DU Force Layout
Documentation

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Development Summary

Phase 1 (26/3 -3/4) - sorting out UI interaction and resolving various bugs in the process

* loading animation + overall app speed
* filter menu upgrade - colour coding, collapse/expand, interaction mirrors selection on visualisation and vice versa
* Simpler Interaction menu - search input + 3 buttons
* Layouts - 3 options - default, Nearly New, Shortest Path
* Tooltips - updating so single node + multiple node table

Phase 2 (4/4 - 13/4)- switch to D3.js from Pixi, adding back Quilt/Middle View, zooming, info panel, download as pdf

* tested out speed - ok, so moved to d3 for greater functionality
* Sorted out dragging and pixelation issues
* Middle/Quilt toggle and different view
* Added back zooming
* Various improvements and tweaks to new SP and NN layouts
* Added back info panel and download as pdf

Phase 3 (14/4-30/4) - screen responsiveness, further tweaks in response to feedback

* overall screen responsiveness and positioning of elements at various sizes
* Fixing various bugs + tweaks in response to feedback
* Quilt now appears by default
* Various interaction changes when moving between the different layout views
* Add Reset button

Phase 4 (9/5-19/5) - tweaks and documentation plus new Quilt/Middle functionality

* wider feedback circle tweaks and bugs
* gathering documentation
* New functionality for quilt/middle mode - click to expand/collapse into and out of levels

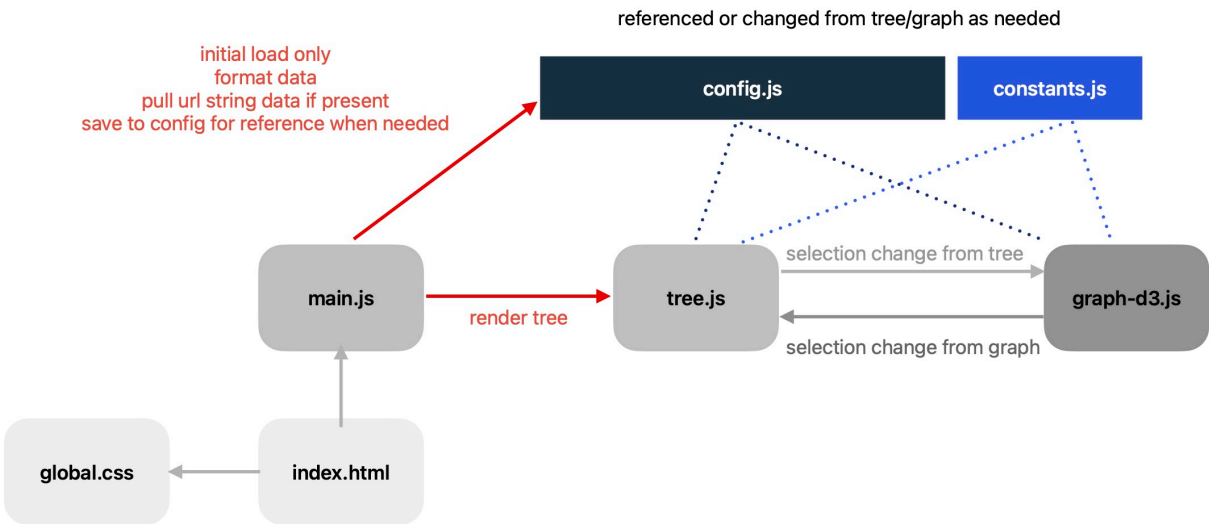Phase 5 (28/5-11/6) - adding url search + changing collapse/expand functionalty

* new expand/collapse strategy
* New url search to 'redraw' the graph - NN, SP, Quilt/Middle
* further tweaks after a 2nd feedback round
* Polish documentation and finish this development phase

Phase 6 (7/7-25/7) - final polish from 2nd round of feedback

* refining Macro and Middle View - encoding and spacing
* Tooltip table - bug with direction toggle + refining positioning for arrows
* Other encoding - colours, arrow size/colour
* Add UnselectAll button in Variable View

