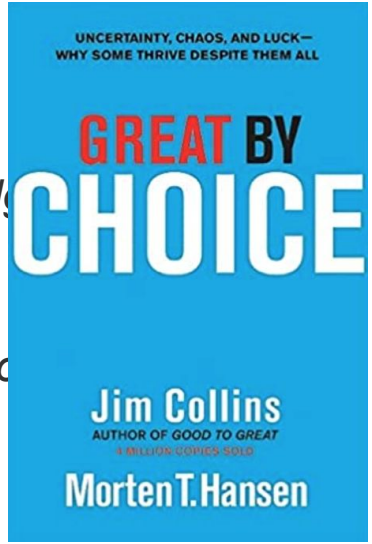
Scenario Planning with Data on Steroids

# There is No ‘New Normal’

*The best leaders and organizations plan for multiple futures and hedg*

*One tool that can assist in scenario planning is Monte Carlo simulatio*

*It is scenario planning, with data, on steroids.*



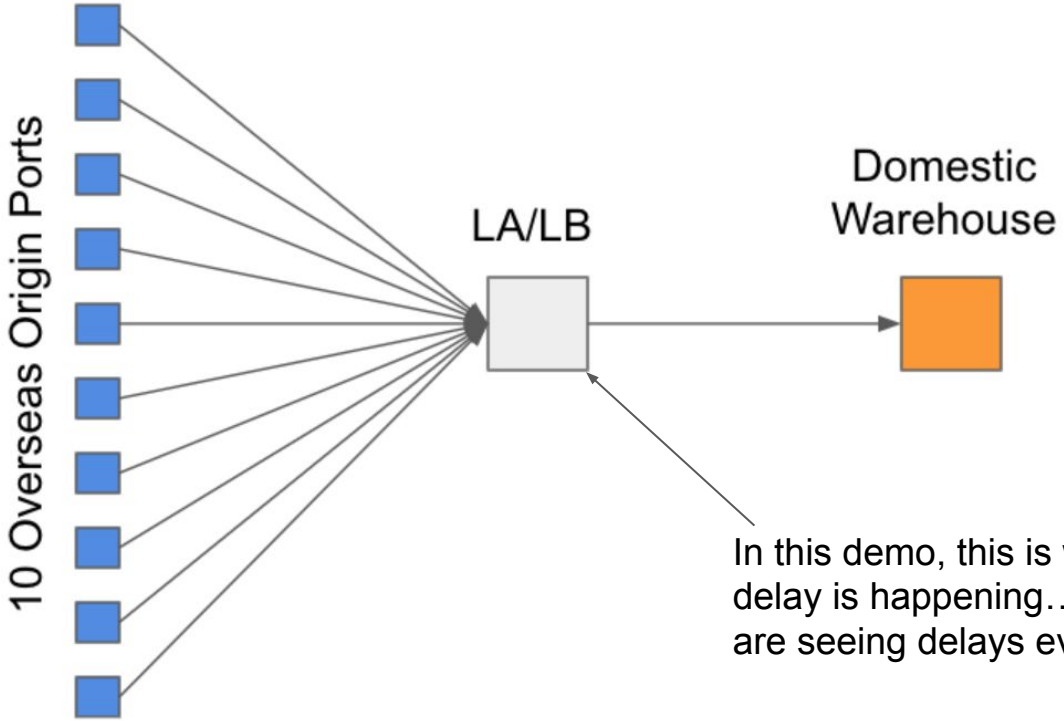
# Supply Chain Disruption

*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.*

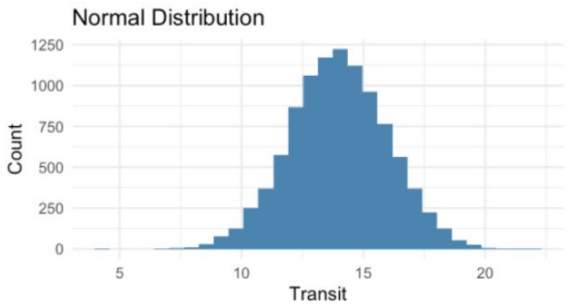
*And we can build these MCs with R.*

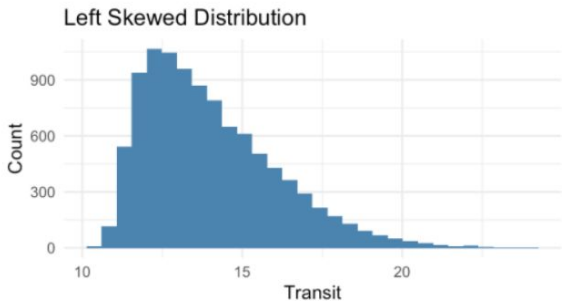
# The Chain


10 Overseas Origin Ports
LA/LB
Domestic Warehouse
In this demo, this is where the delay is happening… it reality, we are seeing delays everywhere...

