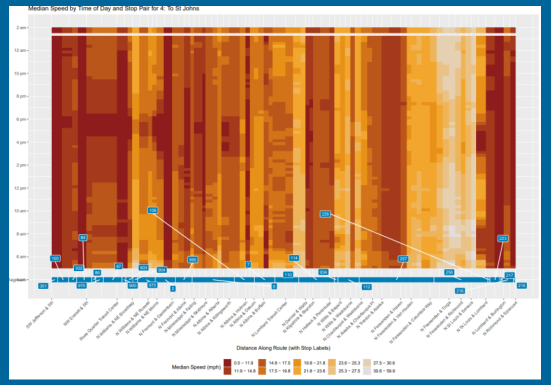
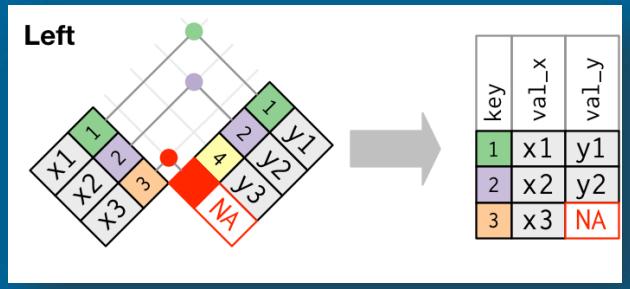
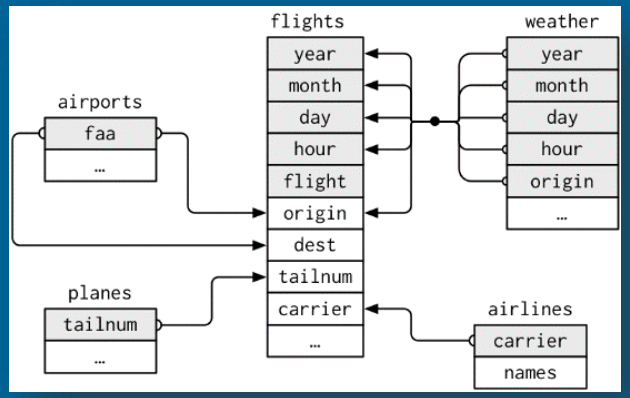
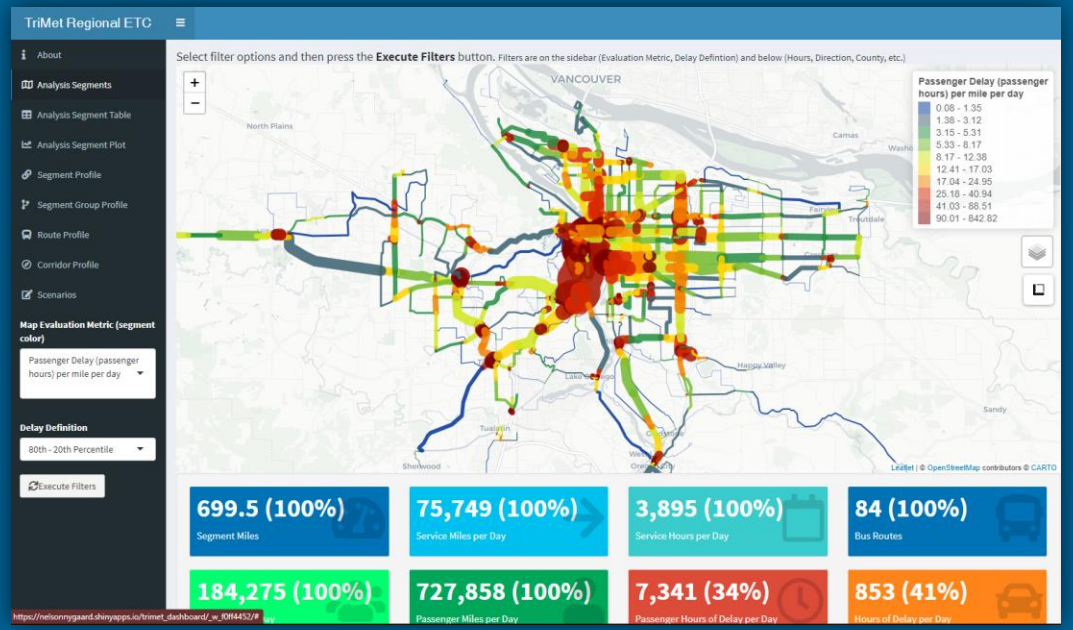