App Interaction Diagram

referenced or changed from tree/graph as needed

initial load only
format data
pull url string data if present
save to config for reference when needed

config.js

constants.js

main.js

render tree

tree.js

selection change from tree

graph-d3.js

selection change from graph

global.css

index.html

page	Notes
Index.html	Home page. * Added some new features (loading animation, zoom buttons, tooltip headers, parameter menu, NN items, SP items, helpInfo tab) * Kept some originals - view, app, hide/showInfo
global.css	Moved all css from index.html here - notes in file

page	Notes
main.js	This file is used once on loading and contains all the data manipulation. The API fetch and nodes/links generation has not been changed. Data manipulation which used to be in the graph.js has been moved here as it's only required once. Data is then stored in the required format in config.js Functions list * **dataNullValueCheck** - checks to make sure SEGMENT_NAME + SUBMODULE_NAME exist in the data - console if they don't * **generateParameterData** - uses nodes + links to parse data into required format, set link direction and ensure duplicate links are included * **getHierarchy** - uses nodeData to generate submodule -> segment -> parameter hierarchy, set config.subModules and return as d3.hierarchy() * **setHierarchyData** - generates high level hierarchy data to allow linking between submodules/segments + parameters at all zoom levels in Quilt/ Middle mode * **handleUrlInputs** - returns if reloading, otherwise checks url search string and sets parameters to 're-render' the graph in that state. * Options as follows ✳NND - nearly neighbour, default view - *NND=~POP:1* (parameter:degree) ✳NNV - nearly neighbour, NN view - *NNV=~POP:2* (parameter:degree) ✳SP - shortest path, - *SP=~POP:~POPEDSECLOWR (start:end)* ✳QV/MV - specifies whether to show in Quilt or Middle view - Search string has a list of the submodules or segments which are expanded + maximum one highlighted parameter separated by _ ~ = upper case parameter
constants.js	Constants used in tree + d3-graph: LINK_COLOR - link and arrow colour ARROW_SIZE - arrow size COLOR_SCALE_RANGE - submodule colours MESSAGES - when there is no match for SP + NN TOOLTIP_KEYS - variables to show in tooltip (if they exist in data) NODE_RADIUS_RANGE - range for circle radii We can add anything else you like here which you want easily adjustable

page	Notes
config.js	This is the global store which is used by tree.js and graph-d3.js and allows all the features to work together seamlessly. Default settings • **currentLayout** - "default", "nearestNeighbour", "shortestPath" • **graphDataType** - "submodule", "segment", "parameter" NB "submodule" = Macro, "segment" = Meso, "parameter" = Variable tier1 = submodule, tier2 = segment, tier3 = parameter • **initialLoadComplete** - prevents unnecessary reloading • **nearestNeighbourOrigin** + **nearestNeighbourDegree** - for NN • **shortestPathStart** + **shortestPathEnd** - for SP • **showArrows** + **showSingleNodes** - toggled with menu button Graph data set on initial load in main.js * **allNodeNames** - list of all * **expandedMacroMesoNodes** - used in macro/meso mode to store expanded nodes * **hierarchyData** - full hierarchy * **subModules** - list of all * **parameterData** - data for Main graph Tree data set on initial load in tree.js • **expandedTreeData** - stored for expandAll button • **collapsedTreeData** - stored for collapseAll button • **currentTreeData** - reflects nodes on Main • **tier1And2Mapper** - referenced when collapsing/expanding tree Other • **defaultNodePositions** - Main, set after 1st load so simulation only runs once • **selectedNodeNames** - Main, nodes currently visible in default view + on tree • **notDefaultSelectedNodeNames** - similar - for NN + SP layout only • **notDefaultSelectedLinks** - links - for NN + SP layout only • **tooltipRadio** - current tooltip radio selection • **macroMesoUrlExtras** - storing URL info for quilt/middle view • **nnUrlView** - flag set if default view NNV URL request to trigger move to NN layout after loading

tree.js	VariableTree = initial load function which sets up functionality of various buttons/select boxes and draws the tree
	
