JARRETT WALKER + ASSOCIATES

Let's think about transit

Request for Proposal

Transit Network Service Allocation Game

TIMELINE

The timeline for this project is as follows

- June 24: RFP Available and advertised.
- July 1: Proposals due at Noon Pacific Time.
- July 3: Notice of successful proposer.
- July 26: Draft operable product due. 50% of project cost can be invoiced.
- Final product due one week after receipt of all comments. Remainder of project cost invoiced.

PURPOSE AND PRINCIPLES

The Service Allocation Game is one of a number of tools for enabling citizens to understand public transit debates and provide relevant and effective input on them. The core idea of games such as this is to engage the citizen in understanding and solving the actual planning problem facing the agency.

These are games in the sense of problems to be solved, and some people will find them fun, but they have no "win" condition. They are simply ways of expressing a view about transit that tests that view against the reality. Like "balance the state budget yourself" tools that newspapers sometimes provide, these tools prevent the user from simply asserting desires and demands, but instead require the user to explain how these are to be paid for.

Jarrett Walker + Associates routinely develops and uses these tools for use in workshop and training settings. In these situations, citizens or students are around tables in groups of six, working on the problem together. In those cases the game board is on a large poster under a sheet of clear Mylar, and the problem is solved by drawing on the Mylar and sometimes tabulating the costs of the group's choices using a spreadsheet.

The problem to be solved, then, is how to take one of these games – already successful in workshop format – and translate it into something that a citizen can "play" on a website. The purpose is to gather input from a much broader range and number of people than will ever attend a workshop event.

LOCAL SERVICE ALLOCATION GAME: BASICS

In this particular game, the problem to be studied is the allocation of local fixed-route bus services across a city. The game does not address the allocation of express services or light rail, just the continuous local services that cover most of a city, and whose deployment requires a series of tradeoffs about how to distribute these resources over a city.

