New Features in SAGE2 v3

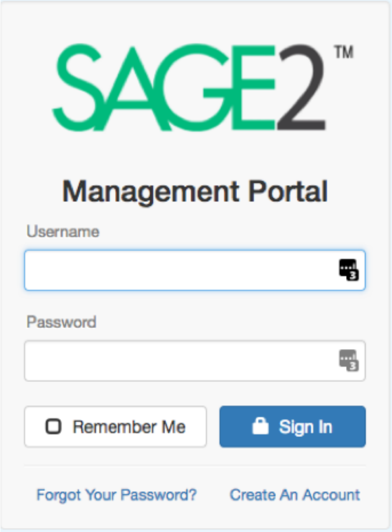
November 2017

SAGE2Cloud

SAGE2Cloud is a server for creating SAGE2 docker containers. It simplifies SAGE2 deployment:

- One click SAGE2 server installation and configuration
- Monthly SAGE2 version selector
- One-click updater
- Support for multiple users and machines

It provides a scalable environment for deploying and managing multiple SAGE2 servers.



Introduction

SAGE2Cloud is a management system for SAGE2 servers. With SAGE2Cloud you can:

- Create, deploy and configure SAGE2 local and remote servers
- Edit and customize the configuration
- Start/Stop the SAGE2 servers

Prerequisites

- docker
- Mongodb
- Install *pm2* to manage the *Node.js* instance:

  ```
  #!bash
  npm install pm2@latest -g
  ```

Installation

Add the user that will be running docker into the docker group:

```
#!bash
sudo vi /etc/group
```

Run ‘docker ps’ to make sure you can connect to docker.

Make sure docker daemon is running: on a machine with systemctl, use:

```
systemctl status docker
```

Clone the repository:

```
#!bash
git clone https://bitbucket.org/sage2/sage2cloud
cd sage2cloud
mkdir certs
npm run in
```

For SAGE2Cloud development instances, you can disable mongodb authentication by editing '/etc/mongodb.conf' and commenting out the lines starting with 'security' and 'authorization'. If you have set up mongodb with authentication, then make sure you provide the right credentials in config.js (see below).
Make sure that 'mongodb' is running: on a machine with systemctl, use:

```
systemctl status mongodb
```

Edit configuration file

```
#!bash
cp config.js.example config.js
vi config.js
```

- hostname: The domain where sage2cloud is running. For example, www.sage2cloud.com. Make sure you have the DNS set up correctly.
- http: The http port that sage2cloud will be running.
- https: The https port that sage2cloud will be running.
- mongoHost: URL where mongodb is running. If your mongodb is running on the same machine as sage2cloud, leave it as localhost. If you are not sure, leave it as is.
- mongoPort: Port where mongodb is running. Default is 27017. If you are unsure, leave it as is.
- mongoName: Name of the db in mongodb. For most instances, sage2Cloud should work.

- mongoUser: If mongodb authentication is enabled, here you have to enter the username. If not, leave it as is.
- mongoPass: If mongodb authentication is enabled, here you have to enter the password. If not, leave it as is.
- useMongoAuthentication: true if authentication is enabled (don't forget to set username and password above), false for no authentication.
- certs: Ca, cert and key certificates. These files should be in the certs directory. See below for instructions on creating certificates if you don't have any.

Setup the SSL certificate

Copy certs in the certs directory. NOTE: Certificates need to follow the following naming convention:

```
#!bash
_.<domain>-ca.crt
_.<domain>.crt
_.<domain>.key
```

If you don't have a certificate, then you can generate a self-signed one (Linux only instructions):

```
#!bash
wget
https://bitbucket.org/sage2/sage2/raw/8f4b44f1e24068a24cba8f4462838bf6adbfdf39/keys/init_webserver.sh
chmod 755 init_webserver.sh
./init_webserver.sh <ip or hostname>
```

For example, if you are setting up sage2cloud for google.com, then your keys should be named as follows:

```
#!bash
_.google.com-ca.crt
_.google.com.crt
_.google.com.key
```

pm2 cheat-sheet

Start app

```
#!bash
pm2 start app.js
```

Stop app

```
#!bash
pm2 stop app.js
```

Add it to the startup

```
#!bash
sudo pm2 startup systemd
```

Run as sage user

```
#!bash
sudo pm2 startup -u sage
```

Reload pm2 (start/stop the pm2 daemon with all the apps that's controlling)

```
#!bash
sudo pm2 update
```

Youtube video

https://youtu.be/q6AdaeoFDm8

Credits

Account management backbone forked from Node-Login created by Stephen Braitsch.

SAGE2 Unity3D Applications

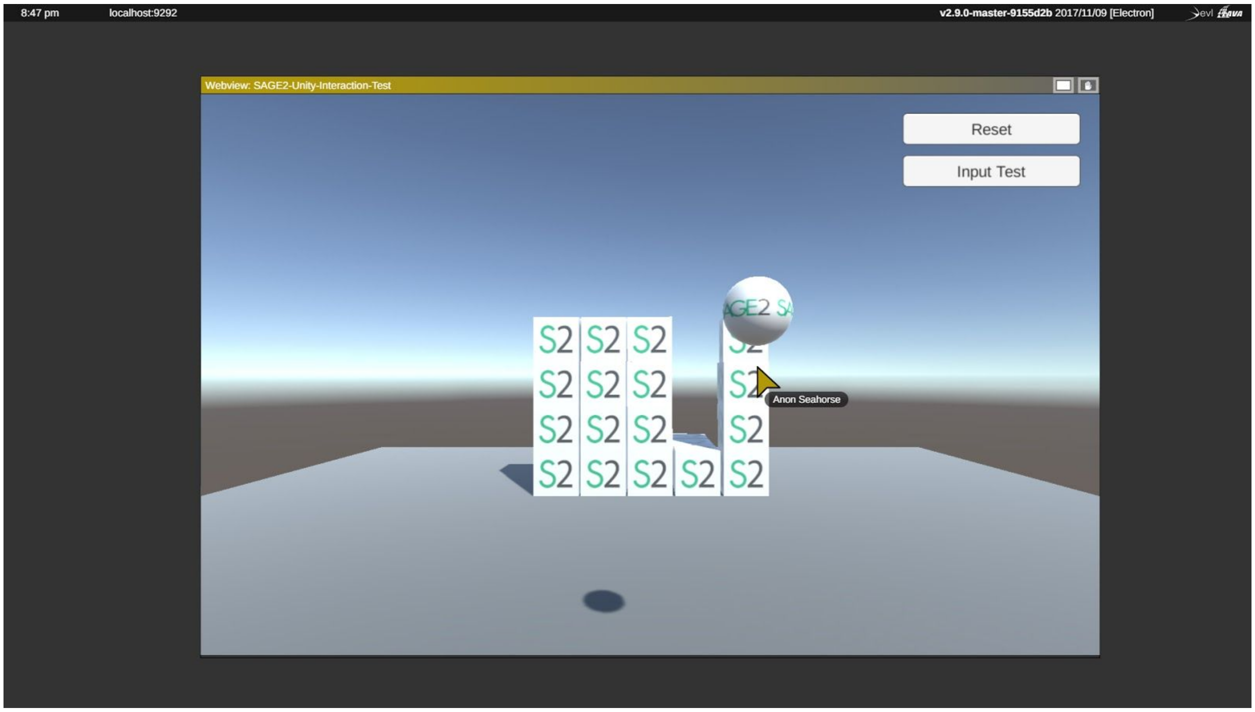
Introduction

Unity WebGL applications can be displayed in SAGE2 similar to how native SAGE2 applications - by dragging and dropping a zipped application folder on the SAGE2 web UI. As Unity applications are displayed as locally hosted WebViews, the display client must be using Electron. WebGL builds from Unity 5.4.2 up to Unity 2017.1.1 have been tested.

Unity applications will be listed under the Media Browser along with the other SAGE2 applications.

This an example SAGE2 Unity app is available on the SAGE2 App Repository (*http://apps.sagecommons.org*) as 'Unity Interaction Test' under 'Examples for Developers'

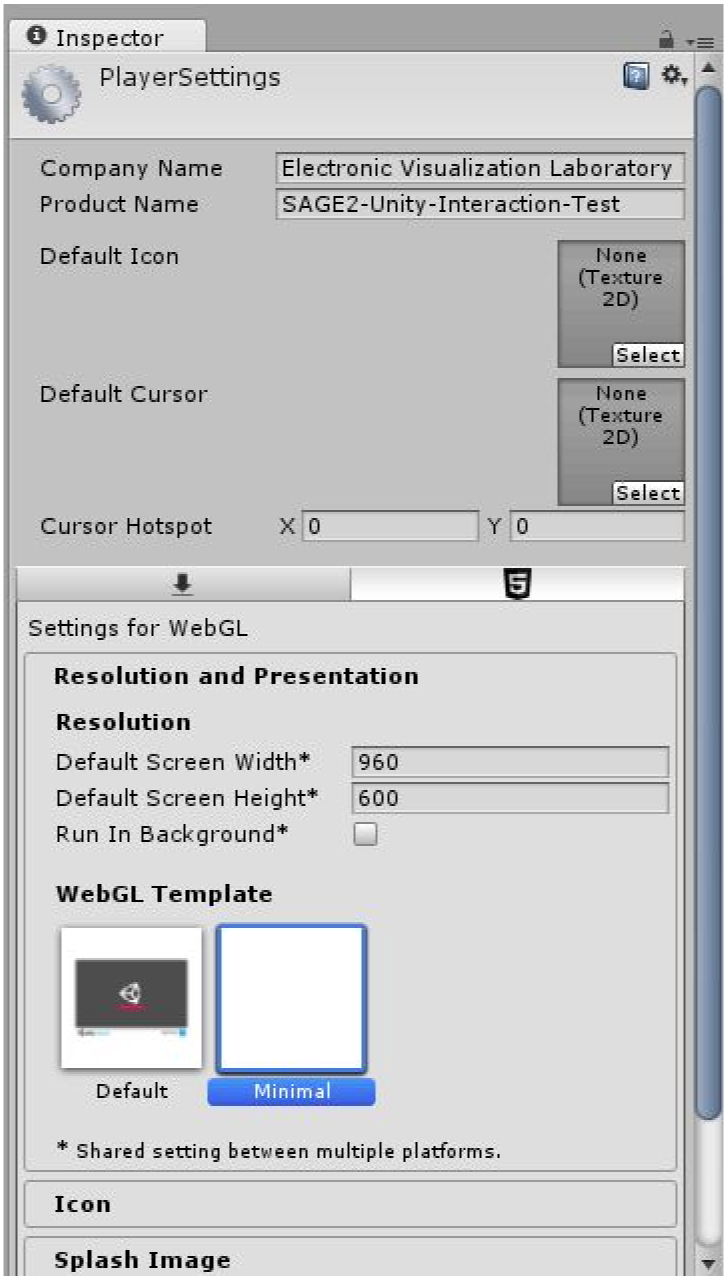
The Unity project source code is also available at: *https://bitbucket.org/sage2/sage2_unity*


8:47 pm
localhost:9292
v2.9.0-master-9155d2b 2017/11/09 [Electron]
Webview: SAGE2-Unity-Interaction-Test
Reset
Input Test
Anon Seahorse

Unity Build Configuration

Before a Unity WebGL application is built for use in SAGE2, under Build Settings/Player Settings/Settings for WebGL/Resolution and Presentation, set the WebGL Template to

'Minimal.' This will format the application so it can be displayed as a full screen, window-scalable application.



