



# Making “Better Bets” in your Supply Chain with Probabilistic Planning

**Jeff Alpert**, VP Product Management, Noodle.ai

SAPinsider  
Las Vegas

---

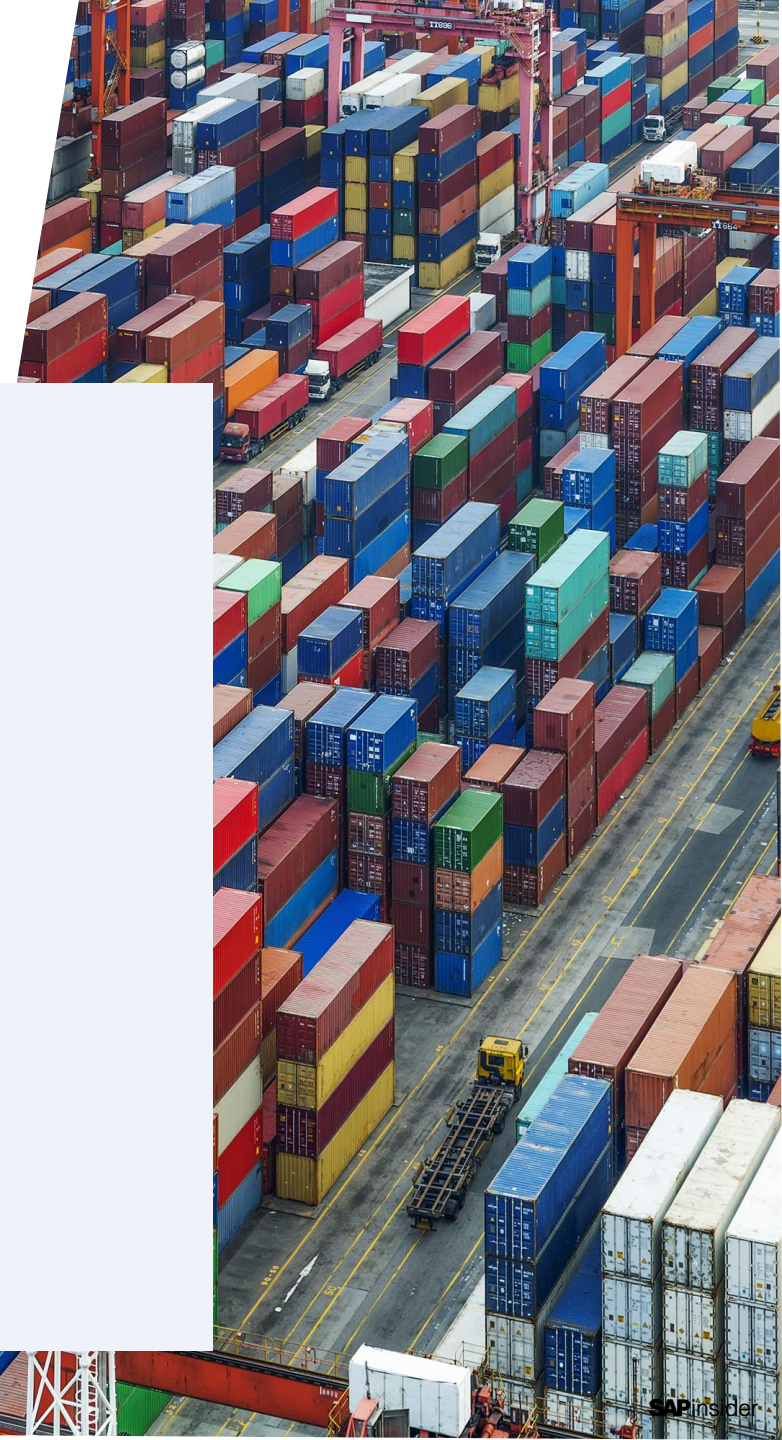
**2023**

**SAP**insider

# What We'll Cover

---

- Make-to-Stock supply chains require betting
- Current methods make bad bets
- Making better bets with predictions and probabilities
- How Probabilistic Planning works
- Introduction to Noodle.ai's Inventory Flow solution
- Wrap-Up