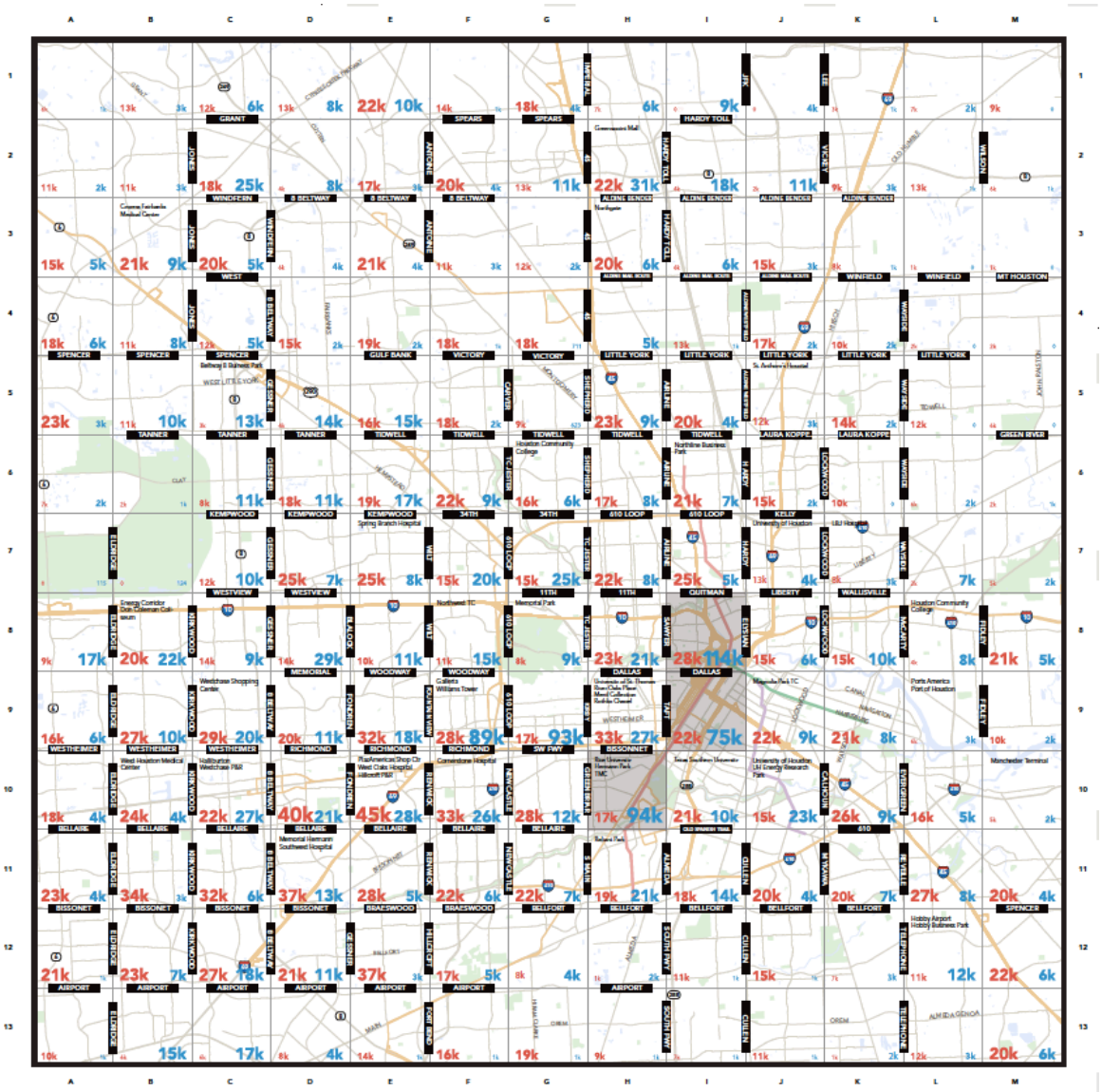


Figure 1. Existing Game Board

The current application is being developed for Houston METRO, but must be readily adaptable in the future to other cities.

The existing gameboard, as used in the workshop, is attached at full resolution, and also appears on the previous page as Figure 1. The ultimate task is to take a budget of 250 points and divide it among all of the cells of the board. Also attached is the spreadsheet groups used to track their budget at a recent workshop in Houston. *The online version of the map does not need to look like this, but must do what this gameboard does.*

In this case, we have defined cells that are 2 miles on a side, so as to cover the enormity of Houston with a manageable number of zones. The cells could easily be understood as forming a spreadsheet, where a running total advises the player how much of the budget has been spent. A background map layer, beneath the “spreadsheet”, would provide the necessary geographical

references to understand where each cell is. Note however that we also prominently label cell boundary streets, main landmarks in each cell, and the population (red) and jobs (blue) in each cell. All these outcomes would need to be included.

If this was all we wanted, the product would just be a transparent spreadsheet with a map behind it. However, we want an additional layer above this, in which the user chooses a particular type of service to offer in each cell, and experiences the cost in the cell as a result of that choice.

How Services Generate Cost

The user will be advised to think about the transit in a cell as consisting of three elements combined:

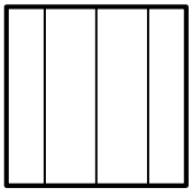
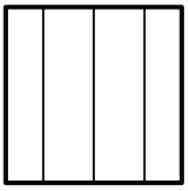
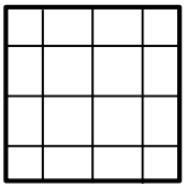
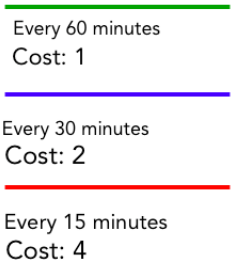
 1/2-mile spacing Cost: 1  1/4-mile spacing Cost: 2	**Spacing** Spacing is the distance between each local bus route. Spacing is also what controls how far a person has to travel from their origin point to where they board the transit vehicle. Theoretically, any spacing is possible, and the product should include the ability to run spacing from 1/4 mile to 2 miles. Cost doubles with spacing, so 1 mile spacing is twice the price of two mile spacing.
 Radial (1-directional)  Grid (2-directional)	**Direction** The direction of service controls which adjacent cells can be reached by taking transit. This whether bus routes run from one end of the cell to the other (radial), or in both directions (grid). If the player selects a grid, this enables transferring. This category is a multiplier- it costs twice as much to run service in both directions as it does in one direction,
 Every 60 minutes Cost: 1 Every 30 minutes Cost: 2 Every 15 minutes Cost: 4	**Frequency** How often the bus comes. Cost doubles as frequency doubles. These colors are used to draw service on the gameboard, in order to distinguish frequency.