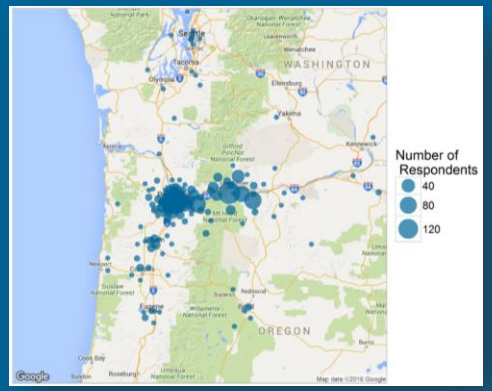


R for Transportation Planning at Nelson\Nygaard

Presented by: Bryan Blanc
August, 5th, 2020



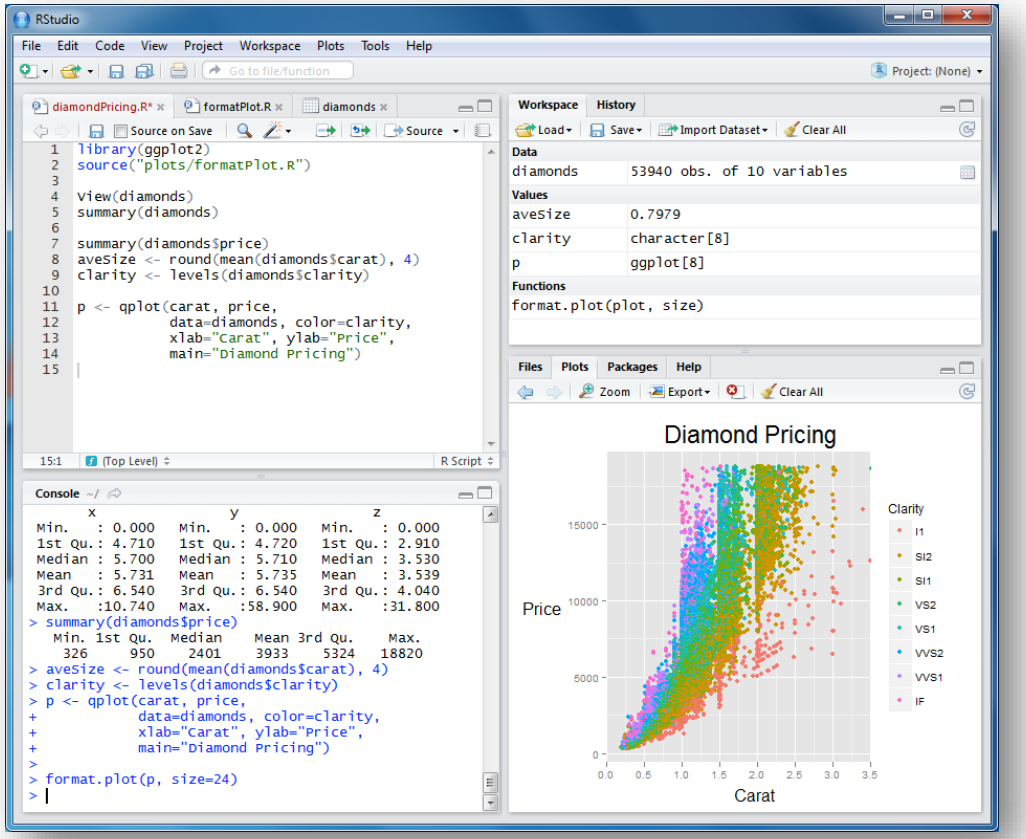




NELSON NYGAARD

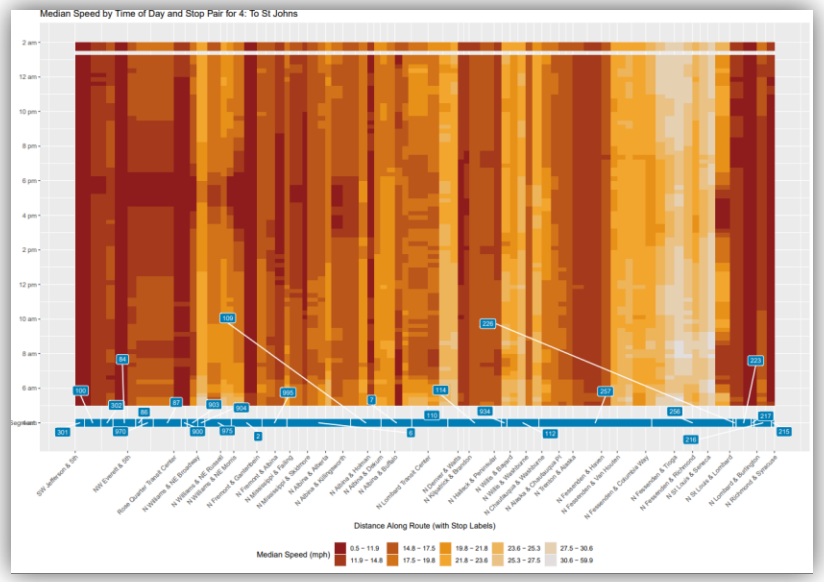
WHAT IS R?

- R is an open source programming language for data science.
- One of two most common languages for data science (other being Python)
- Can be used for all sorts of programmatic data tasks:
  - Statistical analysis
  - Visualization
  - Mapping and geoprocessing
  - Data cleaning
  - Database querying
  - Repetitive procedures