PlayerSettings

Company Name	Electronic Visualization Laboratory
Product Name	SAGE2-Unity-Interaction-Test
Default Icon	None (Texture 2D)
Default Cursor	None (Texture 2D)
Cursor Hotspot	X 0 Y 0

Settings for WebGL

Resolution and Presentation

Resolution

Default Screen Width*	960
Default Screen Height*	600
Run In Background*	□

WebGL Template

Default

[✓ Minimal]

* Shared setting between multiple platforms.

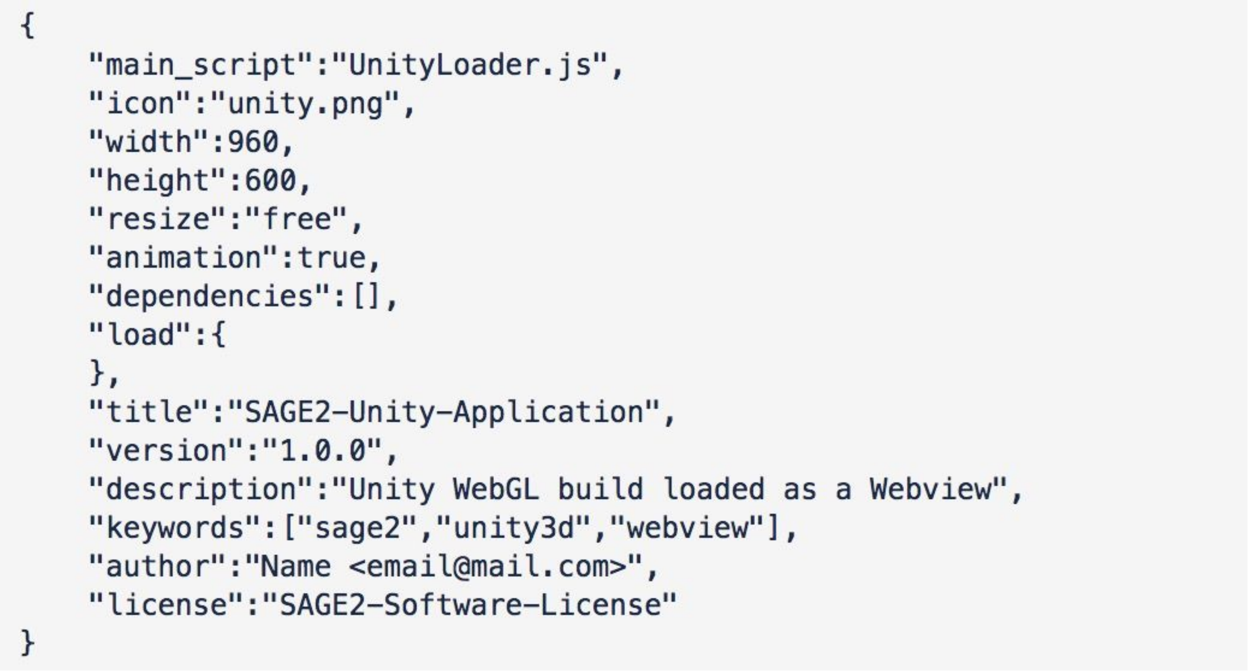
Icon

Splash Image

Preparing to install on SAGE2

Native SAGE2 applications require an instructions.json file which specifies the size of the window, custom icons, description, author, and more. For Unity applications, to have an instructions.json file is recommended, but not required. If SAGE2 detects a Unity WebGL application without an instructions.json, it will be auto generated.

Example instructions.json



```
{
    "main_script":"UnityLoader.js",
    "icon":"unity.png",
    "width":960,
    "height":600,
    "resize":"free",
    "animation":true,
    "dependencies":[],
    "load":{
    },
    "title":"SAGE2-Unity-Application",
    "version":"1.0.0",
    "description":"Unity WebGL build loaded as a Webview",
    "keywords":["sage2","unity3d","webview"],
    "author":"Name <email@mail.com>",
    "license":"SAGE2-Software-License"
}
```

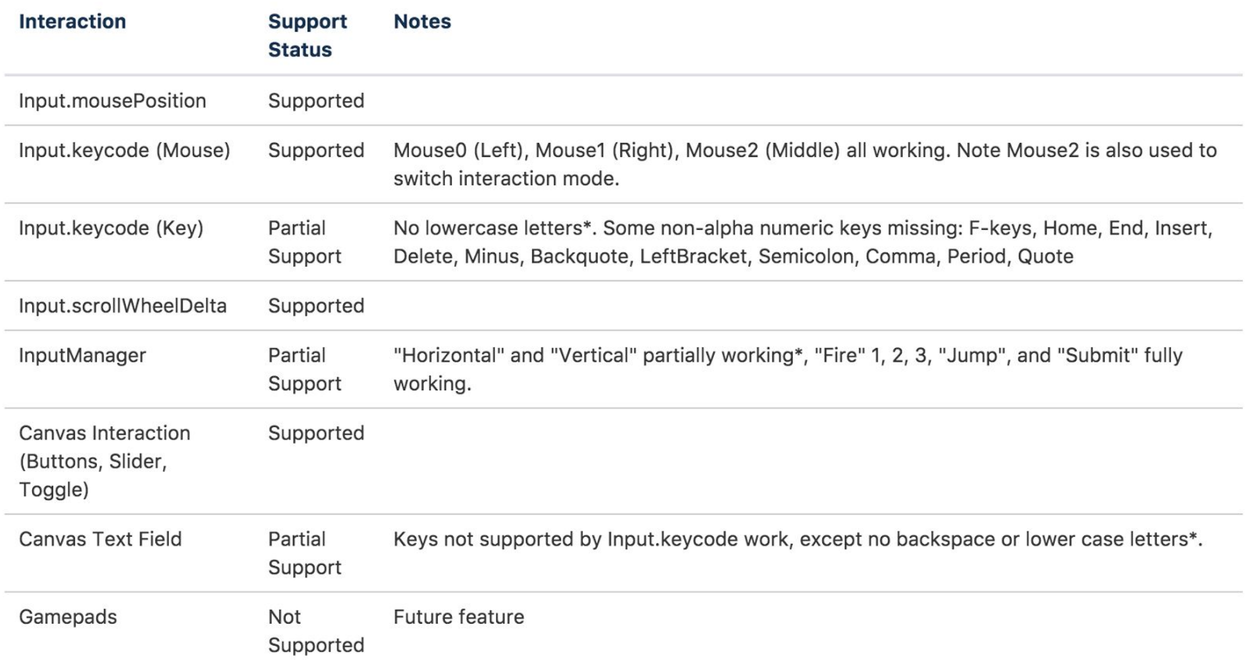
Once the Unity WebGL build is generated zip the folder so that the zip is in the following structure

- [Application folder (Same name as zip file)]
    - Build folder
        - [Unity data files]
        - UnityLoader.js
    - index.html

Interaction

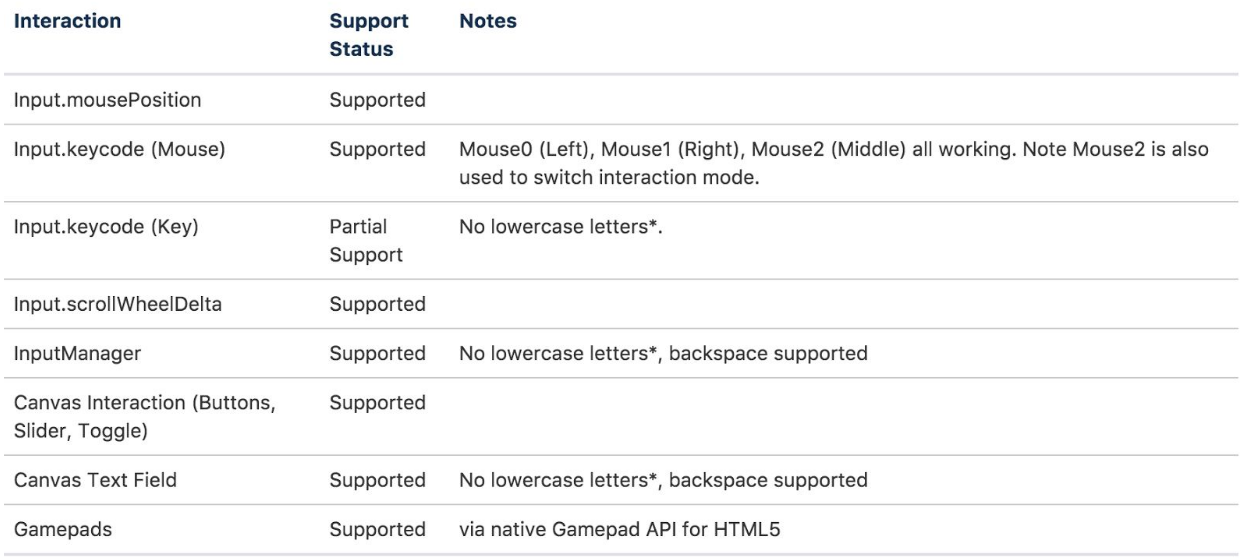
Some keys such as Escape, Middle Mouse Button, and Shift-QuestionMark are used by SAGE2 and may conflict with interaction.