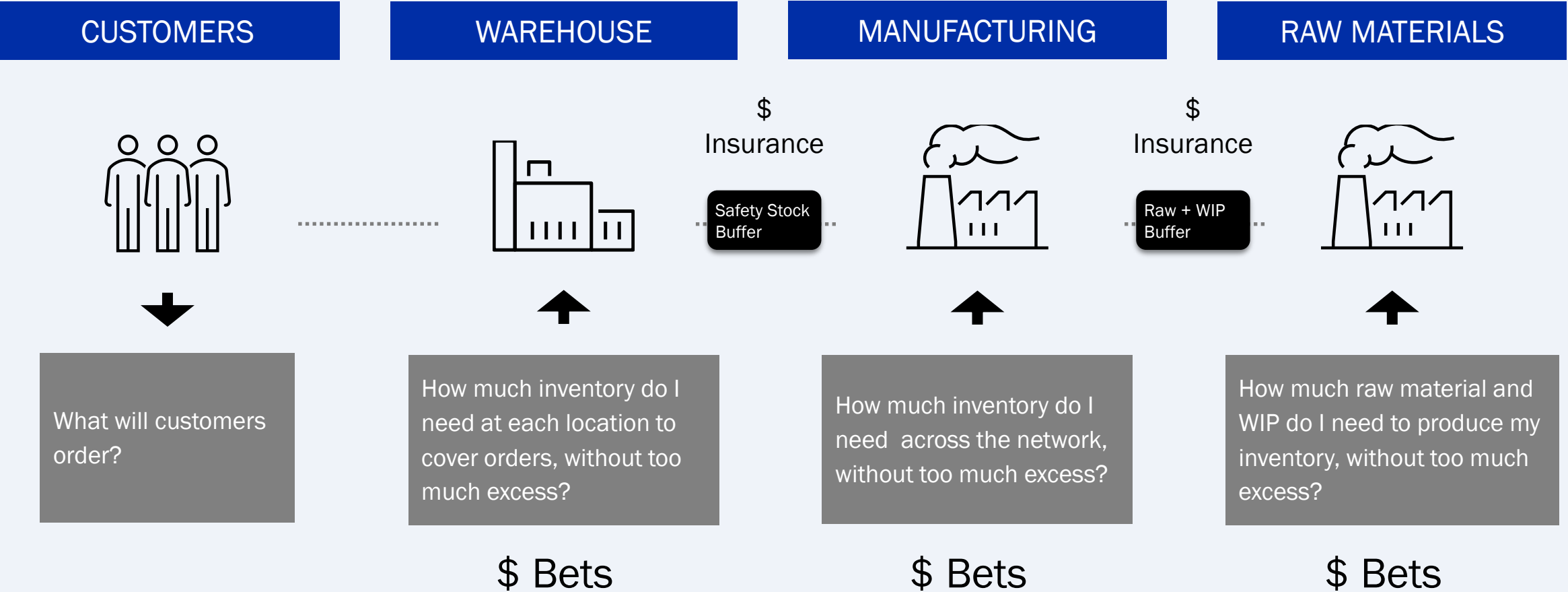




A top-down view of a green poker table. In the center, the text "Any gamblers in the room?" is displayed in white. The table is scattered with various items: a gold-colored glass in the top left, a crystal ashtray with cigarettes in the center, a black smartphone in the bottom right, and several playing cards and chips. A hand with a black watch is visible on the right, holding a card. Another hand is visible on the left, near a stack of cards. The scene suggests a gambling environment.



# Running a Make-To-Stock (MTS) supply chain means you are constantly placing bets



# How can you place “better bets”?

---

## **MIT Blackjack Team**

---

They had vision into what would happen by using a probabilistic system – counting cards

