Scenario Planning with Data On Steroids

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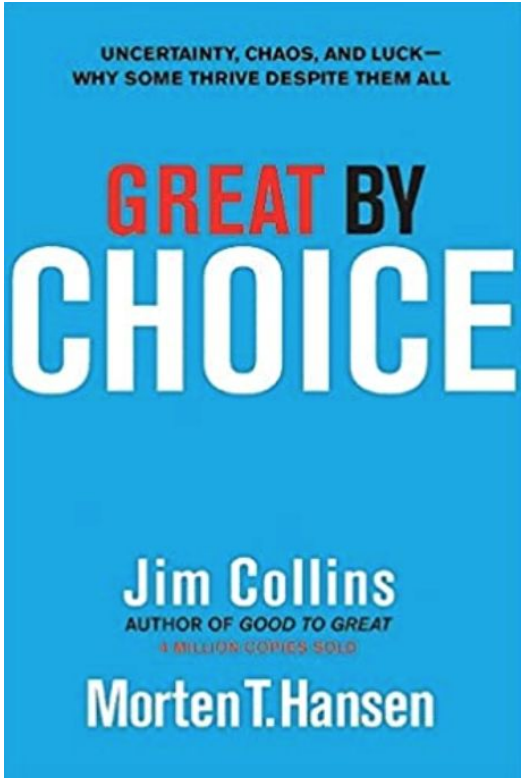
There is No “New Normal”

We believe there will be no new normal. There will only be a continuous series of not normal times. ***The dominant pattern of history isn’t stability, but instability and disruption****.*



Supply Chain Disruption

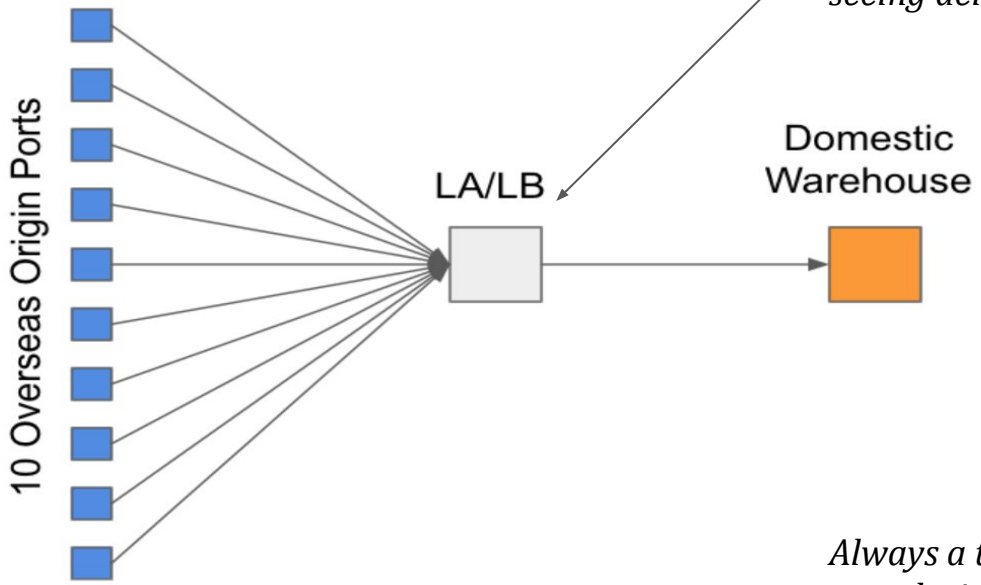
The ports of LA/LB have faced considerable delays over the past year.

In order to estimate the impact of port delays on supply chains we can use MC's.

And we can build these MCs with R.

Photo 191733456 / Cargo © Sheila Fitzgerald | Dreamstime.com

Understanding the System Flow



In this demo, this is where the delay is happening… it reality, we are seeing delays everywhere...

~x units are ordered from each origin node each day...