  - Interactive web applications (with Shiny)
  - Programmatic documents (with Markdown)



WHY USE R FOR TRANSPORTATION PLANNING?

- Most transportation planning projects involve data
  - Surveys (e.g., public involvement)
  - Transit operations (e.g., ridership, performance)
  - Safety (e.g., crashes)
  - GPS and location data (e.g., bike share trips)
  - Demographics and socio-economics (e.g., Census or ACS data)
  - Web data sources – APIs (e.g., Google, car share, bike share)
  - … others

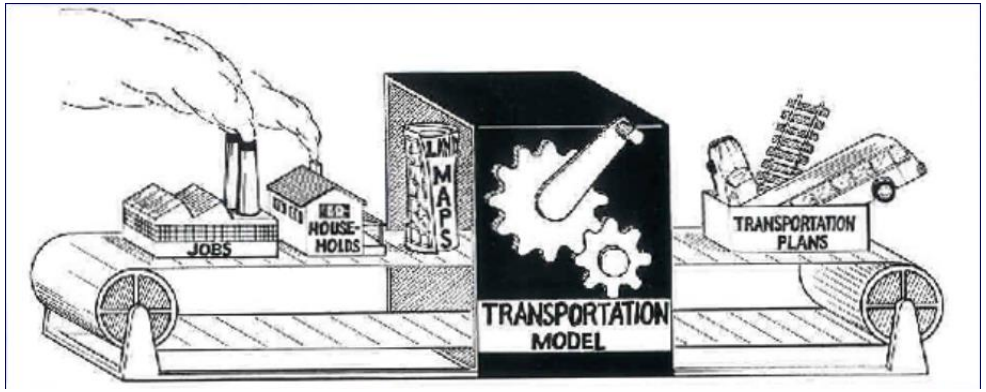


OK… BUT WHY R INSTEAD OF EXCEL (OR OTHER TOOLS)?