They used this data to beat the house and make millions



## **Two implications for Modern Supply Chains**

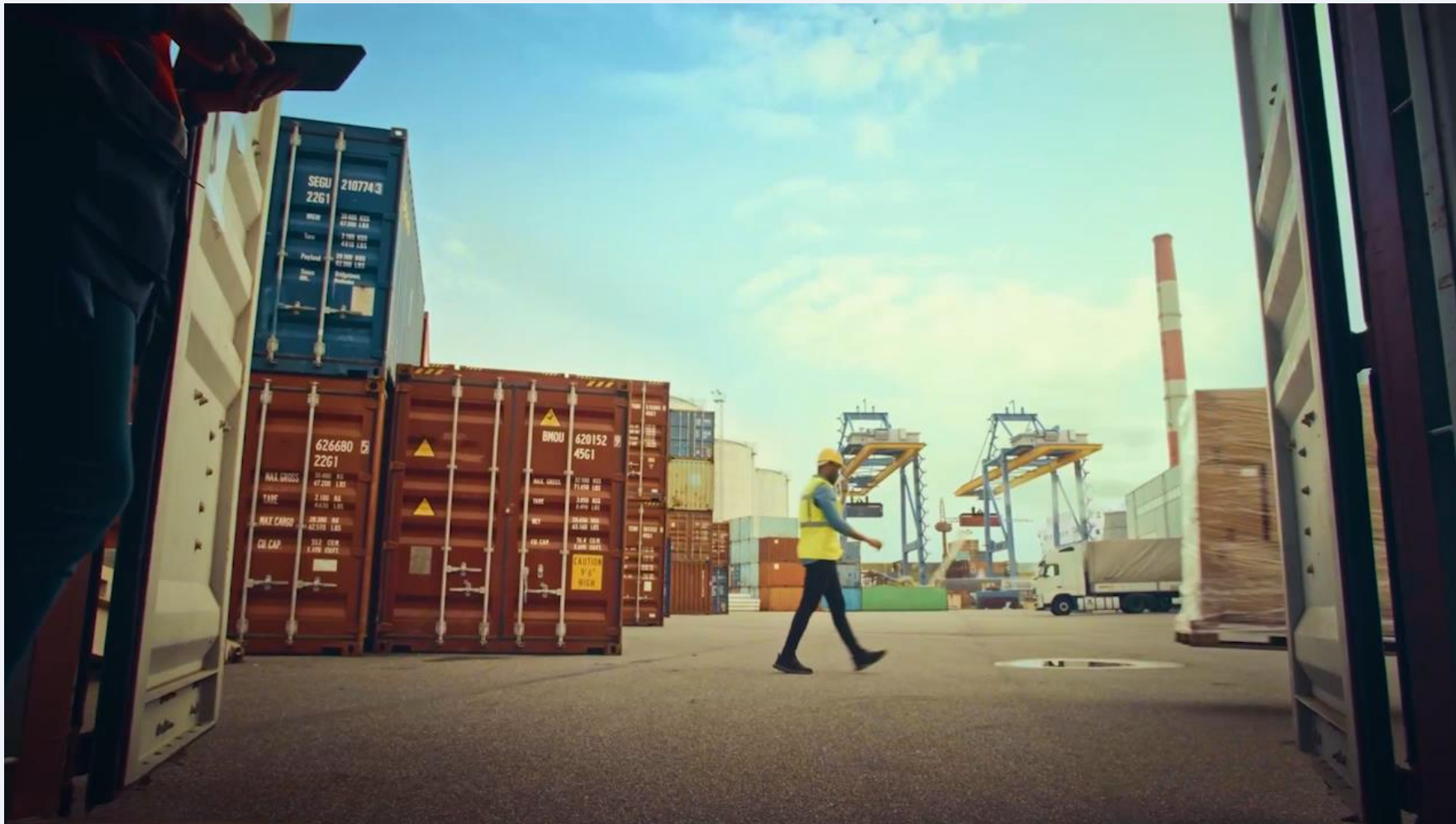
---

Need:

- Better predictive visibility into supply and demand
- New math of probabilities – count cards to make better bets!