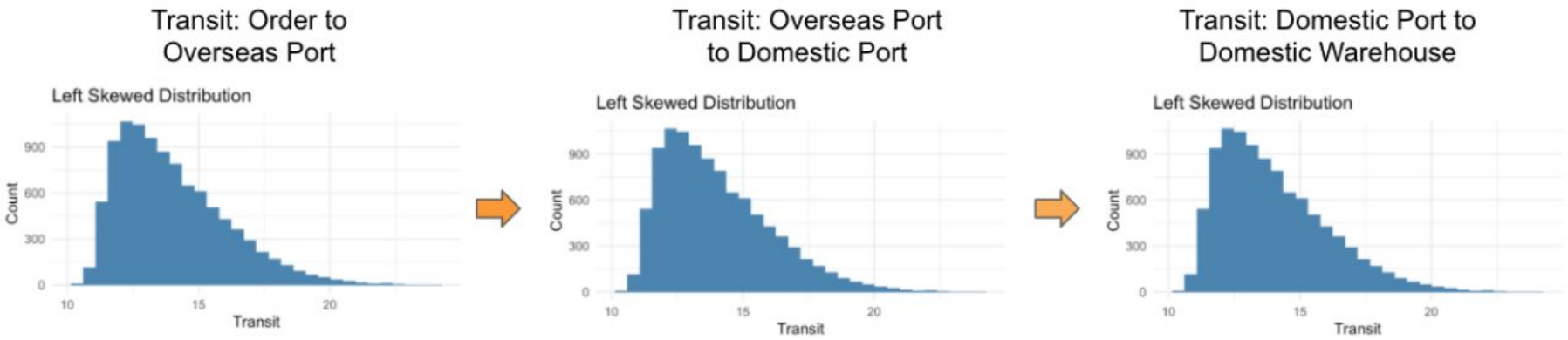
# Foundational Building Blocks: Distributions

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



# Series of Values from Distributions



# What does the data look like for a single instance?

| | volume | start_date | order_oport | oport_dport | dport_dwhse | the_delay_seq | full_transit | arrival_date |
|---|---|---|---|---|---|---|---|---|
| 1 | 100 | 2020-12-01 | 14.71723 | 15.72737 | 3.350394 | 0 | 34 | 2021-01-04 |
| 2 | 100 | 2020-12-02 | 14.01304 | 15.67353 | 3.554470 | 0 | 33 | 2021-01-04 |
| 3 | 100 | 2020-12-03 | 12.99584 | 14.76768 | 3.464123 | 0 | 31 | 2021-01-03 |
| 4 | 99 | 2020-12-04 | 13.51178 | 12.86563 | 5.363727 | 0 | 32 | 2021-01-05 |
| 5 | 99 | 2020-12-05 | 15.45398 | 14.00009 | 4.245830 | 0 | 34 | 2021-01-08 |
| 6 | 101 | 2020-12-06 | 13.87381 | 13.49176 | 5.024287 | 0 | 32 | 2021-01-07 |

| | arrival_date | arrival_volume |
|---|---|---|
| | *<date>* | *<dbl>* |
| 1 | 2021-01-04 | 1992 |
| 2 | 2021-01-05 | 1799 |
| 3 | 2021-01-06 | 1794 |
| 4 | 2021-01-07 | 2308 |
| 5 | 2021-01-08 | 2097 |
| 6 | 2021-01-09 | 1198 |