- Larger datasets (millions or tens of millions of rows are fine)
  - Billions of rows also fine but would need a database setup
- Reproducible workflows
  - Repeated analyses
  - Plot templates
  - Dynamic reports
- Non-numeric data and/or missing data (Excel is poor at handling these)
- Automatable data cleaning and management
- More customizable data visualizations
- Keep spatial and non-spatial analyses in the same environment
- Developing web dashboards

GREAT! BUT WHY ISN'T EVERYONE ALREADY USING IT?

- Steep learning curve – especially for those with little or no scripting experience
- Up-front time investment – making a plot or doing a statistical analysis isn't always as quick as Excel, especially for small datasets
- Excel is most familiar data software for most people.
- R can be a Black Box




```r
##  Set the working directory
##  You need to change the address to your own working directory.
setwd("~/Dropbox/tutorial/")

####################
##  Import a csv file
####################

##  Read the help file if you need to change the default setting.
?read.csv

##  read.csv is the function to import a csv file.
##  Make sure the file is in your working directory.
mydata = read.csv("beer.csv")

##  To see the data matrix
View(mydata)

##  To see the variable names, each column is a variable in the dataset
colnames(mydata)

## You need to create every variable for future use.
## R only knows "mydata" as a matrix and doesn't know any working variable.
nbeer = mydata$nbeer
weight = mydata$weight
height = mydata$height
age = mydata$age
gender = mydata$gender
```

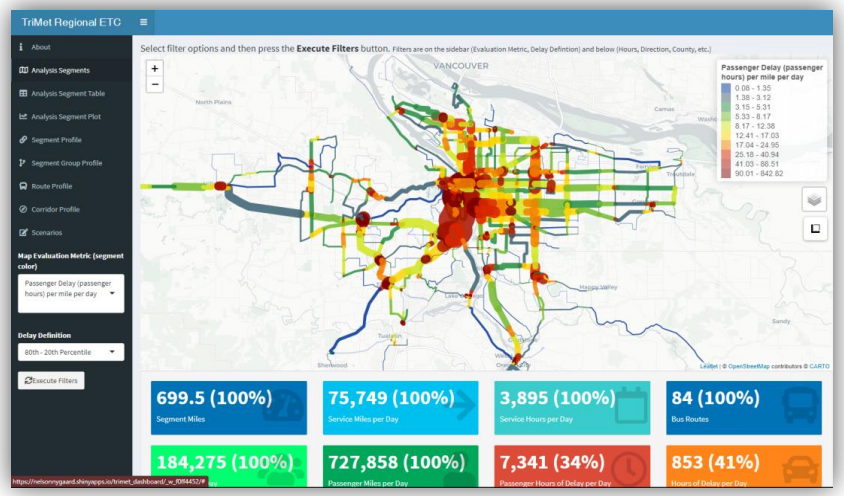
SHINY DASHBOARDS

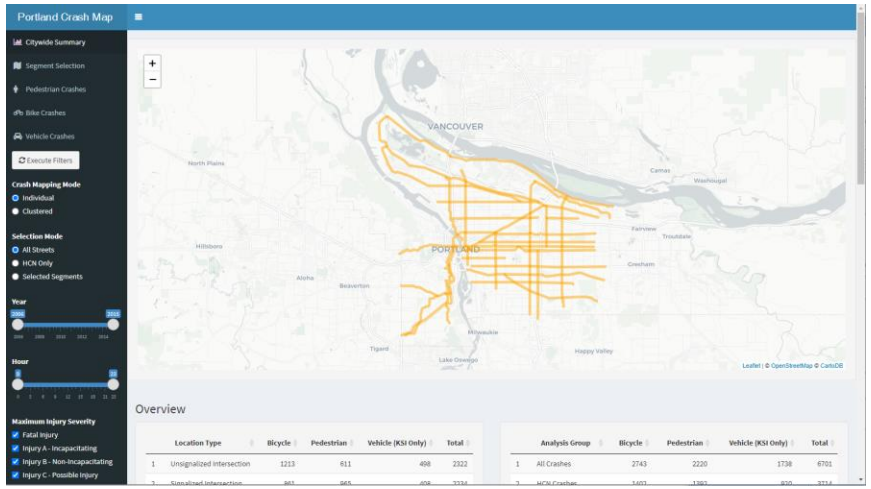
- Of particular interest to NN staff and clients are Shiny dashboards – these are relatively quick to develop web tools for querying, analyzing, and visualizing data
- Example – TriMet ETC dashboard:

https://nelsonnygaard.shinyapps.io/trimet_dashboard/

- Example – PBOT Crash dashboard:

https://nelsonnygaard.shinyapps.io/portland_crash_map/





BRYAN'S ROLE

- Bryan is back at NN through mid-October (TBD following that) to both work on R supported projects AND to build internal capacity with R at Nelson\Nygaard
- Will be giving a 10-week training 'course' to interested staff
  - ~1 hour weekly webinar, 2-3 hrs per week assumed for readings and self-learning
  - Expectation of additional work on your own Shiny app for one of your projects (to-be-identified)
  - Encouraged to do additional reading and self-learning in personal time
  - Do not have to attend every webinar, will be recorded, but strongly encouraged to attend all Shiny webinars because of practice app building component
- All course content will reside on a live website, which will be updated as we go along with new content (and recordings): https://perkinsandwill.github.io/nn_r_training/

PROPOSED TOPICS

Schedule

Week #	Week Start Date	Week End Date	Hours Available	Webinar Topic	Webinar Date	Webinar Time
1	July 20, 2020	July 24, 2020	4	No webinar, training prep time		
2	July 27, 2020	July 31, 2020	4	No webinar, training prep time		
3	August 03, 2020	August 07, 2020	4	Firmwide discussion of using R for NN project work. Presentation in recurring town hall.	August 05, 2020	12:00 PM
4	August 10, 2020	August 14, 2020	4	Tidyverse Introduction in R	TBD	TBD
5	August 17, 2020	August 21, 2020	4	Shiny Dashboard Training Session 1	TBD	TBD
6	August 24, 2020	August 28, 2020	4	Geospatial Data in R	TBD	TBD
7	August 31, 2020	September 04, 2020	4	Shiny Dashboard Training Session 2	TBD	TBD
8	September 07, 2020	September 11, 2020	4	Census, TIGER, and LODES data in R	TBD	TBD
9	September 14, 2020	September 18, 2020	4	Shiny Dashboard Training Session 3	TBD	TBD
10	September 21, 2020	September 25, 2020	4	GTFS data in R	TBD	TBD
11	September 28, 2020	October 02, 2020	4	Shiny Dashboard Training Session 4	TBD	TBD
12	October 05, 2020	October 09, 2020	4	R Markdown training session	TBD	TBD
13	October 12, 2020	October 13, 2020	2	Question Session	TBD	TBD

NEXT STEPS IF INTERESTED IN COURSE

Note that this course is intended for particpants with some programming experience, ideally (but not necessarily) in R. If you do not have that experience but have interest, please fill out the survey anyways so we can engage you about future training opportunities.

1. Ask your team leader if you can participate in the training.
2. Fill out interest survey (includes questions about experience level)
3. Fill out availability survey for weekly webinar time slot
4. Think about and talk to PMs and your team leader about a basic Shiny app you could develop as part of a project, or as a supplement based on data from one of your projects.
5. If you can find time, start reading R for Data Science (freely available online).
6. Ask Cristobal to install R and Rstudio on your machine. Some helpful installation notes are here.
7. Once scheduled and all participants are identified, invites will be sent for initial webinar (week of August 10th)

THANK YOU!

Bryan Blanc

@Bryan on Slack

bblanc@nelsonnygaard.com