Figure 2. Dimensions of Service

Each cell's cost is equal to the spacing the player selects, times the direction, times the frequency.

Spacing	x	Direction	x	Frequency

Figure 3. Cell cost.

So if a cell has 1/2 mile-spaced grid service running every 15 minutes, it costs 8, equal to 1 (the spacing cost) x 4 (the frequency cost) for both directions.

Players may wish to allocate grid service to cells with different spacing and frequency in each direction. This is allowed. Players may also want to divide a cell and treat different parts of it differently. This is probably not feasible in a first phase, but see "Possible Embellishments".

Examples

The image to the right shows some of the example service allocations we have provided to players in the past. The colors represent the various frequencies, the lines the spacing and direction, and the number the total cost of the cell. In the online version of this came, we envision an expanded version of this (perhaps including the ability to run different frequencies in each direction) as a menu, from which users would drag and drop service types onto individual cells.

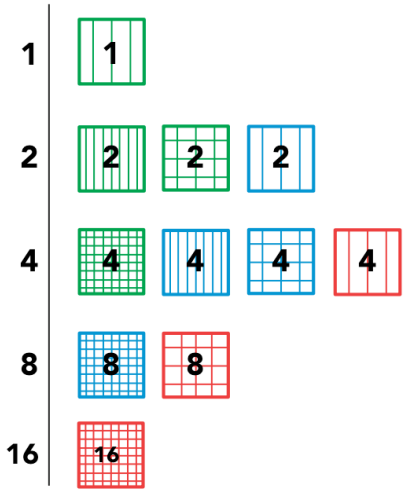


Figure 4. Example Cells and Costs.

The design challenge at this level, then, is to provide a series of drag and drop tools that enable a user to build some permutation of these three variables, create a simple schematic network graphic like the ones above, and then drag this into a cell.

It must be easy to select multiple grid squares and assign the same service pattern to all of them.

Important: While the lines in adjacent cells will line up with each other, and a sense of network may emerge, the user is not assigning bus service to specific streets or thinking about the exact pattern in which buses would run. We want to develop another game that goes to that level, but for now, this is simply about how understanding how basic variables must be chosen to define the level of service in a cell, and how this will affect the kinds of access that the network will provide. The user should be able to figure out that if they choose, say, a 1/2 mile spacing of parallel routes, this will likely put routes on certain streets in the cell and not others, but the game does not explain or illustrate that at a local level. This limitation on detail is intentional. It's part of how the game helps the user stay at "high altitude," seeing the entire city and the citywide tradeoffs rather than getting into details of how a bus should route through a particular neighbourhood.

The principle of "high altitude" is the answer to most other questions about details someone might want to add. If we haven't presented it here, we don't need it and may well not want it (but see "Possible Embellishments")

SOFTWARE FUNCTIONS

This section describes the various functions necessary to the utility of the software.

1. **General Guidelines**

   This product must be written in an open-source format such as HTML 5; the vendor cannot own the platform. This should be easily hosted on a web page, where users can play the game without being required to download any software. The purpose of this game is to provide a simple, easy-to-use, and comprehensible method for people to make choices about transit; we facilitate that by making access to the game as painless as possible.