# Poor predictive visibility means big real-world errors → bad bets



Errors in Supply and Demand  
Projection Lead to Bad Bets

**Demand (wMAPE)**

51% Error



**Inventory Projection**

40% Error

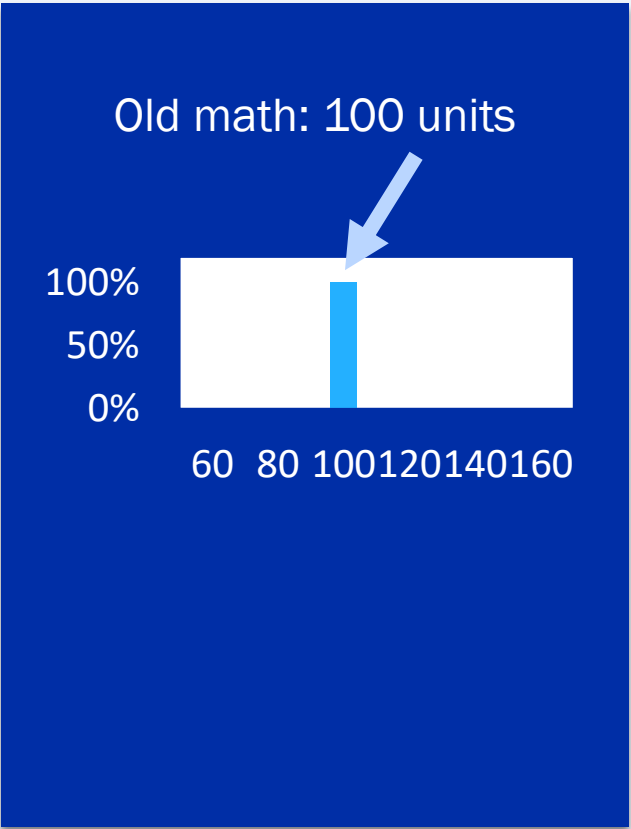


**Supply Orders / Plans**

96% Lead Time Error,  
77% Quantity / Timing Error

# Old math uses fixed supply and demand inputs for making bets

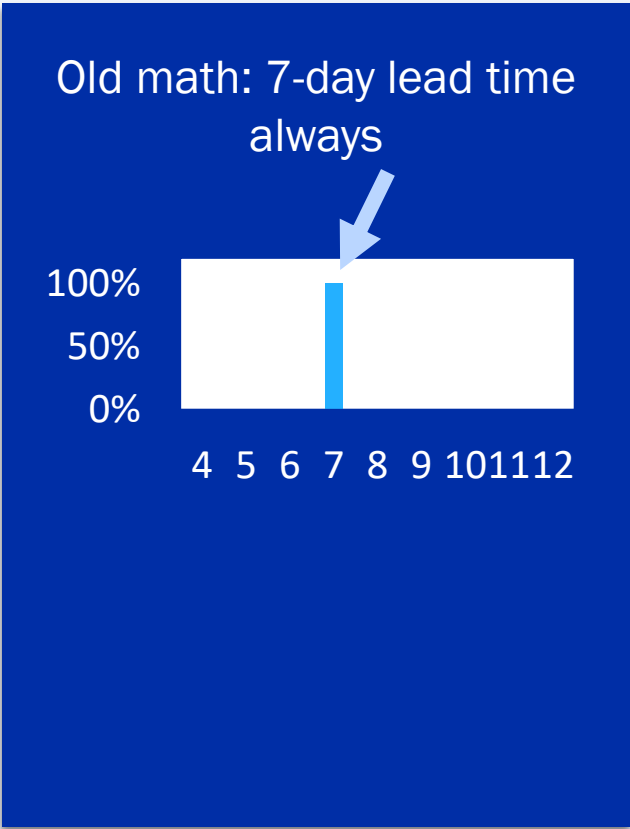
Demand



Inventory

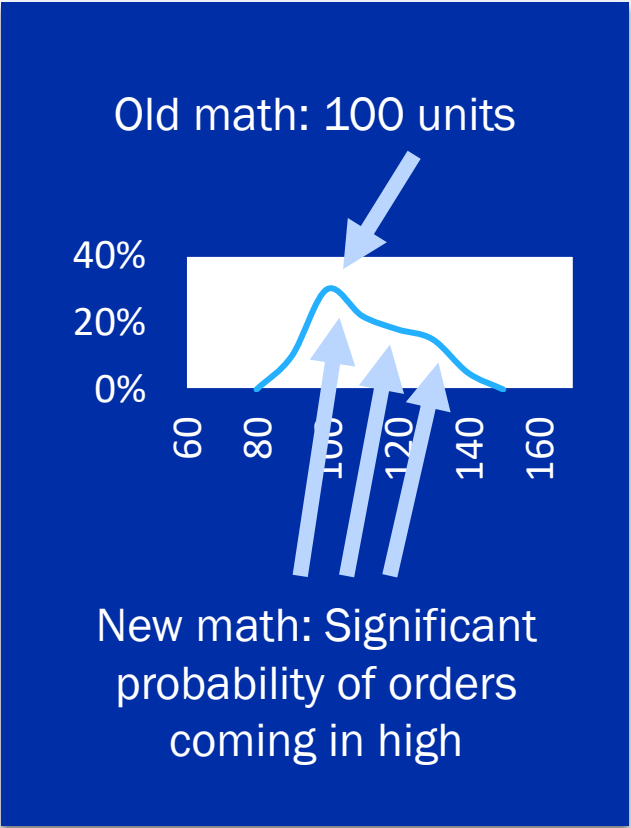
Old math: planned inventory level is good