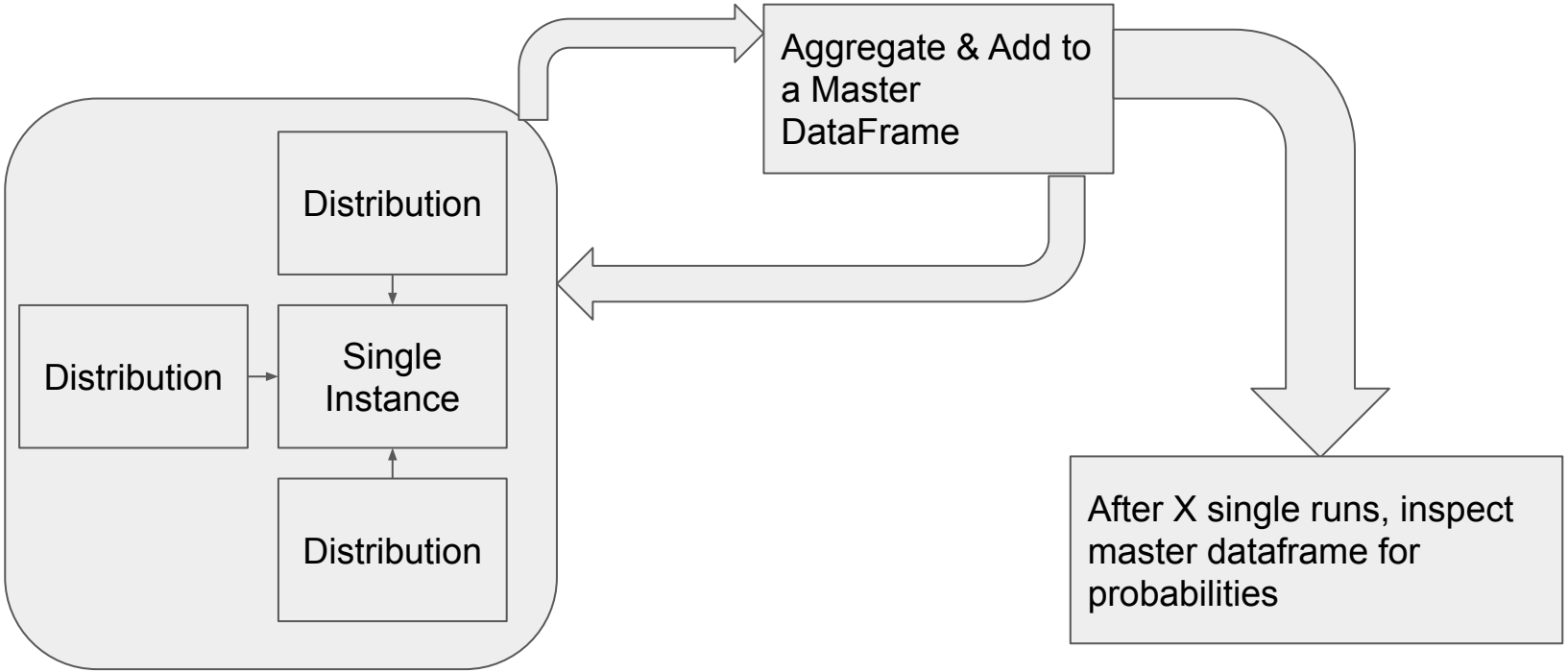
# What if you did that over and over again?

| | arrival_date | arrival_volume |
|---|---|---|
| | <date> | <dbl> |
| 1 | 2021-01-04 | 1992 |
| 2 | 2021-01-05 | 1799 |
| 3 | 2021-01-06 | 1794 |
| 4 | 2021-01-07 | 2308 |
| 5 | 2021-01-08 | 2097 |
| 6 | 2021-01-09 | 1198 |

| | arrival_date | arrival_volume |
|---|---|---|
| | <date> | <dbl> |
| 1 | 2021-01-04 | 1792 |
| 2 | 2021-01-05 | 1698 |
| 3 | 2021-01-06 | 2496 |
| 4 | 2021-01-07 | 1897 |
| 5 | 2021-01-08 | 2294 |
| 6 | 2021-01-09 | 1899 |

| | arrival_date | arrival_volume |
|---|---|---|
| | <date> | <dbl> |
| 1 | 2021-01-04 | 1794 |
| 2 | 2021-01-05 | 1694 |
| 3 | 2021-01-06 | 2400 |
| 4 | 2021-01-07 | 1502 |
| 5 | 2021-01-08 | 2196 |
| 6 | 2021-01-09 | 2001 |

# The Framework



# What are the scenarios?

| Description | Date Range (whse arrivals) | Order Uncertainty | Transit Uncertainty | 5-week Port Delay Sequence |
|---|---|---|---|---|
| No Variance | Jan 7th - Mar 24th 2021 | None | None | (0, 0, 0, 0, 0) |
| Only Transit Variance | Jan 7th - Mar 24th 2021 | None | Medium | (0, 0, 0, 0, 0) |
| Basline | Jan 7th - Mar 24th 2021 | Medium | Medium | (0, 0, 0, 0, 0) |
| Big Variance | Jan 7th - Mar 24th 2021 | High | High | (0, 0, 0, 0, 0) |
| Small Delay | Jan 7th - Mar 24th 2021 | Medium | Medium | (1, 3, 5, 3, 1) |
| Big Bang Delay | Jan 7th - Mar 24th 2021 | Medium | Medium | (10, 8, 6, 4, 2) |