	Function List
	* **getGraphData** - gets the correct graphData depending on graphDataType
	* **renderGraph** - rendersGraph - on load/after graphDataType change
	* **getColorScale** - data from config + constants
	* **remToPx** - responsiveness - gets current px size
	* **getSelectedPath** - returns empty, half checked or checked box depending
	* **drawTree** - draw the tree hierarchy in the current state (called by **VariableTree**, from itself AND from **graph-d3.js**)
	* **saveSvgAsImage** - as described
	* **VariableTree** - renders the initial interactive menu tree, sets resize event listener and sets functionality on various page items
	   * downloadImage button
	   * graphDataType radio button
	   * collapseExpand button

page	Notes
graph-d3.js	Graph component
	initialises various things - data, radius scale, tooltips, zoom functionality, simulation, graphology (for NN and SP - old functionality used as base)
	Then runs the simulation if needed (stored after initial render for Main) and depending on user action calls various update functions
	* **resetMenuVisibility** - after render and layout change
	* **getMacroMesoDepthMultiple** - radius collide perimeter changes by tier for both graphDataTypes
	* **getNodeLabelDisplay/getNodeLabelDy/getNodeLabelSize** - node visibility, size + position dependent on graphDataType, currentLayout + currentZoomLevel
	* **getZoomCalculations** - zoomFit from performZoomAction
	* **performZoomAction** - after render + zoom buttons
	* **resetDefaultNodes** - reset's based on saved positions
	* **activateTooltipToggle** - called every time tooltip redrawn with toggle
	* **getUrlId** - uses regedit to fetch the valid id from saved URL positions
	* **getNeighbours/getNearestNeighbourLinks/generateSymmetricNNArray/ renderNNLevelLabels** - used by **positionNearestNeighbour**
	* **positionNearestNeighbour** - finds nearestNeighbour and if NN view, positions them
	* **positionShortestPath** - finds and positions shortestPath (or no path message)
	* **clickNode** - on node click AND after update if NN level 1 default search
	* switchLayouts
	* **updatePositions** - this function holds the core d3 functionality which sets up the data depending on user selections and applies the joins + visual encoding +url 'redraw' functionality
	* **centroid/forceCluster** - simulation functions
	* **getTooltipTable** - builds the tooltip table html
	* **updateTooltip** - different views in different circumstances
	* **measureWidth** - measures text width - standard function
	* **showTooltipExtra** - small 'info' tooltip
	* **switchLayouts** - switches between default, nearestNeighbour + shortestPath, only available in graphDataType = parameter
	* **updateButtons** - sets functionality for remaining chart buttons - reset, help info,downloadImage (click in tree), hide single, layout, show arrows, nn degree slider, zoom buttons
	* **updateSearch** - lots of old functionality here - responding to search input changes
	* **initGraphologyGraph** - runs on load, used with shortestPath
	* **getSourceId/getTargetId** - ensures correct id whether working on original link data or manipulated link data (after simulation)

More detailed comments can be found within each file

Appendix A: list of changes

Completion Date	Tasks Completed
26th March	* loading animation * Altered simulation so always runs in 'fixed' mode * Zooms to extent of highlighted nodes after every update * Remove pointer-events from tooltip * Filtering tooltip results so only entries with data appear * Allowing nodes to be draggable in ALL layouts - fixing after
28th March	**Filter Menu -look and feel** * default collapsed * Colour coding * Collapse/expand arrow * Select box (all checked initially) * add select/unselect functionality + up stream part selected * Select all button * Unselect all button **Highlighting** * add highlight/unhighlight functionality to graph * Add click multi select * Add visual encoding **Filter Menu -functionality** * hook up changes - highlight on graph - change on list * Hook up changes - search box - highlight on graph - check on list * Hook up changes - change on list - highlight on graph **Tooltip functionality** * hover always shows single (how do we distinguish if a node is clicked) * Fix on click * Table if multiple (scrollable) * Show tooltip after selection in search box and/or on list * Position moves to right if necessary **Menu functionality** * Hook up show single nodes * Hook up view/hide arrows button **Bugs** * Bug - node labels after highlighting * Alter name label size so always the same * handle overlapping arrows/general visibility - a bit better? * Show menu - closed button - inconsistent - ?just switch text