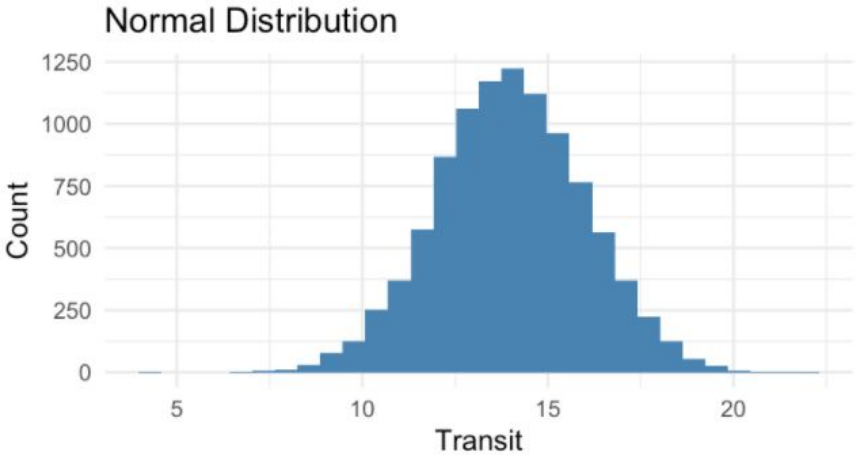
Always a trade-off between complexity and usefulness. All models are wrong...

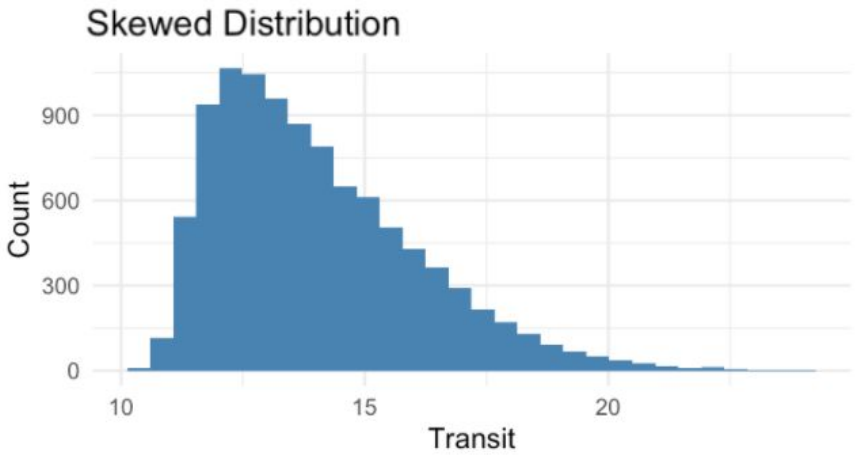
Understanding Variability in Components of the System

Distributions are the building blocks

The speed through each component of the supply chain is variable. Each has a distribution of speeds over time.