2. **Back End Administrator Interface**

   2.1. Base map and grid overlay: the administrator must have the ability to choose the geographic scope of the game, and to overlay the 2-mile grid by which the game is played. The immediate priority is to duplicate the map and grid in the existing Houston exercise, but future uses of the tool will likely concern other locations.

   2.2. Data

   2.2.1. Job and population data are important factors weighed by participants in making decisions about where to assign transit service. The back-end user of this product should be able to upload job and population data for a city, correlated to the grid overlay. These data already exist for Houston as spreadsheets referenced to the map coordinate system, and as tables correlated to cells by unique identifying numbers.

   2.2.2. The administrator can enter a predefined budget. In the Houston exercise, the budget was 250. This may vary in future uses of this game.

   2.2.3. The software should include some basic analysis of players' allocation: the percentage of the jobs and population covered by: 60 minute, 30 minute, and 15 minute service. In this case, "coverage" means that if a cell has any transit service allocated to it, it is considered "covered" by the frequency of service assigned to it. If a cell has multiple frequencies (running in each direction), it is considered "covered" by the highest frequency present in the cell.

   2.3. Output: this is what is returned to us, not what the user sees.

   2.3.1. When a player has exhausted the game budget, they should be prompted to submit their session, and provided a field for general comments.

   2.3.2. Completed user sessions are output in a format compatible with Microsoft Excel. Output should include the budget assigned to each grid cell, as well as the coverage information. In the Houston example, the data produced by each group were formatted as shown in Figure 5. Here, the

Main Houston

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	0	0	0	0	0	0	1	0	0	1	0	0	0
2	0	0	2	0	0	0	2	6	1	1	0	0	0
3	0	1	1	0	1	0	0	2		0	0	0	0
4	0	1	1	0	1	1	0	1	0	0	0	0	0
5	0	0	1	1	1	1		1	1	0	0	0	0
6	0	0	0	2	2	2	2	2	2	1	0	0	0
7	0	0	0	2	2	4	4	2	2	1	1	0	0
8	0	6	1	4	2	2	2	6	D	2	2	1	1
9	0	4	6	2	6	1	1	8	D	4	2	0	0
1	0	2	6	6	1	8	4	T	4	2	2	1	0
1	2	2	4	6	4	1	1	2	4	1	1	2	1
1	2	4	6	4	4	1	0	1	0	1	0	2	1
1	0	0	0	0	0	0	0	1	1	0	0	0	1

number in each cell corresponds to the value of the service type assigned there on the game board.

2.3.3. Output should include general comments. This information should be retained so that it is associated with the finished game board, either directly or using a unique identifier.

Figure 5. Player Output

3. Front End User Interface

3.1. Tutorial and walkthrough of game goals, interface and scoring.

3.2. The user interface displays the base map and grid overlay. The grid overlay must be referenced alphabetically across the X-axis and numerically across the Y-axis. As mentioned in the "Local Service Allocation Game: Basics" section, *the user interface does not need to look like the existing iteration of the game, but must replicate its function,*

3.3. The base map seen by the user must clearly label major streets and cell boundary streets, highways, and destinations, as in the Houston example, attached. The design of this reference information need not duplicate the look of the prior iteration of this game; *it must, however, duplicate the function by showing players clearly the relative boundaries of each cell.*

3.4. The population and job numbers are displayed in their corresponding grid cells, proportionally scaled; their display can be toggled on and off.

3.5. Users select service types from a menu, which can be dragged to grid cells on the map. Figure 4. Example Cells and Costs. provides examples of service types, which can be assigned to cells. This menu should provide an expanded version of the choices from Figure 4, including the option of running different spacing and frequency in each direction.

3.6. The user interface displays the total budget, amount spent, and amount remaining. As players drag service to cells, the budget is depleted based on the cell cost of each type of service. Players are prevented from assigning service that would result in a negative budget

3.7. Game Submission

3.7.1. When the entire budget has been allocated, the software should prompt the player to submit their completed service allocation.