1st April	**Bugs/Small Fixes** * Collapse all - not maintaining state properly after a manual expand * add visual encoding for node hover when selected * Issue hovering over nodes which aren't 'visible' triggering tooltips * Centre loading animation on page * After unselecting a node - restore to all visible if selected count === 0 * fuzzy searching - switch so startsWith come first, then fuzzy * add button tooltips * Tooltip table - content - sort by submodule? * Tooltip table - hover over name - tooltip showing parameter explanation (if it exists) * Tooltip table - needs to be less prominent/styled better * Tooltip table - Add trash icon - doesn't do anything yet, what do you think? * SP search boxes - z index issues * NN - stack circles nicely if space * NN - add extra simulations if needed * NN - make link lines look less pattern (0.4) * NN - hierarchy errors at degree 3 - will be something to do with nodes going in * NN/SP - toggling back to default if hide icon menu clicked * Issue with data - again have added a temp fix, discuss next week
4th April	*Switch to d3 from pixie * added a toggle at the top for Middle + Quilt view * Added initial functionality for Middle + Quilt view * NN and SP - using selected nodes to start + adding results to default after a switch * Table Tooltip - now a bit larger font/padding - don't want to go too big as we need the space, tooltip aligns top left - better? * other bugs I fixed as I found them

10th April	• By default showArrows = true
	• Arrows are always shown in Nearest Neighbour, Shortest Path, Segment View, SubModule View
	• Shift + click on any node in default view goes direct to Nearest Neighbour
	• Whenever any nodes are selected the option on the menu is now "select All"
	• Zooming - should now be working properly in all cases (including Shortest Path)
	• Shortest path - labels always visible
	• Nearest Neighbour
	    ◉ Removed labels apart from the root
	    ○ Added titles to show roots, drivers + outcomes
	    ○ Fixed the error so it's now only showing the connections in the nearest neighbour path (ie not show if a level 2 driver happens to have a link to a level 2 outcome)
	    ○ Mouseover any node to see connections -> root
	    ○ Mouseover any node to get a standard tooltip
	• Info panel + icon
	• Download icon button
	• changed the labels from to Show/hide interactive menu - not sure that is the right words but work in progress!

14th April	1. reworking app so that it is responsive to screen size and adjusts as you resize the window including the following
	    ‣ all fonts and sizes are based on rem (partially set up in the original app) - see start of css in index.html
	    ‣ * 4 levels based on screen width (< 668px, < 768px, < 1024px, >= 1024px)
	    ‣ * minimum screen size of 480 x 480px
	    ‣ * this allows the tooltip to stick top left, the panel to stick top right and the info panel to go above the zoom buttons. They will never overlap
	    ‣ * the user can expand the panel to full height but the tooltip has a maximum height so there will always be screen space available to see the visualisation (albeit pretty tiny if your width is 480px!)
	    ‣ * the info message (for Shortest Path if no matches or either Shortest Path/ Nearest Neighbour if nothing selected yet) is always top middle so never overlapping anything
	
	2. fix the zooming - should be 100% working in all scenarios, please try and break!
	3. NN titles overlapping with nodes (fixed with zooming)
	4. Node Label Visibility - new strategy
	* normal behaviour - visible at zoom 200%, smaller
	* default - if nodes are selected, only these have labels
	* segment, submodule, shortest path, nearest neighbour (root node) - always visible
	* shortest path + nearest neighbour (root node) - text twice the size
	* NN + SP - added reset buttons
	* NN + SP - table now also shows drivers and outcomes
	* Hide Single Nodes button - bug fixed

17th April	1. View order has changed + new labels - **Quilt**, **Middle**, **Main**
	2. Quilt appears by default
	3. Loading message now appears if needed
	     ○ when switching between Views
	     ○ when switching between Collapse All + Expand All
	     ○ when switching layouts
	     ○ when selecting nodes, segments or submodules from the list
	4. clicking a node in **Main** OR searching for a node in **Main** automatically does a **NN** 1st degree search (user welcome to switch to NN and see the different layout and/or up the degrees to 2 or 3 if they want)
	5. due to above change, when switching layouts back to default from **NN** + **SP**, you see ONLY results from previous SP or NN search - no longer adding to the list *(You can still add to the list by selecting and deselecting from the dropdown menu)*
	6. highlight **NN** or **SP** end/start - I've added a white stroke and a dash array to these nodes - what do you think? Easily tweaked..
	7. When in **Main** but showing **NN** or **SP** results a new toggle appears at the top of the tooltip - (both, in only, out only)
	8. Add **Reset** button to default when not expanded all

