Welcome to the “Scenario_Builder” Tool
Select Generator: Choose a scenario or create a new one

This application allows you to create, edit, and delete scenarios of virtual data grids. Here you can choose from any of the existing scenarios in the scenario table to work in. If you select “new”, you can create a new scenario to insert into the table and work from. “Delete” and “DELETE ALL” remove one scenario or all scenarios, respectively. At any point in this application you may choose “visualize” under the “Operation” menu to switch to the Scenario Visualizer.
I have chosen to create a new scenario and am prompted to enter the name in the text box. I cannot enter the name of another existing scenario, or the words “new”, “enter here”, “delete”, or “DELETE ALL”.
Illegal input handling

Here I have entered “db1” as the name of the new scenario, which is not allowed because a scenario named “db1” already exists. I am bounced back to the same page and asked to try again.
New scenario created

I have entered a legal name for my new scenario and it is inserted into the “scenarios” table. Now I can begin with any scenario from the list, including the one I have just created.
Choose and element to create

Now I have chosen to work in the scenario that I just made. I now have the option of creating new users, groups, directories or files. At any point I can choose to create a new scenario or change or delete the one I am working in. If I change which type of element I am creating at any time I will be sent to the appropriate page without navigating back to it. Note the display over the drop-down menus. This shows the numbers of groups, users, directories, files, and total file size of the selected scenario, taken from “scenarios” in phpmyadmin.
I have attempted to create new directories. Since I have just created this scenario, I cannot choose to create new directories or files because there are no users to create them for. At this point I have to choose to create new users or groups.
Create new users

I have selected “users” from the elements dropdown for the scenario I am working in. I did not have to navigate back, changing items in the menus automatically sends me to the user creation page.
Illegal input handling (II)

I am sent back to this page until I enter a positive number less than 5000 (more than 5000 takes a very long time to process).
New users created

I have entered a legal input and the 8 new users have been created and inserted into the “virtual_users” table. The names are generated based on surnames from classic television shows (and some from the 90’s as well), plus 1 or 2 initials at the front and 0, 1, or 2 digits appended to the end. I am also told how long the generation took and the number of repeats detected in the table and within this generation.
Extra Information

At the bottom of the page created after elements are generated there is further information. I am shown a description of the table fields along with an update of the numbers of elements in the current scenario and a description of the way the elements were generated.

### Description of table fields:

- **User #**: The number of the user that was created.
- **User**: The name of the random user that was created.
- **Scenario**: The scenario that the user belongs to.

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Groups</th>
<th>Users</th>
<th>Directories</th>
<th>Files</th>
<th>Size (GB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>db0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

This generates random user names to insert into `virtual_users`. The names are randomly selected and based on the surnames of characters from classic television shows (and some from more recent times), and some number of initials on the front of the name and some number of digits appended to the name. The format of the randomly selected name is in one of 6 randomly selected formats:

- `initial + surname`
- `initial + initial + surname`
- `initial + surname + digit (1-9)`
- `initial + initial + surname + digit (1-9)`
- `initial + surname + digit (1-9) + digit (0-9)`
- `initial + initial + surname + digit (1-9) + digit (0-9)`
I have chosen to create new directories now and have been given the option to enter the user to create the directories for and the number of directories to create. The users in the drop down menu are users associated with the current scenario in the “virtual_users table”. (Note – the display above the menus was updated with the number of users in the current scenario)
Illegal input handling (III)

I have entered invalid input for the number of directories to create. It must be a positive number and less than 5000 (more than 5000 takes a very long time to process).
Ten new directories have been created for the given user and inserted into the “directory_management” table. If the user has no directories a root is automatically inserted before the user-specified directories are created (making 11 total in this case). The names generated are based on names from The Matrix.
Create new files (Illegal input handling IV)

I have chosen to create new files now but there is an error – I cannot create new files for this scenario until I have created users and groups to assign them to (in this case we have no groups). The users in the drop down are users associated with the current scenario in the “virtual_users” table. Note – the display above the menus was updated with the new number of directories in the scenario.
Create new groups

I have chosen to create new groups. I must only enter the number of groups to create – the process does not rely on any information other than the number and the scenario to create them for. Again, I must enter a positive value less than 5000 or I will be bounced back to this page with an error.
New groups created

The specified number of new groups were created and inserted into the “virtual_groups” table. The names of the groups are based on television stations with either 1, 2, or 3 digits on the end.
Here I may enter the user to create files for, the number of files to create and the resource id for the files (taken from “grid_user/resources”). For the number to create, as before, I must enter a positive number less than 5000. Note – the display above the menus was updated with the new number of groups.
New files created