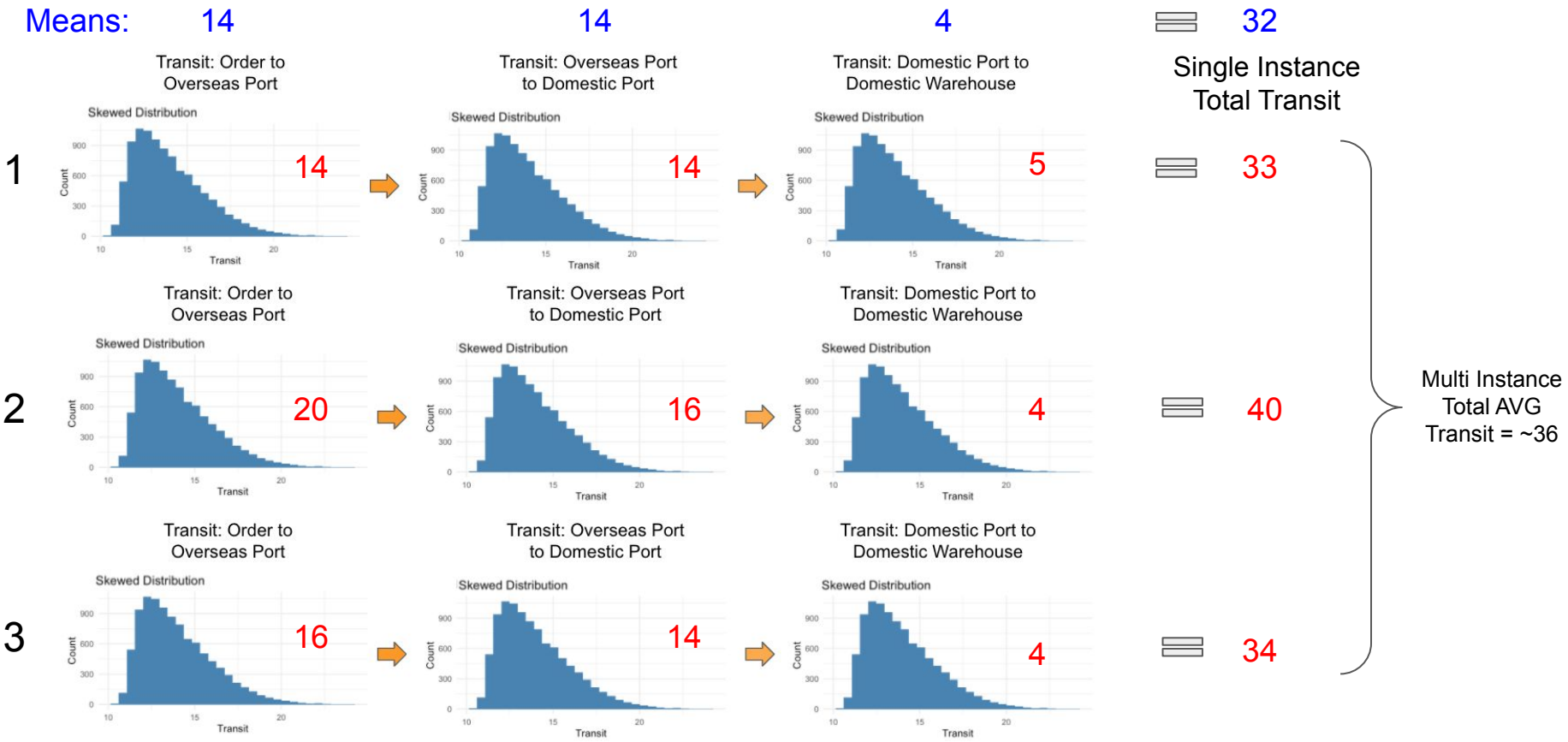
Instead of using averages, looking at distributions gives us a better understanding of possibilities when considering alternative futures.





Understanding Variability in Components of the System

Sample sequence of distributions



Framework for Repetition

What does the data look like for a single instance?

date_range	order_volume	order_oport	oport_dport	dport_dwhse	the_full_transit	dwhse_arrival_date
2020-12-01	1002	12.83476	15.55464	3.765540	32	2021-01-02
2020-12-02	999	13.37339	15.58531	3.882902	33	2021-01-04
2020-12-03	1000	17.29094	15.74620	3.424605	36	2021-01-08
2020-12-04	999	14.78484	12.89926	2.889395	31	2021-01-04
2020-12-05	1001	14.04611	14.75850	3.180346	32	2021-01-06
2020-12-06	999	13.34096	15.43478	4.048189	33	2021-01-08

dwhse_arrival_date	dwhse_arrival_volume
2021-01-02	1002
2021-01-03	0
2021-01-04	1998
2021-01-05	0
2021-01-06	2002
2021-01-07	0

Framework for Repetition

What if you did it over and over again?

dwhse_arrival_date	dwhse_arrival_volume
2021-01-02	1002
2021-01-03	0
2021-01-04	1998
2021-01-05	0
2021-01-06	2002
2021-01-07	0

dwhse_arrival_date	dwhse_arrival_volume
2020-12-28	999
2020-12-29	1001
2020-12-30	0
2020-12-31	1000
2021-01-01	0
2021-01-02	0

dwhse_arrival_date	dwhse_arrival_volume
2021-01-01	1999
2021-01-02	1001
2021-01-03	2000
2021-01-04	0
2021-01-05	2001
2021-01-06	0

Framework for Repetition

The pipeline...