Supply



# New math uses probabilities to make “better bets”

Demand



Inventory



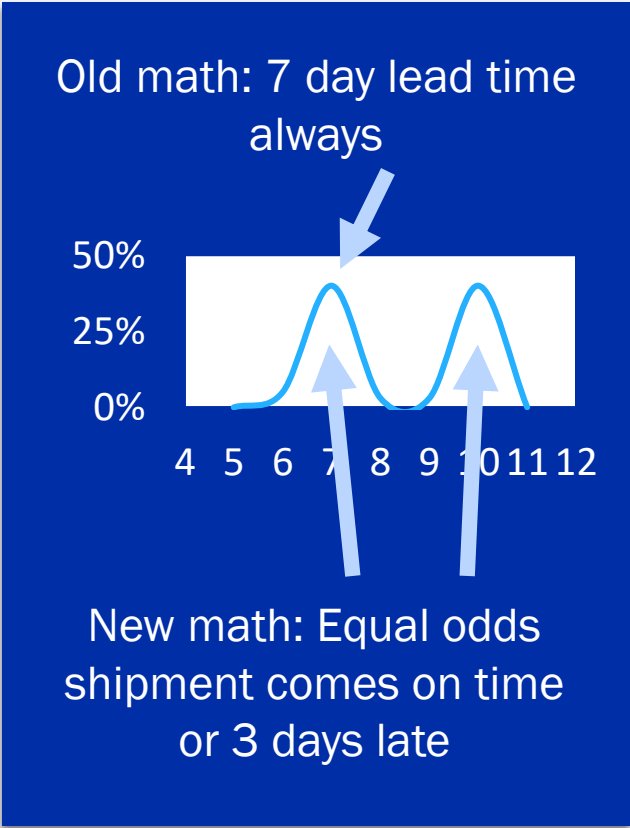
Old math: planned inventory level is good

New math: significant risk of out of stock

PLACE A DIFFERENT BET



Supply





# New math also helps planners identify and understand bad bets . . .

## Old Math Process

Cascaded or Concurrent Plan

Customers

Demand

Distribution

Production

Materials

Suppliers

✗ Higher degree of error

✗ Fixed inputs per step

Spreadsheets!

202041 B	TC55010000	7600	2 Stock below target stock (DB alert)	4000	3 P
201907 P	1501040000	3630	2 Stock below target stock (DB alert)	4000	5 P
201907 C	39F0200000	3070	2 Stock below target stock (DB alert)	4000	5 B
201907	YMW010711	5015	1 Constrained SK below target sk DB alert	4000	5 N
201908 N	1051700000	3940	2 Stock below target stock (DB alert)	4000	3 P
201907 C	1559010004	7560	2 Stock below target stock (DB alert)	4000	3 P
201907 N	589710001	3500	2 High Stock Alert (DB alert)	4000	5 N
201907 D	4HAF010000	5090	1 Constrained SK below target sk DB alert	4000	5 P
202040 C	58F0600000	5150	2 High Stock Alert (DB alert)	4000	3 P
201907 N	5614010000	5150	1 Constrained SK below target sk DB alert	4000	5 P
201907	PZG0600001	5730	2 High Stock Alert (DB alert)	4000	5 N
202022 C	EMAF010000	5150	2 High Stock Alert (DB alert)	4000	3 P
201907 N	KG48700001	3940	2 High Stock Alert (DB alert)	4000	5 N
201911 N	RFMT400000	7560	1 Constrained SK below target sk DB alert	4000	3 P
201911 D	1051700000	3900	1 Constrained SK below target sk DB alert	4000	4 P
201907	58KH050001	3500	2 High Stock Alert (DB alert)	4000	5 N
201914 D	57H0800000	5050	1 Constrained SK below target sk DB alert	4000	6 B
201907 N	PS98800001	3660	2 High Stock Alert (DB alert)	4000	5 N
201907 N					
201907 N					
201909 N					
201907 B					
201907 N					
201907 N					
202018 D					
201907 N					
201911 N					
201907 N					

Planner: “Should I believe these alerts? Which ones are important???”