The new files have been created for the given user and inserted into the “file_management2” table. If the user has no directories, a root is created and the files are stored in it, otherwise the directories to store the files in are chosen at random. The names of the files are also based on The Matrix and random attributes are chosen for the files and stored with them.
Now I wish to view the aspects of the scenario I just created. I select “visualize” from the “Operation” menu after generating my files and select an element to view. (choosing an element allows me to view aspects of it, and “view all” explores all elements together). At any point in this application I may choose “generate” from the “Operation” menu to return to the Scenario Generator.
I have chosen to view all elements and now must choose a scope. I can pick an individual scenario to view or I may choose “all” to view all scenarios comparatively. Currently there are no graphs to “view all” per scenario, so I choose “all” as my scope.
At this point I must choose a graph to view. All elements and scopes have some number of choices of graphs that show pertinent information about the element and scenario in question. Here there is only one choice – “view all”. I can change the element, scope, or graph choice at any time by changing the choices in the menus; no backward navigation is required.
Viewing all elements of all scenarios together

A graph is created based on the element, scope, and graph choices made. Here the four elements of the scenarios are displayed together. More information is displayed below the graph when the mouse is moved over different regions. Here, when I point to “db6”, the scenario name and numbers of its elements are shown. I am also given a brief description of how the chart was built.
Clicking the graph – more information

Each graph, when clicked, creates a table of the information used in the graph generation. Here, this graph is built by reading the entry in “scenarios” for the scenario in question, so clicking in the “db6” region of the graph displays the “db6” entry from the table. I am given a description of the table fields as well. Clicking in any other graph region refreshes the table; no extra navigation is required.
Users – scope “all”

Now I have chosen to view the users in a scope of “all”, or across all scenarios. Here there is only one graph choice – “all users”. I am shown the total numbers of users for all scenarios. Even though this graph is built by pulling the figures out of the entries in “scenarios” in phpmyadmin, displaying the users with their corresponding information when clicking a region is more useful to the user. There is another element to this graph – db2 has only 1 user though db3 has 100 – this drastic difference would make db2 very difficult to click on because its bar would be very small. The values in the chart are logarithmically scaled to avoid this situation.
Users – specific scenarios

Here there are no choices for viewing users in the scope of a single scenario. This information has not yet been added. More graphs can be added to the code that already exists. There are comments in the source code which indicate how to make such changes.
Directories – scope “all”

Now I have chosen to view the directories with a scope of “all”. There are a few choices of graphs. I chose “Average Directory Depth”, which shows me the average depth of the directories in each scenario. Moving the mouse over the regions displays the exact figures and clicking the regions builds a table of all directories used to arrive at this number.
Directories – specific scenarios

Now I have chosen “db6” as my scope. I chose the graph, “Directories per User”. Here we can see the directories we created during scenario generation – we created 10 directories for user “mshunnicutt2” and we can see this reflected in the table. More information is displayed when the mouse is over the region and clicking builds a table of the directories for the user in question.
Here I have chosen to view files over all scenarios. There are many choices of applicable graphs; here I picked “average file size” which finds the average sizes of all files across all scenarios. Moving the mouse over regions prints the exact average (up to two significant figures), and clicking on “db6” shows all files that were counted in the average (i.e. all files in “db6”).
Files – specific scenarios

Now I have chosen to see “files per group” on “db6”. The groups are shown by their group ID’s and the exact number of files is displayed when the mouse is moved over specific regions. When clicked, the files in the scenario with the selected group are shown in the table.
In some cases the information for a graph can be much to big to display. For instance, scenario “db5” has 500 directories, so this graph “files per directory” for “db5” would be difficult to view. In the case when there are more than 20 elements on the x-axis, the data is sorted in descending order by y-value and only the top 20 x-values are displayed.
Groups – scope “all”

This is the only graph available for viewing groups over all scenarios. It shows the numbers of groups in each scenario, with the exact number printed when the mouse enters the region. The table is populated with the names and ID’s of the groups in the selected scenario.
Groups – specific scenarios

There are no graphs available to view for groups over a single scenario. More can be added at any time, as instructions were included in the comments of the source code. When graphs for this element are found necessary they can be added without much more coding.
Deleting information

Back in the generator application, it is possible to delete information from the tables in phpmyadmin. Selecting “DELETE ALL” from menu “Scenarios to choose from” removes all scenarios and all of their corresponding elements by emptying the element tables in phpmyadmin completely after asking if the user is sure. Here we have chosen to delete one specific scenario.
Entering scenario name

It would be very easy for a user to accidentally select the wrong scenario name from a dropdown menu to delete, so as a precaution the user must type the scenario’s exact name in order to have it deleted properly. Here I have entered “db7” which does not exist, and an error is generated.
Deletion complete

A valid scenario name was entered and the scenario and all of its corresponding information was deleted. All applicable phpmyadmin tables were searched and entries with the scenario set to “db6” were removed. The scenario is permanently deleted and the name is now free to be created as a new scenario and populated.
Things to add

There are a few features that I would like to add to this tool in the future…

• I would like to alphabetize the “users” drop down menu populated for “create new directories” and “create new files”. It is difficult to find specific users when there are many of them.
• I would like to give the user the option of viewing or not viewing the table of newly created elements.
• The user should be able to specify the number of groups to choose from randomly when creating new files. Currently the groups are picked from a large array.
• Modify the logarithmic scaling such that the y-axis labels are scaled properly as well.