SAGEPointer



Interaction	Support Status	Notes
Input.mousePosition	Supported	
Input.keycode (Mouse)	Supported	Mouse0 (Left), Mouse1 (Right), Mouse2 (Middle) all working. Note Mouse2 is also used to switch interaction mode.
Input.keycode (Key)	Partial Support	No lowercase letters*. Some non-alpha numeric keys missing: F-keys, Home, End, Insert, Delete, Minus, Backquote, LeftBracket, Semicolon, Comma, Period, Quote
Input.scrollWheelDelta	Supported	
InputManager	Partial Support	"Horizontal" and "Vertical" partially working*, "Fire" 1, 2, 3, "Jump", and "Submit" fully working.
Canvas Interaction (Buttons, Slider, Toggle)	Supported	
Canvas Text Field	Partial Support	Keys not supported by Input.keycode work, except no backspace or lower case letters*.
Gamepads	Not Supported	Future feature

Interacting Directly on Display Client

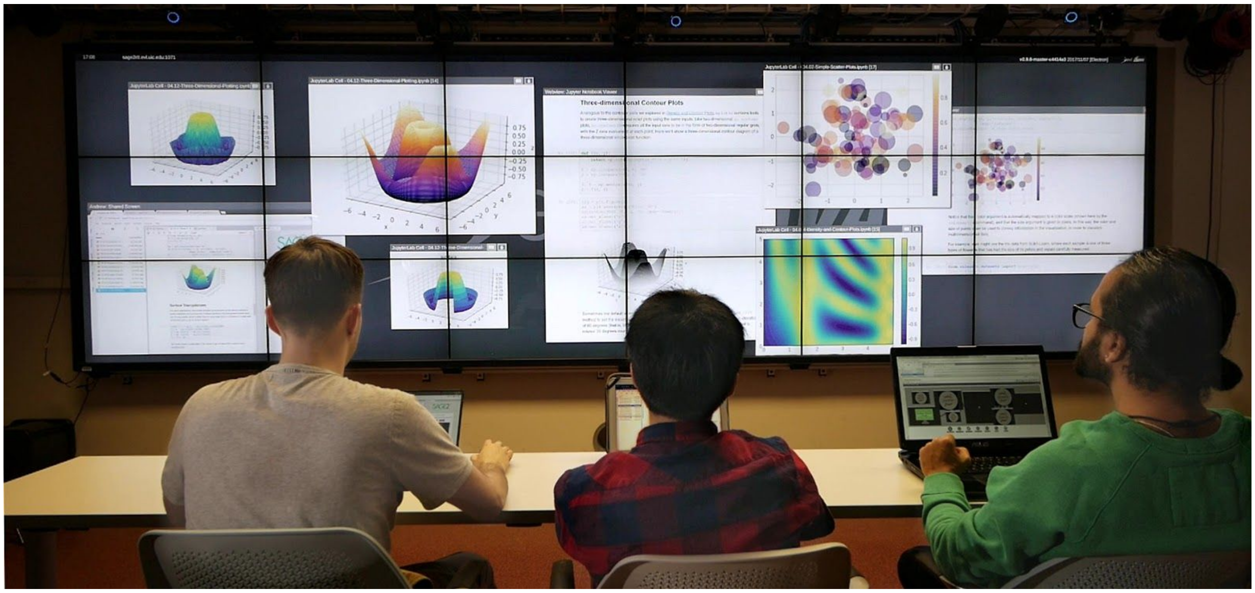


Interaction	Support Status	Notes
Input.mousePosition	Supported	
Input.keycode (Mouse)	Supported	Mouse0 (Left), Mouse1 (Right), Mouse2 (Middle) all working. Note Mouse2 is also used to switch interaction mode.
Input.keycode (Key)	Partial Support	No lowercase letters*.
Input.scrollWheelDelta	Supported	
InputManager	Supported	No lowercase letters*, backspace supported
Canvas Interaction (Buttons, Slider, Toggle)	Supported	
Canvas Text Field	Supported	No lowercase letters*, backspace supported
Gamepads	Supported	via native Gamepad API for HTML5

- All letter keys are sent to Unity applications as uppercase to allow InputManager Vertical/Horizontal axis to function though the SAGEPointer

Jupyterlab Integration

A JupyterLab extension to integrate SAGE2 into the JupyterLab scientific workflow.



Three researchers using JupyterLab and SAGE2 together with the jupyterlab_sage2 extension.

Extension

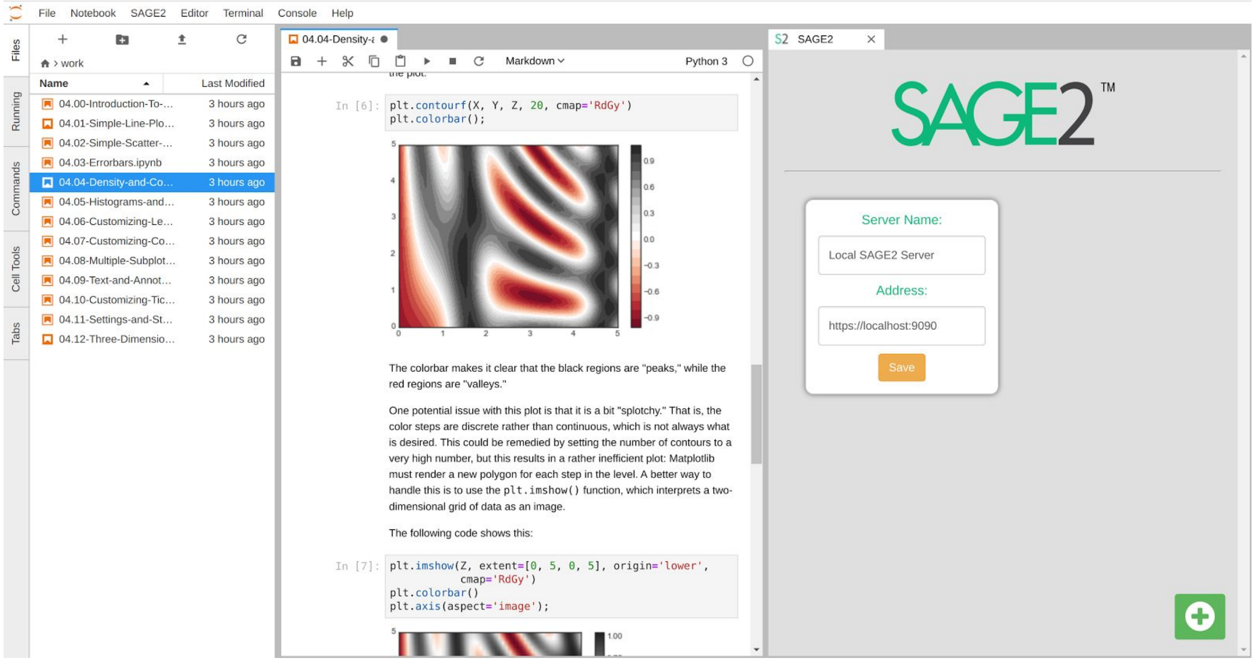
The goal of this extension is to use SAGE2 with JupyterLab to integrate existing data science workflows into the collaborative software.

Disclaimer: A SAGE2 server must be running version 2.0.327 or newer to use this JupyterLab functionality.

This extension to JupyterLab allows a user to simultaneously connect to multiple SAGE2 servers and share JupyterLab content with SAGE2, including:

- Notebooks
- Notebook Cells (Images)

From the JupyterLab launcher, open the SAGE2 widget under "Other." Once the SAGE2 Widget is opened, a server connection can be created by clicking the green '+' button and entering the server Address. A Server Name can be specified in order to more easily refer to a server later.



Name	Last Modified
04.00-Introduction-To-...	3 hours ago
04.01-Simple-Line-Plo...	3 hours ago
04.02-Simple-Scatter-...	3 hours ago
04.03-Errorbars.ipynb	3 hours ago
04.04-Density-and-Co...	3 hours ago
04.05-Histograms-and...	3 hours ago
04.06-Customizing-Le...	3 hours ago
04.07-Customizing-Co...	3 hours ago
04.08-Multiple-Subplot...	3 hours ago
04.09-Text-and-Annot...	3 hours ago
04.10-Customizing-Tic...	3 hours ago
04.11-Settings-and-St...	3 hours ago
04.12-Three-Dimensio...	3 hours ago

```
In [6]: plt.contourf(X, Y, Z, 20, cmap='RdGy')
        plt.colorbar();
```

The colorbar makes it clear that the black regions are "peaks," while the red regions are "valleys."

One potential issue with this plot is that it is a bit "splotchy." That is, the color steps are discrete rather than continuous, which is not always what is desired. This could be remedied by setting the number of contours to a very high number, but this results in a rather inefficient plot: Matplotlib must render a new polygon for each step in the level. A better way to handle this is to use the `plt.imshow()` function, which interprets a two-dimensional grid of data as an image.

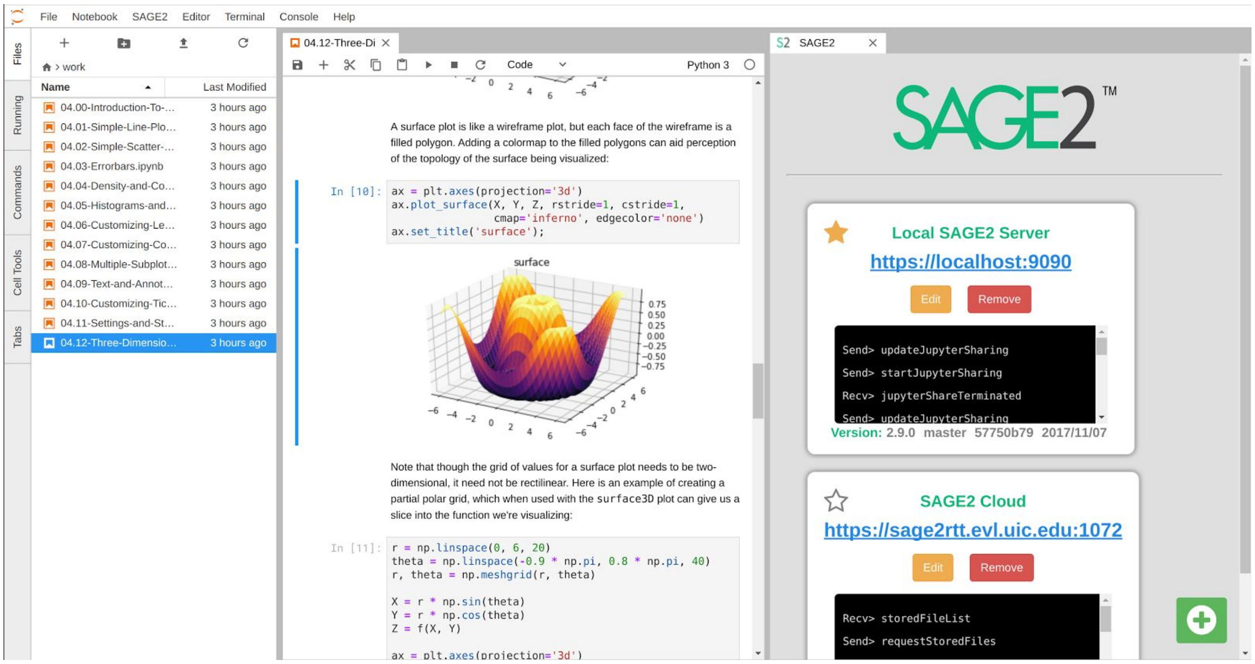
The following code shows this:

```
In [7]: plt.imshow(Z, extent=[0, 5, 0, 5], origin='lower',
                   cmap='RdGy')
        plt.colorbar()
        plt.axis(aspect='image');
```

Server Name: Local SAGE2 Server

Address: https://localhost:9090

The plugin displays current server connections -- these connections are persistent whether or not the widget is open. The gold star indicates a 'favorite' SAGE2 server, or a server which you will be using more frequently.