3.7.2. The submission form should have a field for general comments. This information should be retained so that it is associated with the finished game board, either directly or using a unique identifier.

4. Software provider should specify if they can host the website themselves or prefer it hosted on the transit agency website. We prefer the former, with a link to your hosted site being placed on the transit agency website. Traffic will not be heavy: Anticipate no more than 1000 visits/day.

POSSIBLE EMBELLISHMENTS

The following embellishments are not necessary and should not be included in your base price unless your approach makes them easy. However, if your approach can be easily adapted to achieve these things in the future, please note that.

1. While the Houston implementation covered here can use the grid of 2-mile squares, the game would ideally be adaptable, without too much redesign, to cities where the grid

squares are other sizes. This will affect the appearance and costing of the various schematic network types, as the line spacing is based on fractions of a mile.

2. If the scale of the grid were a flexible attribute, another method of assigning service other than drag-and-drop would be preferable. Ideally, players would be able to select multiple cells and assign them all with a uniform service type. Alternatively, the player would be able to select the service type first, and then "paint" it across multiple cells.
3. While this is not critical for the deadline use of this product in Houston (because the data has already been processed), having the ability to upload job and population data such that it would be automatically normalized to the 2-mile grid is highly desirable for future uses of this tool.
4. One desirable embellishment would be to dispense with grid squares and allow the user to divide the map into areas however they like (presumably by drawing boundaries with a mouse) and assign service levels to them. Costs would then be calculated based on the area to which each pattern is applied.

OWNERSHIP

The game is based on game-board materials and rules that are the intellectual property of Jarrett Walker + Associates. For the immediate Houston project, we anticipate that JWA would purchase the design from the software provider and implement it on the transit agency's website. The product would remain JWA property, but a software-as-service arrangement could easily emerge in the future in which the software designer also assisted JWA with installation and customization for other transit agency clients.

HOW TO RESPOND

A simple letter proposal will suffice. Please email (to Evan Landman, evan@jarrettwalker.com) a brief letter proposal specifying:

- Your name or firm name.
- Resumes and other evidence of relevant experience.
- If you are a firm, the specific staff to be assigned, and their resumes.
- Samples or links to previous work. Links to active sites are preferred.
- References. Please specify up to two former clients that we can contact to discuss your work. These can also be people for whom you did projects in an academic setting.
- Your approach to the task. A few paragraphs about the tools and methods you would use to create the product.
- A statement that you agree to all conditions and requirements specified in this RFP, except as specifically indicated in your letter.
- Proposed cost.
- Proposed embellishments above the basic scope, and their cost, if they are also deliverable by the deadline.
- Any other caveats about our legal relationship, ownership, and so on.

Important: Please focus on the specific requirements of this task, understanding that both cost and time are of the essence. While the selected vendor could end up in a longer-term relationship with JWA developing similar tools and assisting client transit agencies in implementing them, this will only happen by way of success with the immediate task before us.

SELECTION CRITERIA

The successful proposal, combined with possible input from references, will convince us that

- You can deliver this product on time and in budget
- You have the availability to proceed with the work on its rushed timeline.
- You understand both the larger purpose of the project and the specifics of our request
- Your proposed cost is the lowest that offers us excellent value and satisfies the items above, and does not exceed $9000 maximum. A preliminary rough costing by one respondent came in around $7500. A still-lower cost will of course be attractive, but only if we are convinced of your ability to deliver on time and with the necessary quality.
- We may express some preference for proposers in Portland, Oregon with whom we could work face-to-face, and more broadly for proposers in nearby time zones for ease of communication. However, we are open to proposals from elsewhere. The cost and transaction must be in US dollars.

QUESTIONS

To ask questions, please go to ___ [posting website]. Leave your question in the form of a comment. NOTE: Please begin your comment by assigning your question a number that is one up from the highest question number already there. In other words, begin your comment with "Question 1:" or whatever the next number is. We will respond in a comment referencing that number. Comments are not threaded but will be easily tracked in this way.