After X number of iterations, inspect the results

dwhse_arrival_date	dwhse_arrival_volume
2021-01-02	1002
2021-01-03	0
2021-01-04	1998
2021-01-05	0
2021-01-06	2002
2021-01-07	0

Distribution

Distribution

Single Instance

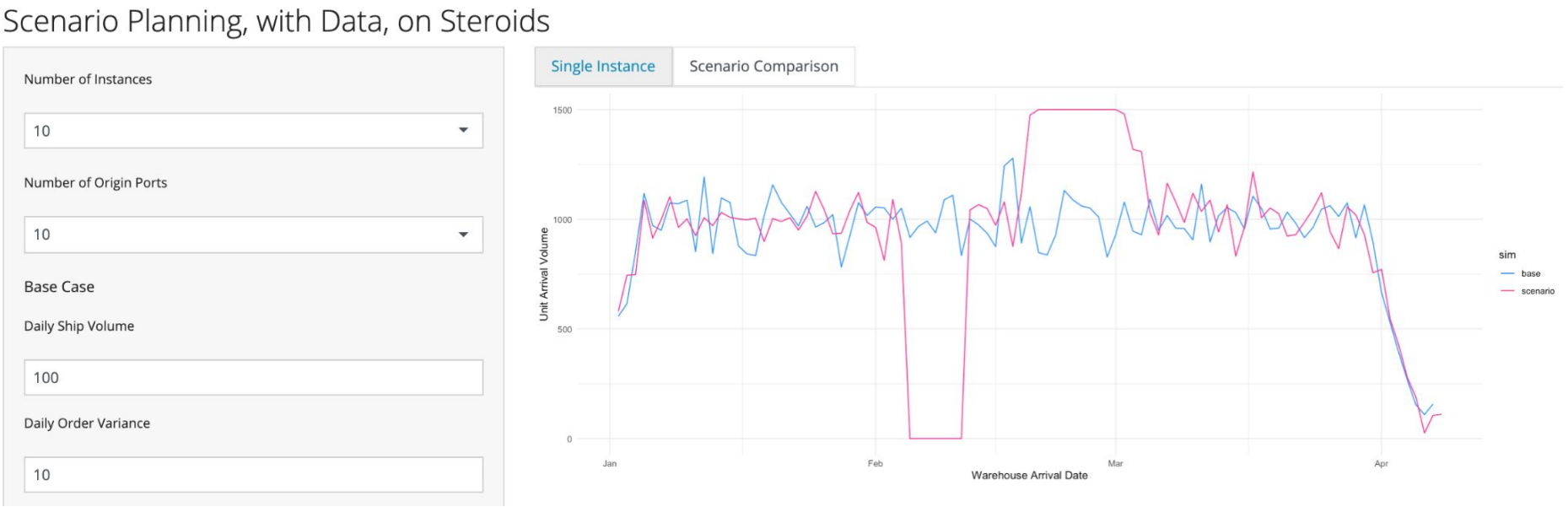
Distribution

Add to a Master DataFrame

dwhse_arrival_date	dwhse_arrival_volume
2021-01-06	0
2021-01-06	1999
2021-01-06	0
2021-01-06	0
2021-01-06	1999
2021-01-07	1999
2021-01-07	1000
2021-01-07	0
2021-01-07	3002
2021-01-07	1001

Exploring Scenarios

Now it's time for what-ifs



One of the easiest and most engaging ways to demo the results for users is via Shiny. But, all of you already knew that :) https://lazo-labs.shinyapps.io/port-delay-sim-app/