✗ Subject to bias

## New Math Process

✓ Greater accuracy of demand + supply

✓ Considers probabilistic inputs

Quantify Expected Value at Risk

• 30% chance of \$5,000 loss on Pecan Granola = EV of \$1,500

• 40% chance of \$3,500 loss on Chocolate Granola = EV of \$1,200

Planner: “highest importance are the highest expected Value-at-Risk items”

✓ No bias

noodle.ai

9  
SAPinsider

# New math also helps planners identify and understand bad bets . . .

## Old Math Process

Cascaded or Concurrent Plan

Customers

Demand

Distribution

Production

Materials

Suppliers

Higher degree of error

Fixed inputs per step

Spreadsheets!

Planner: "Should I believe these alerts? Which ones are important???"

Subject to bias

## New Math Process

Item	Expected Value Loss \$
Pecan	\$ 1,500
Chocolate	\$ 1,200
Blueberry	\$ 1,000
Coconut	\$ 850
Classic	\$ 750
Peanut	\$ 500

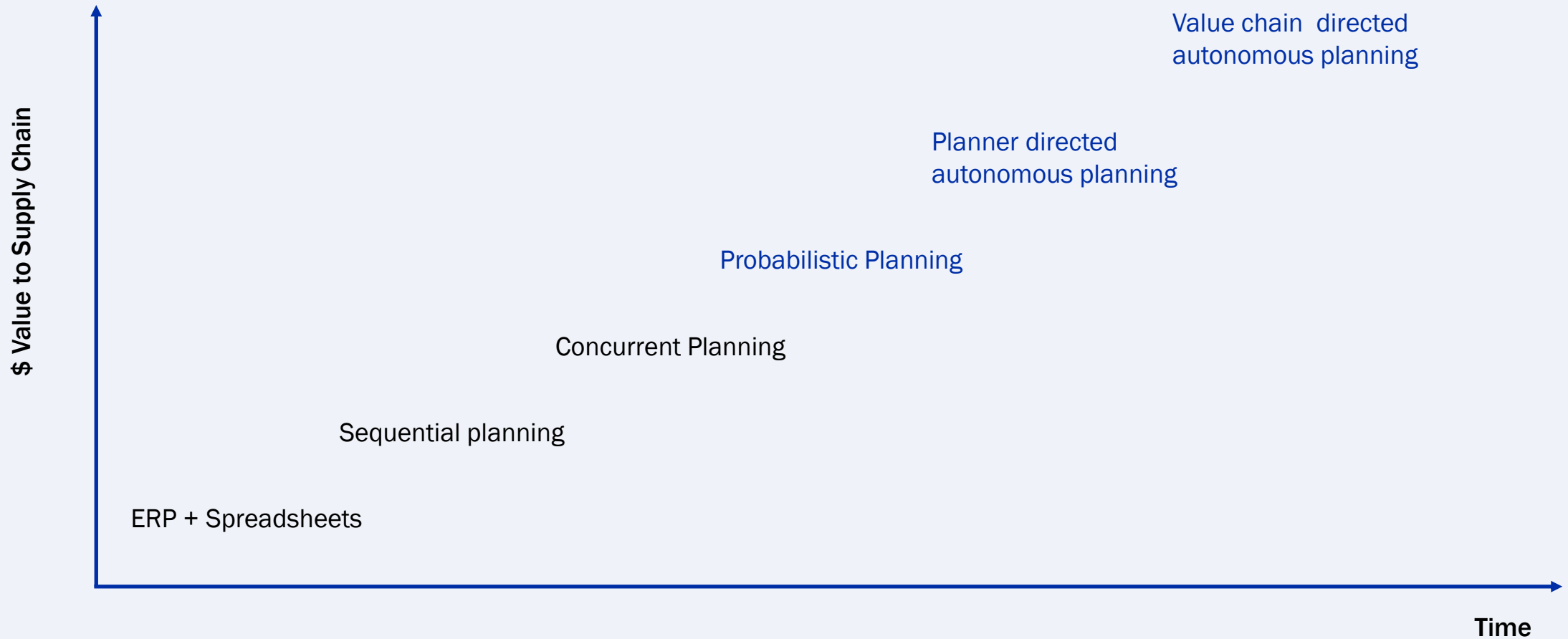
### Analyze Value at Risk

- Should I expedite to stop the loss?
- \$1,300 expedite cost
- Worth it on Pecan Granola, not on Chocolate Granola