Name	Last Modified
04.00-Introduction-To-...	3 hours ago
04.01-Simple-Line-Plo...	3 hours ago
04.02-Simple-Scatter-...	3 hours ago
04.03-Errorbars.ipynb	3 hours ago
04.04-Density-and-Co...	3 hours ago
04.05-Histograms-and...	3 hours ago
04.06-Customizing-Le...	3 hours ago
04.07-Customizing-Co...	3 hours ago
04.08-Multiple-Subplot...	3 hours ago
04.09-Text-and-Annot...	3 hours ago
04.10-Customizing-Tic...	3 hours ago
04.11-Settings-and-St...	3 hours ago
04.12-Three-Dimensio...	3 hours ago

A surface plot is like a wireframe plot, but each face of the wireframe is a filled polygon. Adding a colormap to the filled polygons can aid perception of the topology of the surface being visualized:

```
In [10]: ax = plt.axes(projection='3d')
         ax.plot_surface(X, Y, Z, rstride=1, cstride=1,
                         cmap='inferno', edgecolor='none')
         ax.set_title('surface');
```

Note that though the grid of values for a surface plot needs to be two-dimensional, it need not be rectilinear. Here is an example of creating a partial polar grid, which when used with the `surface3D` plot can give us a slice into the function we're visualizing:

```
In [11]: r = np.linspace(0, 6, 20)
         theta = np.linspace(-0.9 * np.pi, 0.8 * np.pi, 40)
         r, theta = np.meshgrid(r, theta)

         X = r * np.sin(theta)
         Y = r * np.cos(theta)
         Z = f(X, Y)

         ax = plt.axes(projection='3d')
```

☆ Local SAGE2 Server
https://localhost:9090

```
Send> updateJupyterSharing
Send> startJupyterSharing
Recv> jupyterShareTerminated
Send> updateJupyterSharing
```

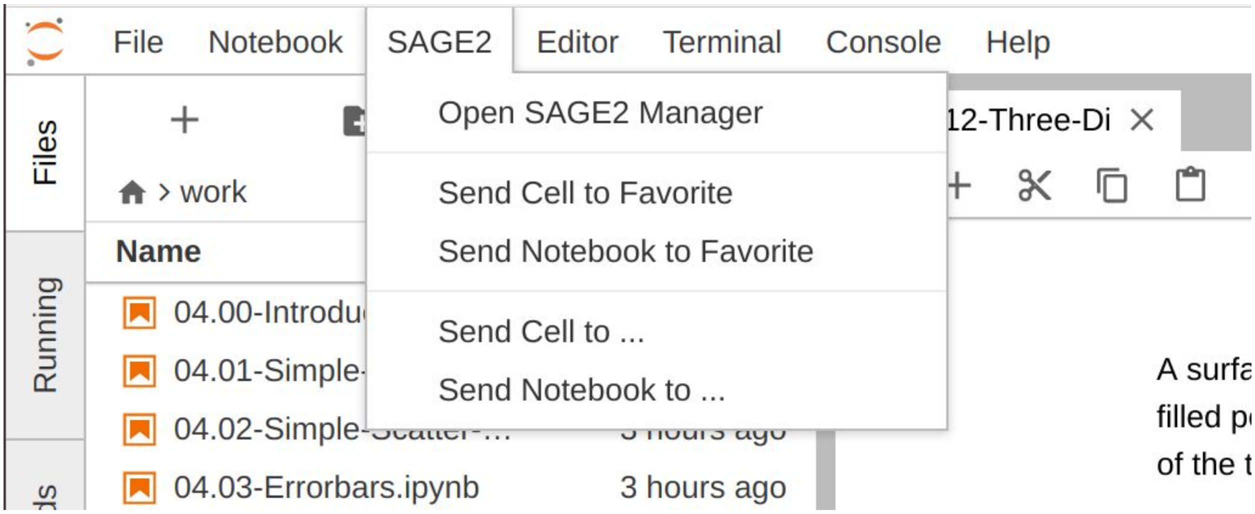
Version: 2.9.0 master 57750b79 2017/11/07

☆ SAGE2 Cloud
https://sage2rtt.evl.uic.edu:1072

```
Recv> storedFileList
Send> requestStoredFiles
```

When a Notebook is open, the Notebook or a selected cell output may be sent to SAGE2 through the main menu. Sending a Cell/Notebook to 'Favorite' sends the content to the

Favorited server, while sending content to '...' opens a dialog in which a user may choose one of the SAGE2 connections to send to.



Notebooks are sent to SAGE2 and rendered using nbviewer. Notebook cells are rendered as images and automatically updated when a cell is re-run.

Package Installation

Prerequisites

- JupyterLab

Installation

```
jupyter labextension install jupyterlab_sage2
```

Development

For a development install (requires npm version 4 or later), do the following in the repository directory:

```
npm install
jupyter labextension link .
```

To rebuild the package and the JupyterLab app:

```
npm run build
jupyter lab build
```

Docker Installation

To try JupyterLab with SAGE2, use the sage2/jupyterlab-datascience-notebook Docker image. This image is built FROM the jupyter/datascience-notebook and includes Python 3, R, and Julia as well as a variety of data science packages.

To install/update

```
docker pull sage2/jupyterlab-datascience-notebook
```

To run

```
docker run -it --rm -p 8888:8888 sage2/jupyterlab-datascience-notebook start.sh jupyter lab
```

The -p 8888:8888 maps the external port to the docker port: -p external:internal. If you would like to select a different port to access Jupyterlab use -p yourport:8888.

When starting the docker image, the console will give a JupyterLab url with an access token.

To access JupyterLab, navigate your webpage to

http://yourhostname:yourport/?token=yourtoken.

For more information on the jupyter/datascience-notebook Docker image, visit:

https://github.com/jupyter/docker-stacks/tree/master/datascience-notebook

Future Plans

In the future, we plan to support more content types and methods of sending data from JupyterLab to SAGE2, as well as implement a file browser for JupyterLab which allows access to SAGE2 files in the JupyterLab workspace.

Issues and Contributing

- Please direct any issues or bug reports to the repository's Issues
  - https://github.com/AndrewTBurks/jupyterlab_sage2/issues
- If you would like to contribute, submit a Pull Request
  - https://github.com/AndrewTBurks/jupyterlab_sage2/pulls

Youtube video

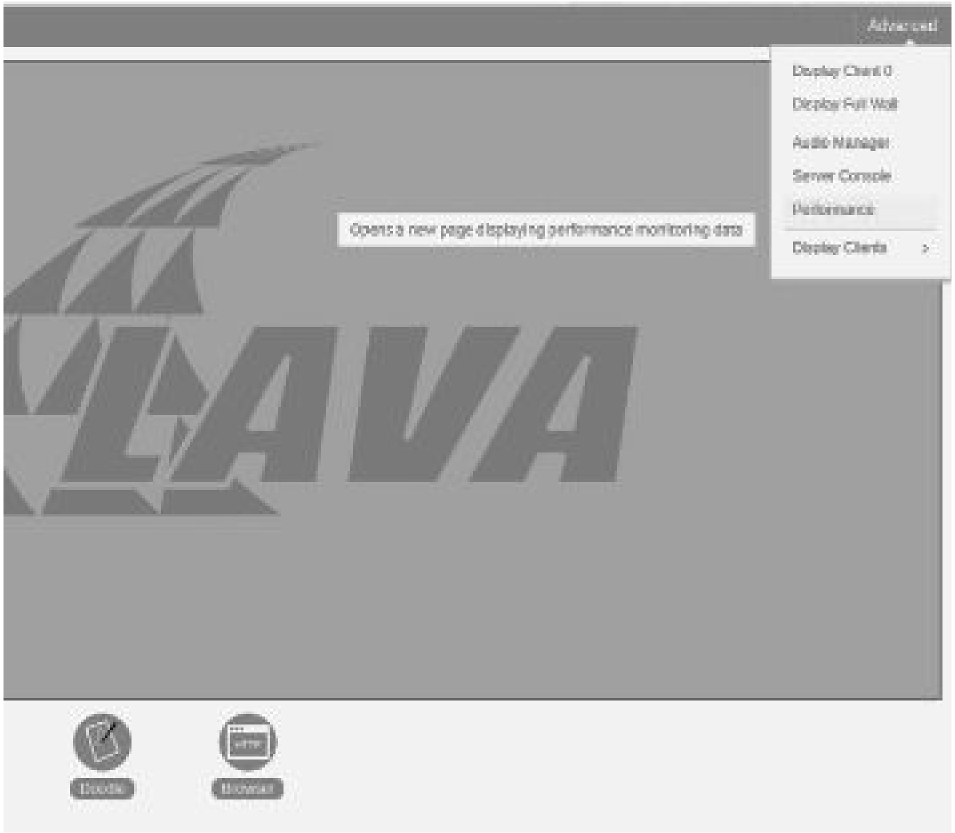
https://youtu.be/l2pRLhw6GSE

Performance monitoring for SAGE2

The new performance monitoring utility provides a comprehensive view of the health of SAGE2 system enabling the users to narrow down the cause of potential issues like slow responses to interactions or a video becoming “choppy”.

