:15	14 Slots	CuSeh
<input type="checkbox"/> 144843	Running	wjzheng	general-c...	Mon 12:40:02	k05n11s[01-02]	mut70_g4
<input type="checkbox"/> 144993	Exit	rezajaha	general-c...	Mon 14:21:09	59 Slots	M02ReacVRCpH2_Zs
<input type="checkbox"/> 145398	Running	wjzheng	general-c...	Mon 17:58:37	14 Slots	mut63_c3
<input type="checkbox"/> 145404	Running	tesfayea	general-c...	Mon 18:07:59	10 Slots	Cu2Se-def6
<input type="checkbox"/> 145590	Running	dermotco	general-c...	Mon 21:59:37	2 Slots	Gd1212-1X1X2FeRuS
<input type="checkbox"/> 145675	Running	wjzheng	general-c...	Tue 01:00:01	12 Slots	mut70_c5
<input type="checkbox"/> 146024	Running	wjzheng	general-c...	Tue 11:41:01	2 Slots	mut70_g2
<input type="checkbox"/> 146328	Running	tesfayea	general-c...	Tue 13:18:16	10 Slots	Cu2Se-def1
<input type="checkbox"/> 146330	Running	tesfayea	general-c...	Tue 13:20:09	9 Slots	Cu2Se-def2
<input type="checkbox"/> 146334	Running	tesfayea	general-c...	Tue 13:23:15	8 Slots	Cu2Se-def4
<input type="checkbox"/> 146335	Running	tesfayea	general-c...	Tue 13:24:45	12 Slots	Cu2Se-def5
<input type="checkbox"/> 146338	Running	tesfayea	general-c...	Tue 13:26:48	10 Slots	Cu2Se6
<input type="checkbox"/> 146340	Running	tesfayea	general-c...	Tue 13:28:30	8 Slots	Cu2Se7
<input type="checkbox"/> 146500	Running	casosins	general-c...	Tue 13:52:24	d09n09s01	cpcl0
<input type="checkbox"/> 146503	Running	casosins	general-c...	Tue 13:56:50	d16n41	cncl24

Filters

- All
- Submitted Today
- Running
- Pending
- Finished



Example: Cluster Load

The screenshot shows the engineframe web interface. At the top left is the engineframe logo. The top right shows the user 'efadmin' and links for Settings, Administration, and Logout. Below this is a navigation bar with tabs: Home, My Data, My Sessions, All Sessions, My Jobs, All Jobs, Cluster Load (selected), and File Manager. On the left is a sidebar menu with categories like Basic Concepts, Data Management, and Interactive Services. The main content area displays two host cards for 'slurm01' and 'slurm02'. Each card shows a status of 'ok', a jobs counter (0/1), CPU usage (1% for slurm01, 0% for slurm02), and memory usage (0/512). A search bar and a 'Sort by: Host Name' dropdown are also visible. On the right, there are 'Filters' (All, Free Hosts, Busy Hosts, Offline Hosts) and a 'Host Status' section with a green pie chart representing 2 'Ok' hosts.

Host Name	Status	Jobs	CPU	Memory
slurm01	ok	0/1	1%	0/512
slurm02	ok	0/1	0%	0/512

Example: Host Details

engineframe Welcome, eadmin | [Settings](#) | [Administration](#) | [Logout](#)

ShowCase Services | Home | My Data | My Sessions | All Sessions | My Jobs | All Jobs | Cluster Load | File Manager

- Basic Concepts
- Playing with Options
- Data Management
- Advanced Actions
- Scheduled Services
- Interactive Services
- Charting
- Access Control

Refresh

Host slurm02

Status **ok**
ok (base)

Load

Job Slots	0/1
CPU utilization	0%
Physical memory	0/512
Free tmp space	2048 MB

Hardware

Host type	x86_64
Number of processors	1

Resources

vnc	vnc
dcv	dcv

**Known limitations:
free memory value and
others not available**

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Host Details: Limitations

Comparison of retrieved informations - What is missing

 Host Isf706linux

Status **ok**
ok (base)

Load

Number of users	0
Job Slots	0/1
CPU utilization	15%
CPU run queue length:	
Averaged 15 sec (r15s)	1.6
Averaged one minute (r1m)	0.0
Averaged 15 minutes (r15m)	0.1
Physical memory	792MB/950MB
Swap space	68MB/945MB
Free tmp space	13.97GB
Paging rate	0.2 pages/sec
I/O throughput	56 Kb/sec
Idle time	1035 minutes

Hardware

Host type	X86_64
Host model	Intel EM64T
Number of processors	1
Swap space	945MB

 Host slurm02

Status **busy**
busy (base)

Load

Job Slots	1/1
CPU utilization	1%
Physical memory	0/512MB
Free tmp space	2048 MB

```
[root@slurm01 ~]# scontrol show node slurm02
NodeName=slurm02 Arch=x86_64 CoresPerSocket=1
  CPUAlloc=1 CPUErr=0 CPUTot=1 CPULoad=0.09
Features=vnc,dcv
  Gres=mem:256
  NodeAddr=slurm02 NodeHostName=slurm02
  OS=Linux RealMemory=512 AllocMem=0 Sockets=1 Boards=1
  State=ALLOCATED ThreadsPerCore=1 TmpDisk=2048 Weight=1
  BootTime=2013-08-01T23:37:11
SlurmdStartTime=2013-08-06T13:24:56
  CurrentWatts=0 LowestJoules=0 ConsumedJoules=0
  ExtSensorsJoules=n/s ExtSensorsWatts=0
```