9th May	**NN Source -** highlighting - switched to a flashing animation so it should be visible from the highest node level + updated so the search-input box also includes this value (after a click and after a search) **NN Default - make names more legible** - I've changed the zoom to 95% from 90% and made the labels bigger if in default, parameter, NN. It zooms in to the # of visible nodes (ie the NN) - zooming further might mean the user doesn't spot some neighbours… **NN Node labels** - This is a compromise between overlap and space. I've put the names back in at the 'normal' size. On nodes like POP there is overlap but you can always drag them around to see and position yourself? **NN Slider** - 1,2 and 3 always visible **Quilt, Middle** - click to hold the mouseover **Reset button** - bugs appearing/not appearing at the right time - fixed **Bug** - node labels after a reset - fixed Bug - arrow visibility on Main/Quilt after a main - fixed Bug - dragging - fixed Tooltip - added Display Name (data missing for lots) to table + single view Tooltip - added NN header
14th May	SP - clear 'end' search box (unless coming from the tooltip table - see 3) SP - add an icon button to the tooltip table when in NN mode which automatically goes to the SP between NN node + selected row
19th May	* Documentation - writing up functionality, changes over the course of the project + fulfilment of original requirements New Functionality in Quilt and Middle view to * click on a submodule and expand to see segments inside * Click on a segment and expand to see parameters inside * Click an expanded submodule/segment to collapse all within that group
28th May	New Quilt Middle expand/collapse functionality To expand - press click To collapse: * segment - hold down either shift or ctrl or alt or command and click (I can add right click too if you like) * parameter - just click (but it will also work if you hold keys above down)
3rd June	New functionality to 'redraw' charts using the URL - starting with NN Adding a button to save the URL Bug fix - hover on parameter Quilt Writing some basic test scripts
6th June	Removing URL button, add to URL as you expand and collapse. Move to SP and Quilt/Middle as well (some known issues)
11th June (Completed 17th)	* Quilt + Middle with URL - this is now working with parameter so that they are in the right place - most of the time. It is less accurate with Middle for a technical reason I won't go into but much better. The added bonus of this new approach is the URL string is much shorter. * Quilt + Middle parameter click - now instead of collapsing (which you do with shift/alt/command click) it highlights the node + it's links + shows the label. * Quilt + Middle parameter with URL - it reverts to the clicked state * Quilt + Middle tooltip - now showing the 'normal' single tooltip in the top left hand corner instead of the tiny ones * Quilt + Middle labels - not an exact science but I've added code to scale the labels up as you zoom in so they are more readable. * NN + URL - there is now NND and NNV generated so you can go to Degree 1 in either view depending on which you copy the link from

9th July	* arrows 25% larger * macro view - variable nodes further apart * meso view - making them wider apart messes up the whole view so I've left it. Shrinking the stroke-width has helped. * Macro + Meso view - changed fill back to colour fill and stroke as previous * unselect all button now top right whenever the menu is visible in Variable view * only -> position switched around so arrow THEN text * NAME field - put the arrow in brackets BEFORE the name * tooltip table arrow toggles -BUG - this now updates, not sure why I didn't apply this originally * shortest path label bug fixed * colours - switched to the new ones - see 25th July
25 July	* changed arrow + link colour * Tested out some alternative colour palettes * Added and LINK_COLOUR, ARROW_SIZE to constants.js (alongside colour palette options) to constants so easily changeable * Updated code and test script so no further reference to Quilt/Middle - now Macro/Meso * NB Meso mode is not working brilliantly - you'll get much better insights and links by starting in Macro and drilling down to the links you want. Examining the submodules, their containing segments and then variables is probably better done in another chart format as it's super busy and it's very hard for the algorithm to get the spacing right - it does work though - just not optimal.