Performance page

The performance monitoring page is listed as “Performance” under the “Advanced” menu at the right top corner of the SAGE2 UI page as shown in Fig1

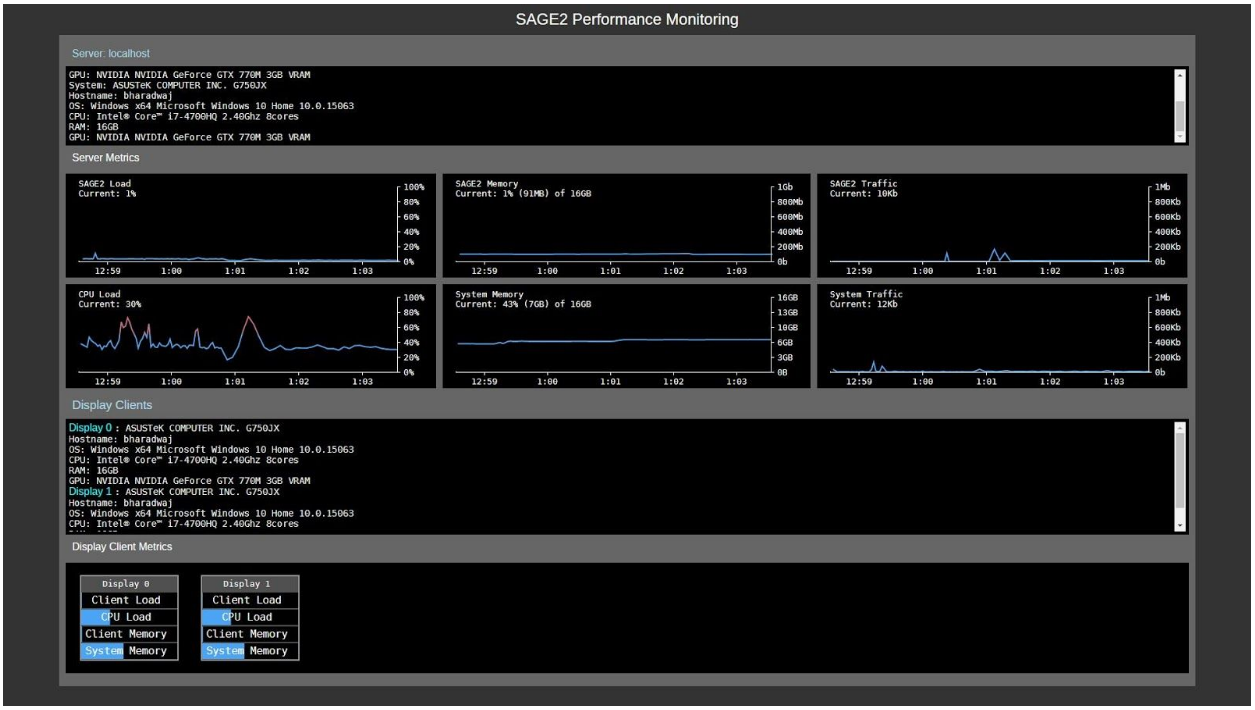


Opens a new page displaying performance monitoring data

Fig1: Accessing Performance page through SAGE2 UI

Metrics and Graphs

The page has two sections, one for the server and one for the clients. Fig2 gives an overview of what the page looks like. On the server side of things, the hardware details of the machine on which the SAGE2 server is running is first listed out. After that, three different metrics namely Load, Memory, and Network traffic for both the SAGE2 server and the overall host machine are visualized as charts. These charts show the trends of each of the metrics for the past 5 minutes, along with giving out their current values. Fig3, Fig4, and Fig5 each shows these charts.



```
GPU: NVIDIA NVIDIA GeForce GTX 770M 3GB VRAM
System: ASUSTeK COMPUTER INC. G750JX
Hostname: bharadwaj
OS: Windows x64 Microsoft Windows 10 Home 10.0.15063
CPU: Intel® Core™ i7-4700HQ 2.40Ghz 8cores
RAM: 16GB
GPU: NVIDIA NVIDIA GeForce GTX 770M 3GB VRAM
```

```
Display 0 : ASUSTeK COMPUTER INC. G750JX
Hostname: bharadwaj
OS: Windows x64 Microsoft Windows 10 Home 10.0.15063
CPU: Intel® Core™ i7-4700HQ 2.40Ghz 8cores
RAM: 16GB
GPU: NVIDIA NVIDIA GeForce GTX 770M 3GB VRAM
Display 1 : ASUSTeK COMPUTER INC. G750JX
Hostname: bharadwaj
OS: Windows x64 Microsoft Windows 10 Home 10.0.15063
CPU: Intel® Core™ i7-4700HQ 2.40Ghz 8cores
```

Fig2: Performance monitoring page

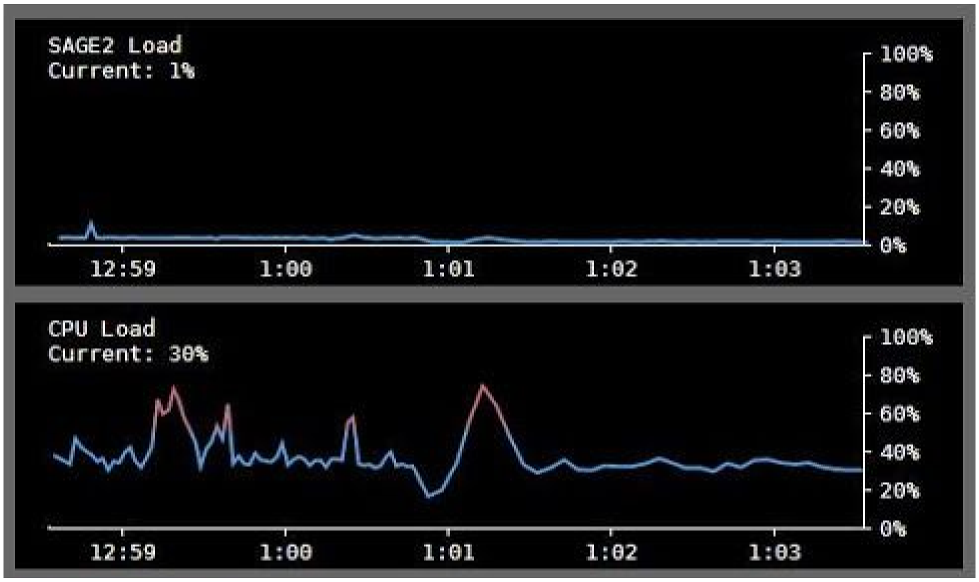


Fig3: Load of SAGE2 server and overall system load

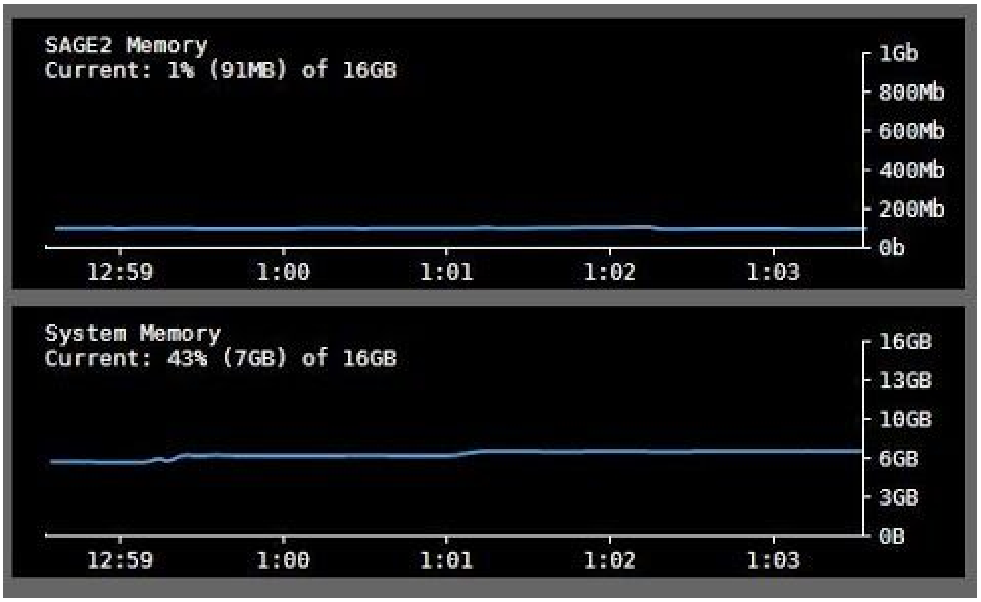


Fig4: Memory usage of SAGE2 server and overall system memory usage

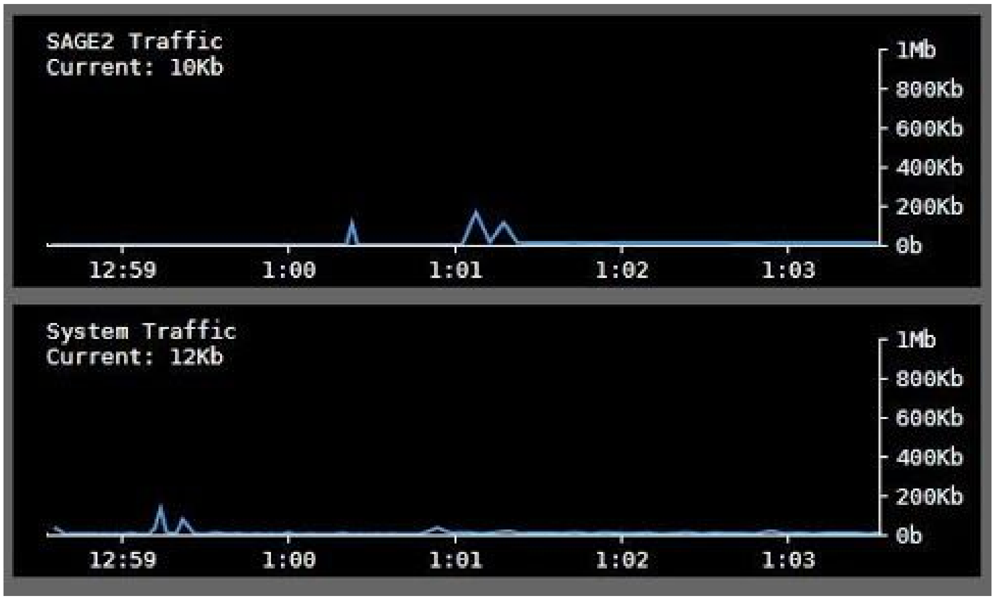


Fig5: Network traffic of SAGE2 server and overall system network traffic

Under the client section, the hardware details of all the display clients that are connected are given in a list. Then a small-multiples view of the display clients is provided, where each small-multiple shows the current values of load and memory for the corresponding display client as a horizontal histogram. Moreover, these small-multiples are interactive. Users can select one or more of these small multiples as shown in Fig. 6 to bring up metric charts similar to server metric charts. These charts show multiple lines, where each line corresponds to one of the selected display clients. The small-multiple of a selected display client is highlighted with a colored border and the same color is used to display the corresponding line in the charts.