Hardware

Host type	x86_64
Number of processors	1

Example: Interactive Sessions

NICE EnginFrame Technology Showcase - Mozilla Firefox

File Edit View History Bookmarks Tools Help

NICE EnginFrame Technology S...

https://viz01.ccr.buffalo.edu/enginframe/demo/showcase/showcase.xml?_uri=/com.enginframe.interactive/list.sessi

enginframe

Welcome, albertof | Settings | Administration | Logout

ShowCase Services

Home My Data My Sessions All Sessions My Jobs All Jobs Cluster Load File Manager

Basic Concepts

Playing with Options

Data Management

Advanced Actions

Scheduled Services

Interactive Services

Desktop Session

Interactive Application

Advanced Options

Charting

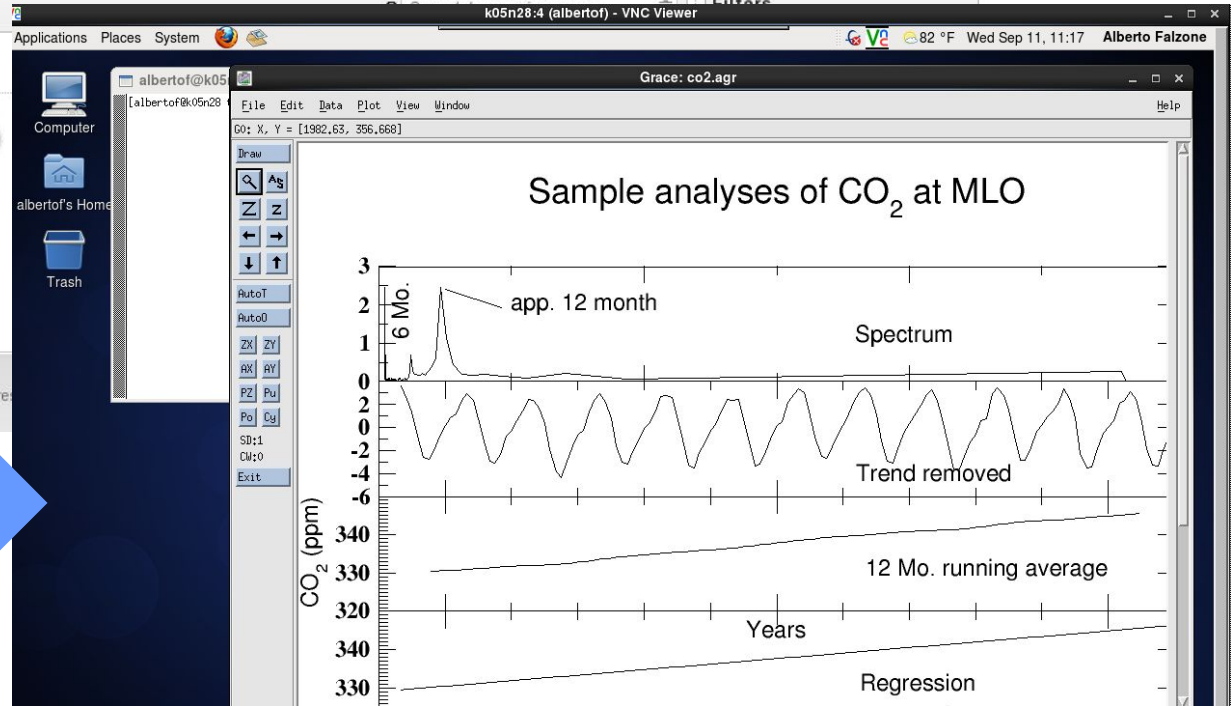
Access Control

Refresh

Sort by: Started on

VNC SLURM

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Connect to interactive session on mouse click

Example: Session Details

The screenshot shows the Enginframe web interface. At the top left is the Enginframe logo. The top right has a navigation bar with links: Welcome, eadmin | Settings | Administration | Logout. Below this is a secondary navigation bar with tabs: ShowCase Services, Home, My Data, My Sessions, All Sessions, My Jobs, All Jobs, Cluster Load, File Manager. A left sidebar contains a tree view of services: Basic Concepts, Playing with Options, Data Management, Advanced Actions, Scheduled Services, Interactive Services (with sub-items: Desktop Session, Interactive Application, Advanced Options), Charting, and Access Control. The main content area displays details for a session titled 'Test VNC SLURM'. At the top of this area are buttons: Connect, Close, Share, View Log, Refresh. Below the buttons is a small thumbnail of a VNC window. To the right of the thumbnail, the session title 'Test VNC SLURM' is shown, followed by its metadata: Owner (efadmin), Project (Interactive), and Status (Running). Below this, there are two summary boxes. The 'Session' box (purple header) lists: Remote Host (slurm02), Cluster (linux), Operating System (Linux), Creation Time (Aug 02, 2013 17:46:35), Size (1280x800), Color Depth (16M colors), and Remotization Protocol (Virtual Network Computing (VNC)). The 'Job' box (green header) lists: Job ID (498) and Job Manager (slurm). At the bottom of the session details, there is a 'Sharing' section (purple header) with Collaborators and Viewers, both listed as '-'. The footer of the page contains the NICE logo and copyright information: Copyright © 1998 - 2013 NICE s.r.l. All trademarks and logos on this page are owned by NICE s.r.l. or by their respective owners.

Conclusions

- NICE EnginFrame can now be used to create easy to use technical computing / HPC portals for your SLURM-based computing infrastructure
- SLURM 2.5.7 or higher version is required
- Future work:
 - How to retrieve the missing informations for hosts and jobs is under evaluation
 - MPI support to be tested in deep
 - Support for previous SLURM version under evaluation

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