Appendix B: Original List on Upwork + notes

Task	Notes re: resolution
Draggable Nodes - Nearest Neighbors: When the central node is reselected and dragged, switch modes so that clicking on other nodes does not switch them to the central node and instead allows them to be moved as well. The existing cancel button can be used to exit both the dragging mode and the Nearest Neighbors view. Draggable Nodes - Shortest Path: Likely needs enabled without requiring a specific context-based check like with Nearest Neighbors. Draggable Nodes - Ensure that the selected node's position continues to update dynamically as they are dragged, and that the links between nodes are continuously redrawn in real-time to maintain connections. Once the drag is completed, the node's position should remain fixed - as it does under the current usage - while the rest of the network continues to respect the original now static force simulation results.	Drag functionality works as required * drags current node * Drags links connected to current node * Everything else remains fixed * Position saved when done * A tiny bit laggy when a node has loads of links (ie POP) but now we have d3 it doesn't lose the link and doesn't cause any errors Drag functionality consistent across layouts. (Will be when NN + SP complete)
Distinguish In-Flows & Out-Flows in Nearest Neighbors & Shortest Path: Create a toggle to show both drivers and outcomes, just drivers, or just outcomes. This should help clarify the clutter of too many arrows or unclear relationships where the arrow is not visible due to the offset of the variable name.	NN layout shows this AND the in/out flows are visible on the tooltip with the ability to filter
In cases where arrows overlap due to bidirectional relationships, this must be fixed in a way that it no longer overlaps, such as an offset.	Fixed
Shortest Path Ease of Use: a. Simplify steps from the current process, described here: i. Find and remember ending node's location ii. Activate Show Shortest Path toggle in top-left iii. Select starting node through either clicking on the node or using the search bar iv. Select ending node by clicking on the node Shortest Path Ease of Use: b) At present, we cannot use the search bar to select the ending node. At minimum, we need this update to include enabling this. Shortest Path Ease of Use: Include an option to clear the path selection or reset it by clicking an empty space, as well as maintain a dedicated cancel button. Shortest Path Ease of Use: Improving the visibility and design of the current cancel button would be appreciated.	Shortest Path now has new layout which resolves all this and more. Also, new feature on the tooltip after an NN search where you can choose a row from the table and click the shortest Path icon to trigger it

Task	Notes re: resolution
Static Force Diagram: a. We need the network force to be disabled and the nodes to hold static positions once the diagram has been fully loaded. Given varying load times, this should likely be based on the iteration count.	Done
Zoom In/Out Scale i. We need a way for users with trackpads to be able to zoom in/out. Currently if you zoom in it zooms the webpage in – not the diagram. Creating a sliding scale or another variation that would allow you to control the zoom of the diagram is needed.	Solved before I started!
Fixed Pop-Up Description Box i. Currently the description box for each variable is only visible when you are hovering over the variable. If the variable is clicked on, the box should stay so that the variable name can be copied and links can be provided in the description box. 1. Clicking the variable again should get rid of the box 2. If no variable is selected then the hover feature should remain	Done, much more functionality as well
Create Search Function for List View i. The list needs a way to search for a variable	Decided not to do? Could be done if you like (pretty quick) but I think all the other functionality means it might not be needed..
Searching for Variables i. The search for variables currently has to be exact. We would like to change this so that you can search for key words and widen the search so that misspelled terms will show the closest examples	Done
Bug Fixes - Address an issue where upon reset, 'Show directions' and 'Show neighbors' are active despite not being highlighted. We would like it to be highlighted whenever active. Bug Fixes - Upon reset, there is a period where "Hide Single Nodes" is not usable. Please identify and address the source of the delay Bug Fixes - In prior versions, dynamic scaling of the UI elements was causing issues, and a more static version was implemented as a workaround. This causes occasional issues where either (1) parts of the UI are cut off or (2) black bars can appear at the bottom of the screen on higher resolution monitors or in full-screen mode. Please revisit these and related areas to address both issues.	Either not relevant as it works in a different way or fixed (UI responsiveness)