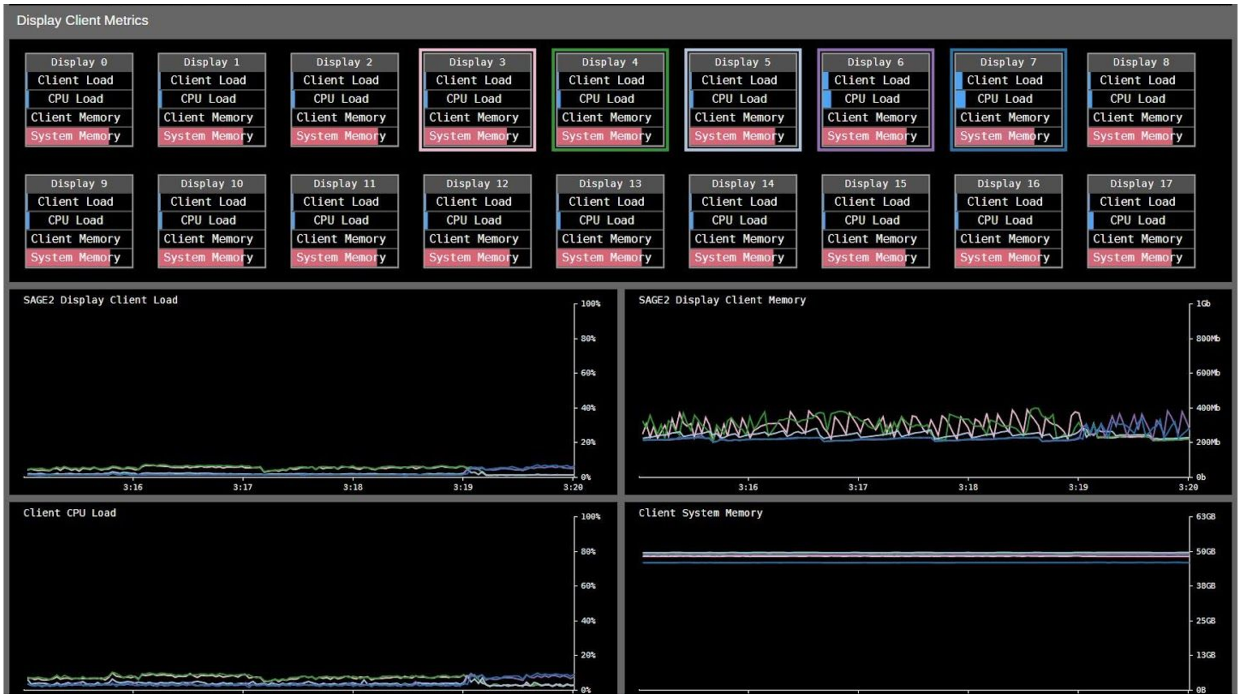
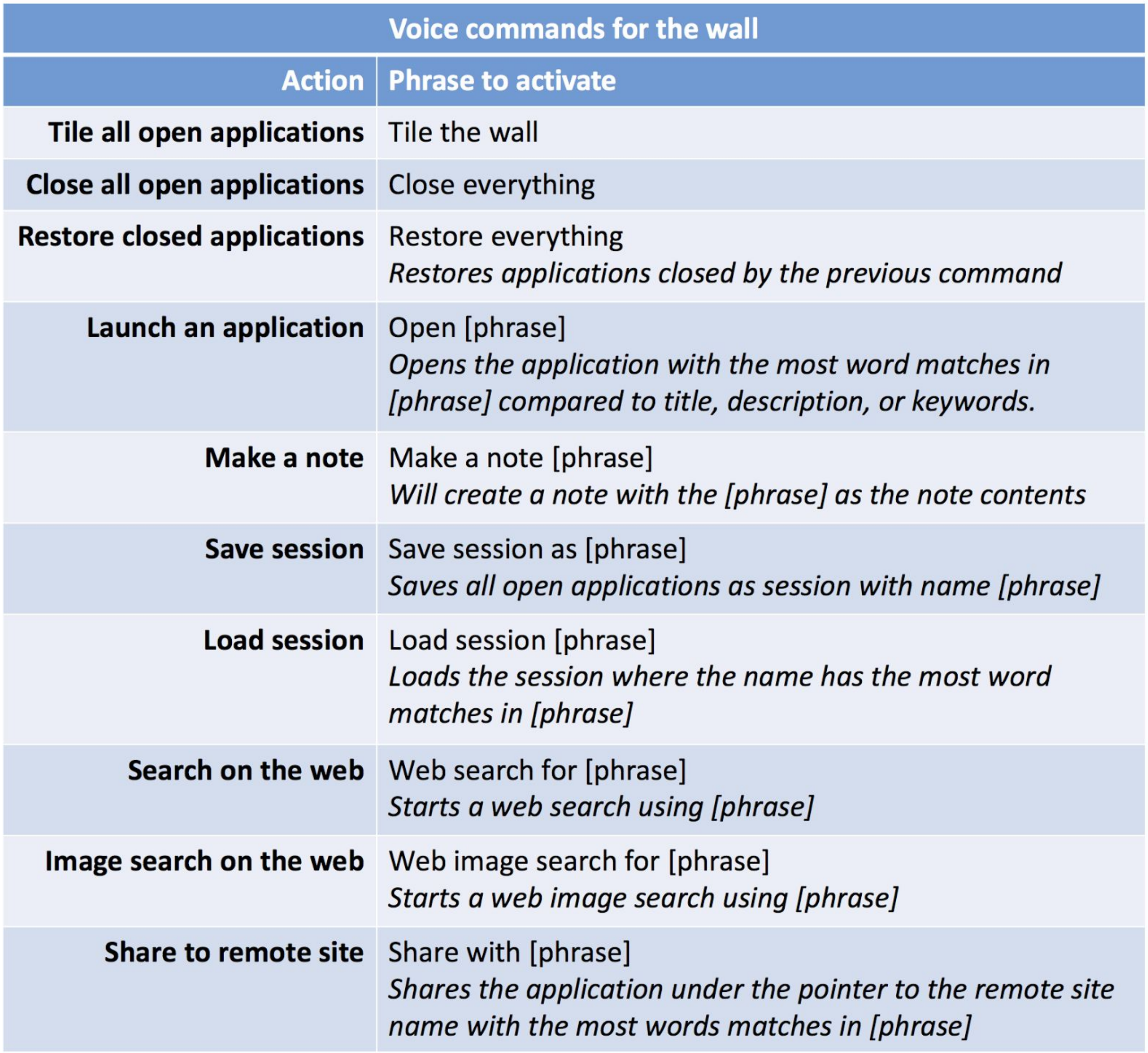


Fig6: Multiple display clients selected to show their metric charts

Voice Commands

Common Commands



Voice commands for the wall	
Action	**Phrase to activate**
Tile all open applications	Tile the wall
Close all open applications	Close everything
Restore closed applications	Restore everything *Restores applications closed by the previous command*
Launch an application	Open [phrase] *Opens the application with the most word matches in [phrase] compared to title, description, or keywords.*
Make a note	Make a note [phrase] *Will create a note with the [phrase] as the note contents*
Save session	Save session as [phrase] *Saves all open applications as session with name [phrase]*
Load session	Load session [phrase] *Loads the session where the name has the most word matches in [phrase]*
Search on the web	Web search for [phrase] *Starts a web search using [phrase]*
Image search on the web	Web image search for [phrase] *Starts a web image search using [phrase]*
Share to remote site	Share with [phrase] *Shares the application under the pointer to the remote site name with the most words matches in [phrase]*

Wall Commands

Action	Invocation Words Required
Tile all open applications	Clean wall Clean this up Cleanup Organize Tile content Tile everything Tile wall Tile windows
Close all open applications	Clear everything Close everything Get rid everything Toss everything Toss it all
Restore closed applications	Restore view Restore everything Bring back everything This will restore applications closed by the previous command.
Launch an application Open file from media browser	Launch `[phrase]` Load application `[phrase]` Open `[phrase]` Start `[phrase]` Based on the `[phrase]`, the application with the most matches within the tile, description, or keywords (described in instructions.json) will be launched. If any phrase contains the word: `pdf`, `image`, `picture`, `video`, or `movie`. Instead of an application, it will search for a name match within the corresponding folder of the media browser.
Make a note	Make a note `[phrase]` Make a reminder `[phrase]` Write down `[phrase]` Creates a note with the `[phrase]` as the contents.
	Save applications as `[phrase]`

Save session with a name	Save content as `[phrase]` Save session as `[phrase]` Save state as `[phrase]` Save wall as `[phrase]` Save applications name `[phrase]` Save content name `[phrase]` Save session name `[phrase]` Save state name `[phrase]` Save wall name `[phrase]` Creates a saved session with `[phrase]` as the name visible within the media browser.
Restore all applications that were part of a saved session	Restore session `[phrase]` Load session `[phrase]` Bring back `[phrase]` Restores a session with the most word matches within the given `[phrase]`.
Open a Webviewer application and search using Google	Web search `[phrase]` Google search `[phrase]` Will first open a new Webview application, then perform a Google search with the given `[phrase]`. If "image" is said after web or google, image search will be done instead of text search Ex: Google image search `[phrase]`.
Share an application to a remote site	Share with `[phrase]` Send to `[phrase]` Will share the application directly under the pointer to the remote site who's name has the most word matches within `[phrase]`.

For wall commands, each of the words of an invocation must be present. For commands with phrases, the phrase must follow the preceding word, otherwise the phrase will be incorrectly detected. Aside from the phrase and the word before it, the invocation words can be in any order.

Application Commands

Applications can be issues commands from their context menu. The menu entry activated will be the one with the most word matches. When multiple applications are open, the application directly under the pointer will be checked first. If no matches are found, the rest of the applications will be checked starting from the oldest.

For entries that take user input, the word before the input area is used to identify the start of input. Anything after that word will be sent as input.

UI client Commands

The following commands can be activated from within the client UI. They do not reach the server for evaluation.

Action	Invocation Words Required
Tell the time	What time is it
Tell the data	What is today's date
Open the help page	Help Will open in a new tab the quick reference for voice commands. This may be prevented by pop-up blockers.