# We believe the future is probabilistic

A new class of tools is emerging that has the potential to eradicate trillions of waste



---

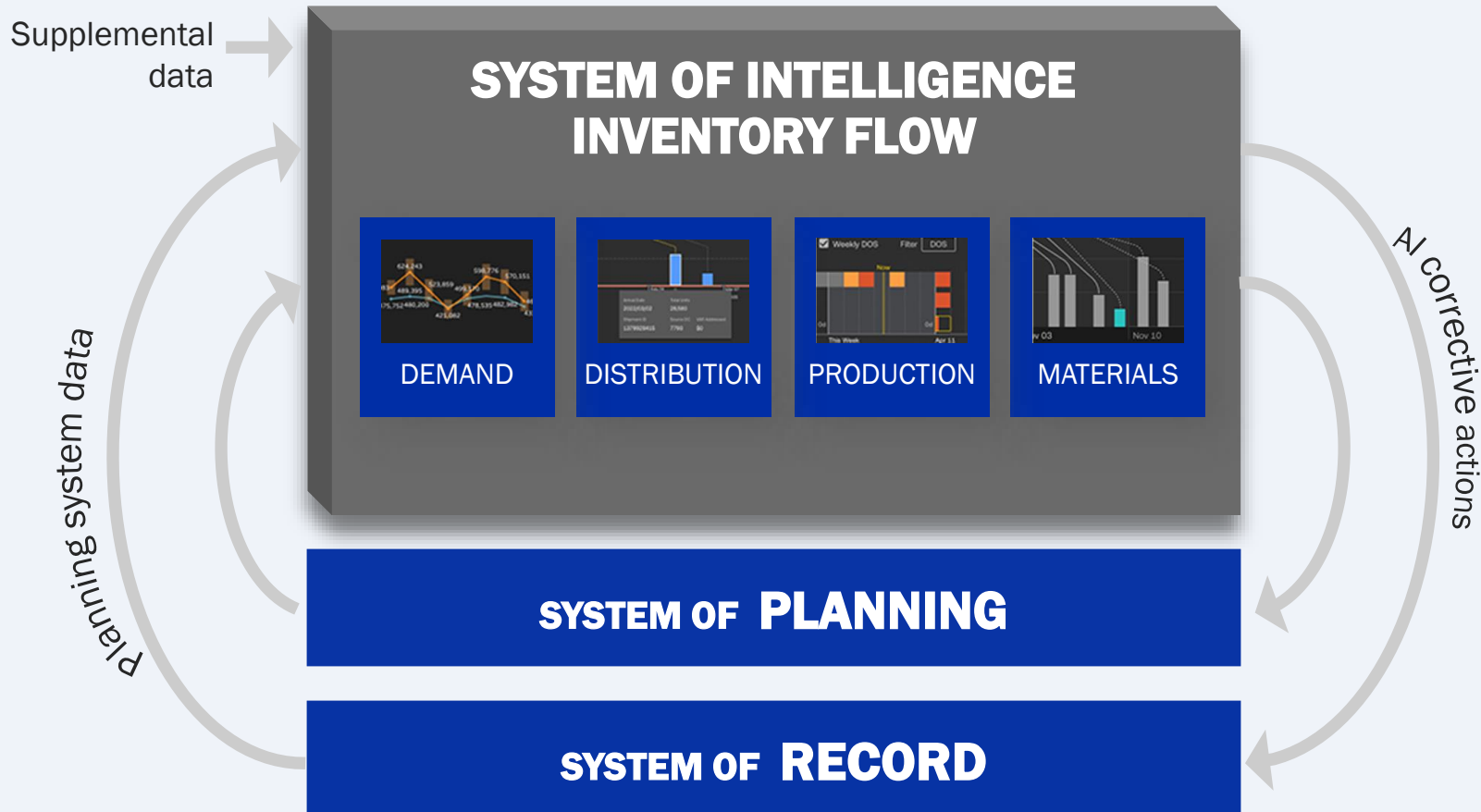
## Noodle.ai has developed Inventory Flow using New Math