Appendix C - Simple Test Script

Last checked by Bryony Miles - 17th June 2025

		Ok?
Initial Load	Macro view default Submodules + links visible + draggable 2 buttons - info (show/hide info), download (downloads screenshot) + help tooltip Zoom buttons - in, out, reset + help tooltip	
Macro + Meso		
hover	Highlights nodes, links and linked nodes, normal tooltip and expand/collapse helper tooltip nb: some parameters have no links	
click	Drills down in submodule/segment - hovering still works as expected Collapses to segment if parameter Highlights (or unhighlights) if parameter (and shows links if they exist)	
Shift/ command/alt + click	Collapses -> segment if parameter, -> submodule if segment	
Search box	Search for a node - if you select one it is highlighted	
Show Single Nodes + Show Arrows toggle buttons	Should work as expected. Show Single Nodes is reset to true after every search as search results is not aware of whether links exist or not	
MAIN		
Initial Load	Main view selected All nodes and links visible (after loading - which has animation) + draggable 2 buttons - info (show/hide info), download (downloads screenshot) Zoom buttons - in, out, reset Input Search box (Search for variables message) Hide/show single nodes (default = show, toggle on and off) + help tooltip Hide/show arrows (default = show, toggle on and off) + help tooltip Layout drop down (default selected) + help tooltip Hide/Show interactive menu button (automatically show if small screen) Interactive menu (can expand collapse as needed, all nodes selected, constantly in sync with nodes on the graph)	
Search input	Doesn't exist - nothing happens Exists - drop down appears, select from choices (fuzzy searching) On Select - chosen node flashing, nearest neighbours + links shown, labels for selected nodes shown, tooltip appears with NN HEADER + SP links, reset button appears After initial load - yes After NN - yes (if nn node selected + degree === 1 it maintains state) After SP - yes After interactive menu - yes, removes all previously selected nodes and reverts to NN status as above On Select After switching to Macro and back After switching to Meso and back	

Choose NN	Single nodes button hidden Search input text "Search for origin node" New slider with options 1,2,3 + circle reset button Info + download buttons still there Search for nodes to find the Nearest Neighbour message appears Perform a search Nodes appear, labels visible, url changes Hover shows links and linked nodes + single tooltip Degree slider ups the levels (or downs) Reset clears the search input Move to SP with input populated - top input same Move to Default with input populated and degree = 1 - all results shown and NN default behaviour Move to Default with input populated and degree > 1 - reset to nothing selected After initial load - yes From default where a node is chosen in NN mode (node populates search box) From default where there is a random selection - search box cleared From SP (no selection, or both selection) - search box cleared After switching to Macro and back After switching to Meso and back	
Choose SP	Single nodes button hidden Search input text "Search for start node" New input "Search for end node" + reset button Info + download buttons still there Search for nodes to find the Shortest Path message appears Search boxes work as normal Once you have a valid start and end node * no link - message appears at the top - There is no shortest path between the selected nodes * Link - nodes appear Reset - clears boxes When you have a path of nodes * nodes appear, labels visible * reset clears the search box * Hover node outline and individual tooltips After initial load - yes NN - yes (NN node in 1st box) search - yes (NN node in 1st box) interactive menu - yes, boxes cleared After switching to Macro and back After switching to Meso and back	
Select/ unselect from interactive menu	Unselected nodes have low opacity Labels appear on selected nodes (zoomed out) Tooltip appears with a list of all selected and NO HEADER or SP links After initial load - yes search - (yes, adds to current selection, turns off NN, clears search input) After NN - yes After SP - yes After switching to Macro and back After switching to Meso and back	

Node mouseover	White border, single node tooltip Expanded all - yes Interactive menu - yes Switch to Macro and back - yes After SP - yes After NN - yes	
Node click	1st degree NN search - reset and url link button appear	
URL search	NN - default - NND=~GDPPCP:1 NN - degree 1 from NN layout - NNV=~GDPPCP:1 NN - degree 2/3 from NN layout - NNV=~GDPPCP:3 SP - ?SP=~GDPPCP:~GDPADJ QV - various expanded (make your own) QV=submodule-7 QV=submodule-10_segment-10_dkl MV - various expanded - repeat	
UnselectAll	Only visible if no NN and some selected? Works as expected	

Tooltip	Single node - shows all data which is there from values in constants.js - currently 'NAME',"DISPLAY NAME", "Parameter Explanation", "SUBMODULE_NAME", "SEGMENT_NAME" Multiple nodes selected (but not NN) - … fields, small tooltip on hover Multiple nodes selected (NN) - header with NN node and both/direction toggle. SP column - click to see shortest path. Mouseover (fields won't show if no data) 	
Reset button	Resets to initial state	

Url link	NN search, SP search or Macro/Meso drill down - url is populated. Will open in this state in a new browser if copied, refresh clears it, limited functionality for reviewing parameter nodes in Macro + Meso	