Youtube video

https://youtu.be/9atA_h_t5pM

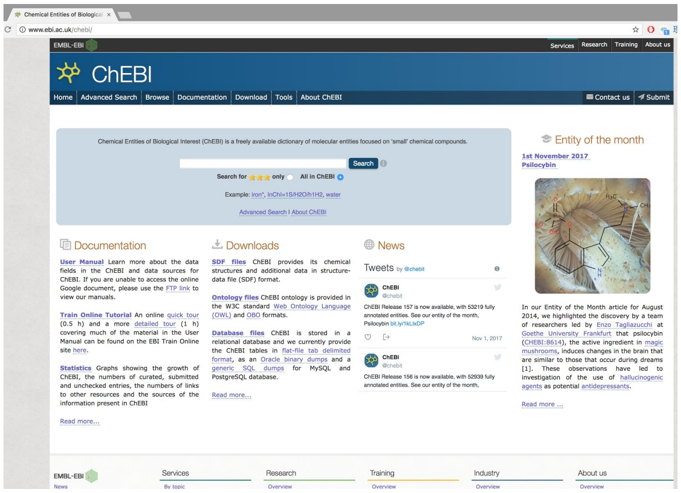
Applications Updates

Movie Sync Remote Control

- This applications is able to control multiple video players at once.
- Detects when over a video player and can add that player under its controls from the context menu or within the application.
- The longest connected player becomes master, which the other player will synchronize with.

ChemViewer Updates

- Expanded to show information from http://www.ebi.ac.uk/chebi/
- Updated by Jared McLean, at University of Hawaii Hilo



Chemical Entities of Biological Interest (ChEBI) is a freely available dictionary of molecular entities focused on 'small' chemical compounds.

Search for ★★★ only ○ All in ChEBI ●

Example: iron*, InChI=1S/H2O/h1H2, water

Advanced Search I About ChEBI

User Manual Learn more about the data fields in the ChEBI and data sources for ChEBI. If you are unable to access the online Google document, please use the FTP link to view our manuals.

Train Online Tutorial An online quick tour (0.5 h) and a more detailed tour (1 h) covering much of the material in the User Manual can be found on the EBI Train Online site here.

Statistics Graphs showing the growth of ChEBI, the numbers of curated, submitted and unchecked entries, the numbers of links to other resources and the sources of the information present in ChEBI

Read more...

SDF files ChEBI provides its chemical structures and additional data in structure-data file (SDF) format.

Ontology files ChEBI ontology is provided in the W3C standard Web Ontology Language (OWL) and OBO formats.

Database files ChEBI is stored in a relational database and we currently provide the ChEBI tables in flat-file tab delimited format, as an Oracle binary dumps and a generic SQL dumps for MySQL and PostgreSQL database.

Read more...

Tweets by @chebit

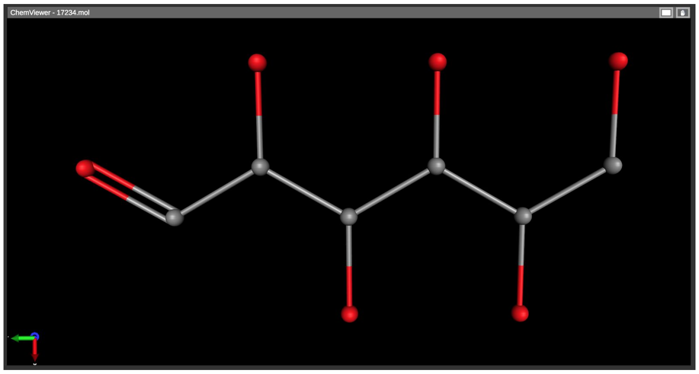
ChEBI @chebit
ChEBI Release 157 is now available, with 53219 fully annotated entities. See our entity of the month, Psilocybin bit.ly/1kLIxDP
Nov 1, 2017

ChEBI @chebit
ChEBI Release 156 is now available, with 52939 fully annotated entities. See our entity of the month,

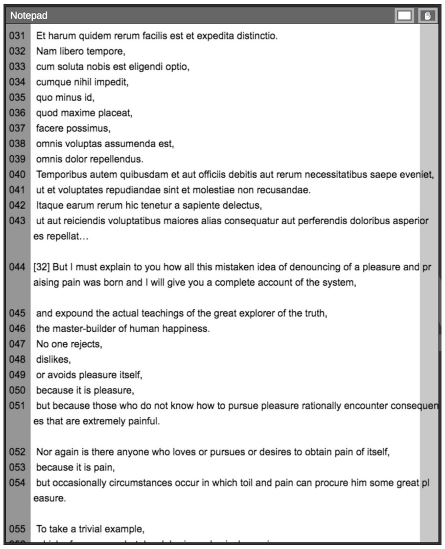
1st November 2017
Psilocybin

In our Entity of the Month article for August 2014, we highlighted the discovery by a team of researchers led by Enzo Tagliazucchi at Goethe University Frankfurt that psilocybin (CHEBI:8614), the active ingredient in magic mushrooms, induces changes in the brain that are similar to those that occur during dreams [1]. These observations have led to investigation of the use of hallucinogenic agents as potential antidepressants.

Read more ...



Notepad Update

- 

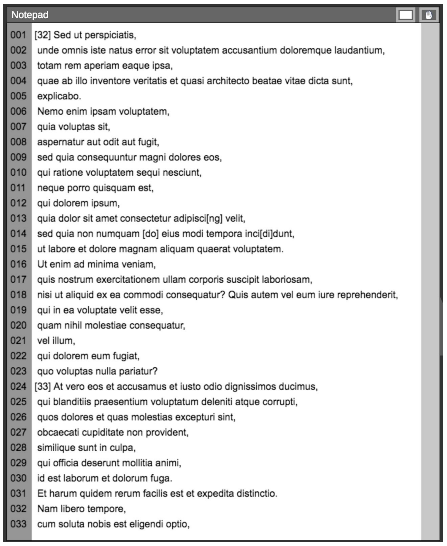
Et harum quidem rerum facilis est et expedita distinctio.
Nam libero tempore,
cum soluta nobis est eligendi optio,
cumque nihil impedit,
quo minus id,
quod maxime placeat,
facere possimus,
omnis voluptas assumenda est,
omnis dolor repellendus.
Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet,
ut et voluptates repudiandae sint et molestiae non recusandae.
Itaque earum rerum hic tenetur a sapiente delectus,
ut aut reiciendis voluptatibus maiores alias consequatur aut perferendis doloribus asperior
es repellat…

[32] But I must explain to you how all this mistaken idea of denouncing of a pleasure and pr
aising pain was born and I will give you a complete account of the system,

and expound the actual teachings of the great explorer of the truth,
the master-builder of human happiness.
No one rejects,
dislikes,
or avoids pleasure itself,
because it is pleasure,
but because those who do not know how to pursue pleasure rationally encounter consequen
es that are extremely painful.

Nor again is there anyone who loves or pursues or desires to obtain pain of itself,
because it is pain,
but occasionally circumstances occur in which toil and pain can procure him some great pl
easure.

To take a trivial example,



[32] Sed ut perspiciatis,
unde omnis iste natus error sit voluptatem accusantium doloremque laudantium,
totam rem aperiam eaque ipsa,
quae ab illo inventore veritatis et quasi architecto beatae vitae dicta sunt,
explicabo.
Nemo enim ipsam voluptatem,
quia voluptas sit,
aspernatur aut odit aut fugit,
sed quia consequuntur magni dolores eos,
qui ratione voluptatem sequi nesciunt,
neque porro quisquam est,
qui dolorem ipsum,
quia dolor sit amet consectetur adipisci[ng] velit,
sed quia non numquam [do] eius modi tempora inci[di]dunt,
ut labore et dolore magnam aliquam quaerat voluptatem.
Ut enim ad minima veniam,
quis nostrum exercitationem ullam corporis suscipit laboriosam,
nisi ut aliquid ex ea commodi consequatur? Quis autem vel eum iure reprehenderit,
qui in ea voluptate velit esse,
quam nihil molestiae consequatur,
vel illum,
qui dolorem eum fugiat,
quo voluptas nulla pariatur?
[33] At vero eos et accusamus et iusto odio dignissimos ducimus,
qui blanditiis praesentium voluptatum deleniti atque corrupti,
quos dolores et quas molestias excepturi sint,
obcaecati cupiditate non provident,
similique sunt in culpa,
qui officia deserunt mollitia animi,
id est laborum et dolorum fuga.
Et harum quidem rerum facilis est et expedita distinctio.
Nam libero tempore,
cum soluta nobis est eligendi optio,

- Now supports text scrolling
- Updated by Jirayu Roungsuriyaviboon of Mahidol University, Thailand

Application Data Sharing

- Data sharing was added to SAGE2 application API to allow multiple applications to work as one large application
  - Also enable applications to be designed like components that other developers can utilize
  - Applications are able to launch other applications
  - This allows not only data passing, but window manipulation

- Applications that launch others, are able given each others' ID
  - The IDs are pass in variables to identify the parent (launcher) and child (launched application)
- Applications can create named variables on the server
  - Those variables can be requested or subscribed to
  - Any application can create, request, subscribe, or modify variable

Youtube Video

https://youtu.be/uU5HZtmvS10

Remote Pointers

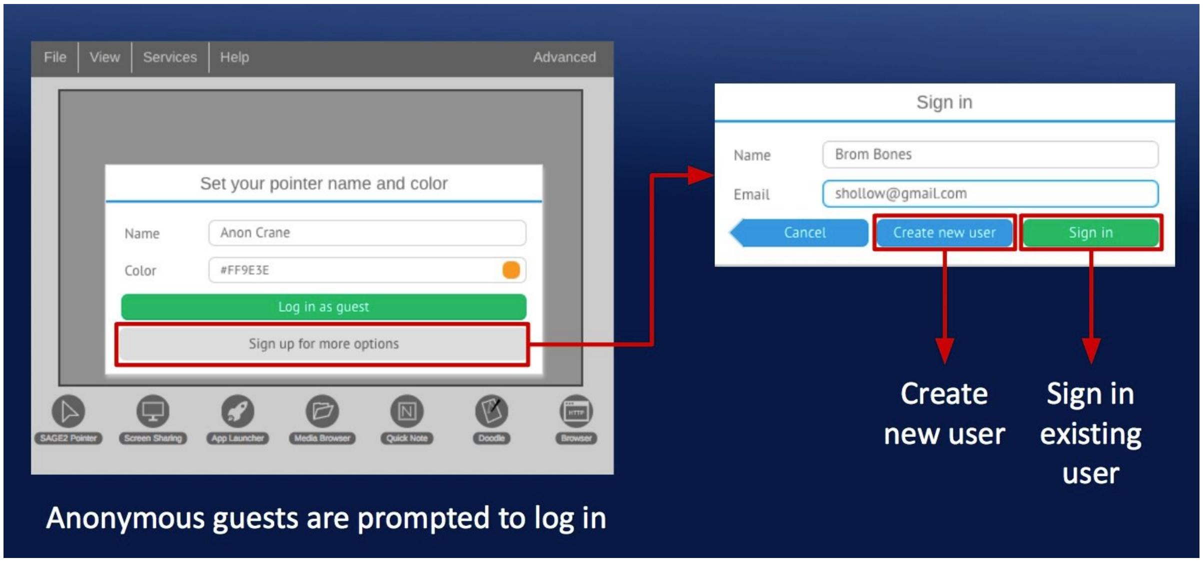
- Improves collaboration and identifying features in an application
  - Applications shared with a remote site shows pointers over an application from participants of both sites
  - Pointers of the remote site are suffixed with “@hostname”
- Utilizes application synchronization
- Pointers are associated with the application
  - Relative position is preserved even if scale is mismatched between sites
  - Can move the application on your site and relative position will still be preserved
  - Application must be visible to see remote pointer
  - Hides pointer when in window management mode

Youtube Video

https://youtu.be/6E7pdyuhwhA

User Model

- Distinguish between people using SAGE2
    - Access and authorization
    - Log activity—who did what
    - Scenarios and roles, e.g.
        - Group meeting with a leader
        - Teachers / students
        - …etc.



Name: Anon Crane

Color: #FF9E3E

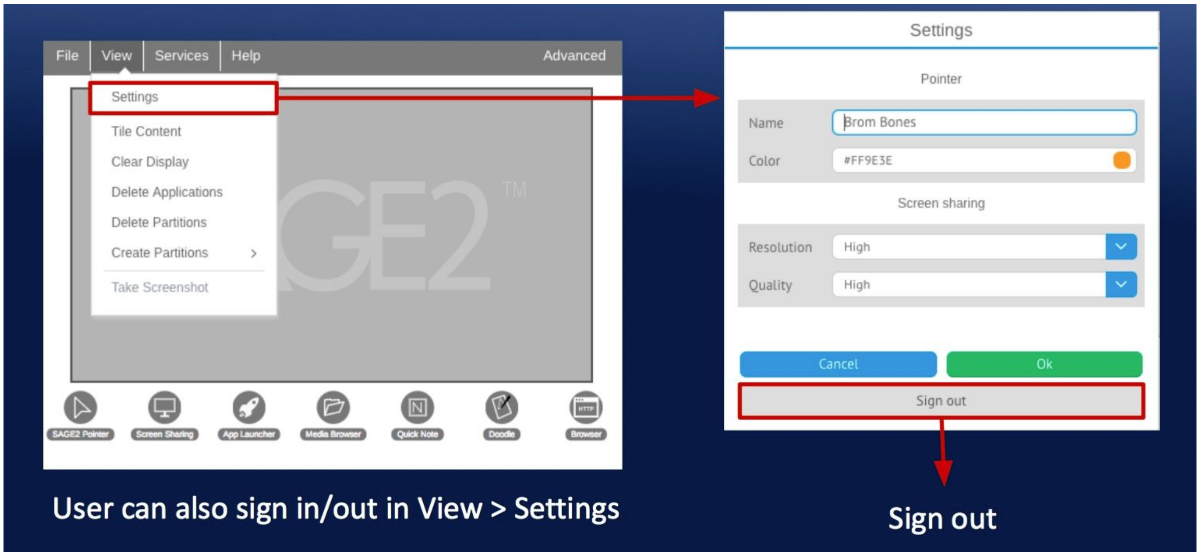
Name: Brom Bones

Email: shollow@gmail.com

Create new user

Sign in existing user

Anonymous guests are prompted to log in



Name: Brom Bones

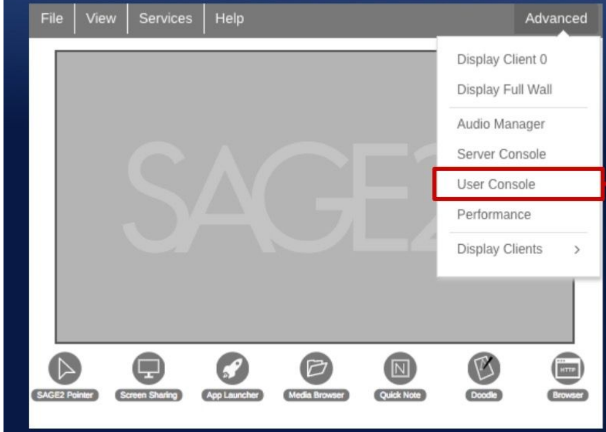
Color: #FF9E3E

Resolution: High

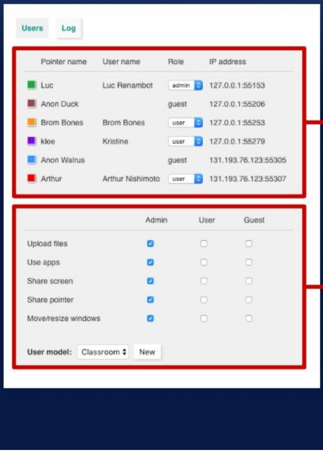
Quality: High

User can also sign in/out in View > Settings

Sign out



Open the User Console via the Advanced menu



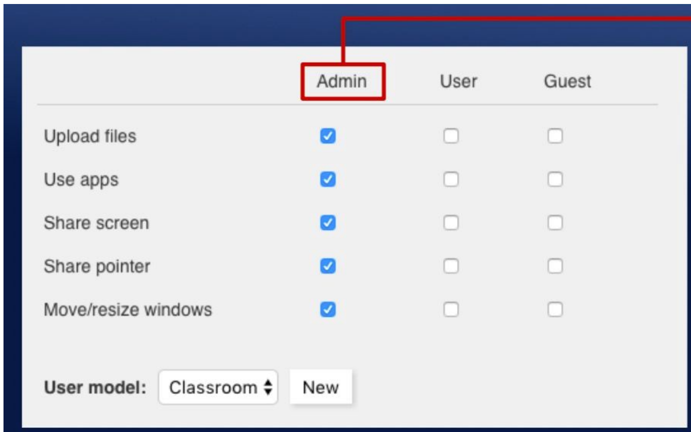
	Pointer name	User name	Role	IP address
🟩	Luc	Luc Renambot	admin	127.0.0.1:55153
🟥	Anon Duck		guest	127.0.0.1:55206
🟧	Brom Bones	Brom Bones	user	127.0.0.1:55253
🟪	klee	Kristine	user	127.0.0.1:55279
🟦	Anon Walrus		guest	131.193.76.123:55305
🟥	Arthur	Arthur Nishimoto	user	131.193.76.123:55307

	Admin	User	Guest
Upload files	☑	☐	☐
Use apps	☑	☐	☐
Share screen	☑	☐	☐
Share pointer	☑	☐	☐
Move/resize windows	☑	☐	☐

User model: Classroom New

See who's connected

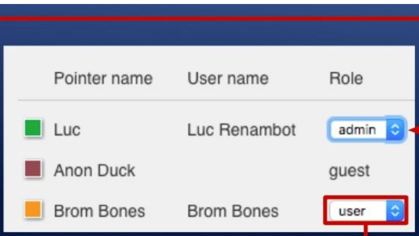
Manage roles and permissions



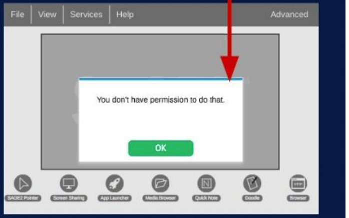
	Admin	User	Guest
Upload files	☑	☐	☐
Use apps	☑	☐	☐
Share screen	☑	☐	☐
Share pointer	☑	☐	☐
Move/resize windows	☑	☐	☐

User model: Classroom New

Example scenario: only the teacher (admin role) has permission to use the wall

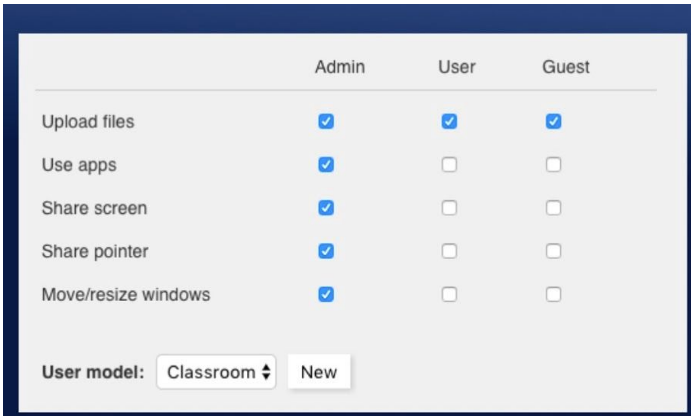


	Pointer name	User name	Role
🟩	Luc	Luc Renambot	admin
🟥	Anon Duck		guest
🟧	Brom Bones	Brom Bones	user



You don't have permission to do that.

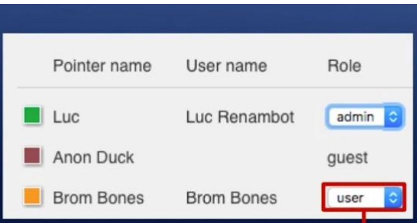
Actions by unauthorized users are disabled



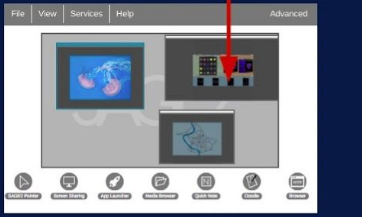
	Admin	User	Guest
Upload files	☑	☑	☑
Use apps	☑	☐	☐
Share screen	☑	☐	☐
Share pointer	☑	☐	☐
Move/resize windows	☑	☐	☐

User model: Classroom New

Example scenario (cont'd): teacher allows other people to add files to the wall



	Pointer name	User name	Role
🟩	Luc	Luc Renambot	admin
🟥	Anon Duck		guest
🟧	Brom Bones	Brom Bones	user



Adding files is now enabled

- Next Features
    - Secure authentication
        - Currently using username/email as login keys
        - Integrate Passport/Express
    - Authorized access to user console
    - Extended role creation
        - Currently limited to admin/user/guest