# Inventory Flow transforms the existing planning stack using data you already have

Inventory Flow finds and fixes expensive planning errors from SOP/SOR



# Inventory Flow makes “better bets” using probabilistic AI

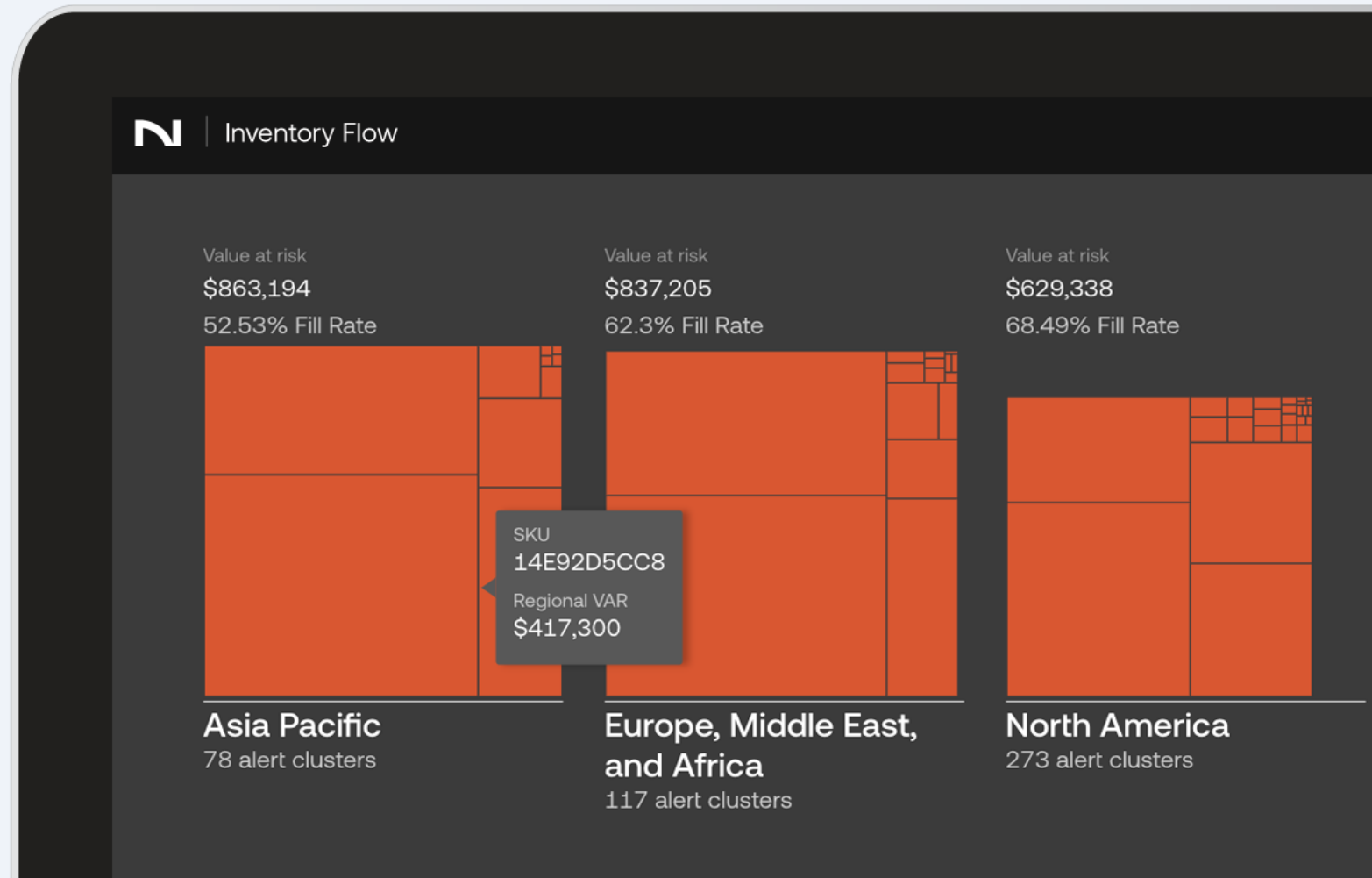
Predicts Value-at-Risk, pinpointing where to recoup lost profits

## Superior predictive visibility

Predicts both demand and supply,  
eliminating major blind spots

## Probabilistic inputs to calculate expected Value-at-Risk

VAR is then leveraged to create a  
prioritized worklist that transforms planner  
efficiency



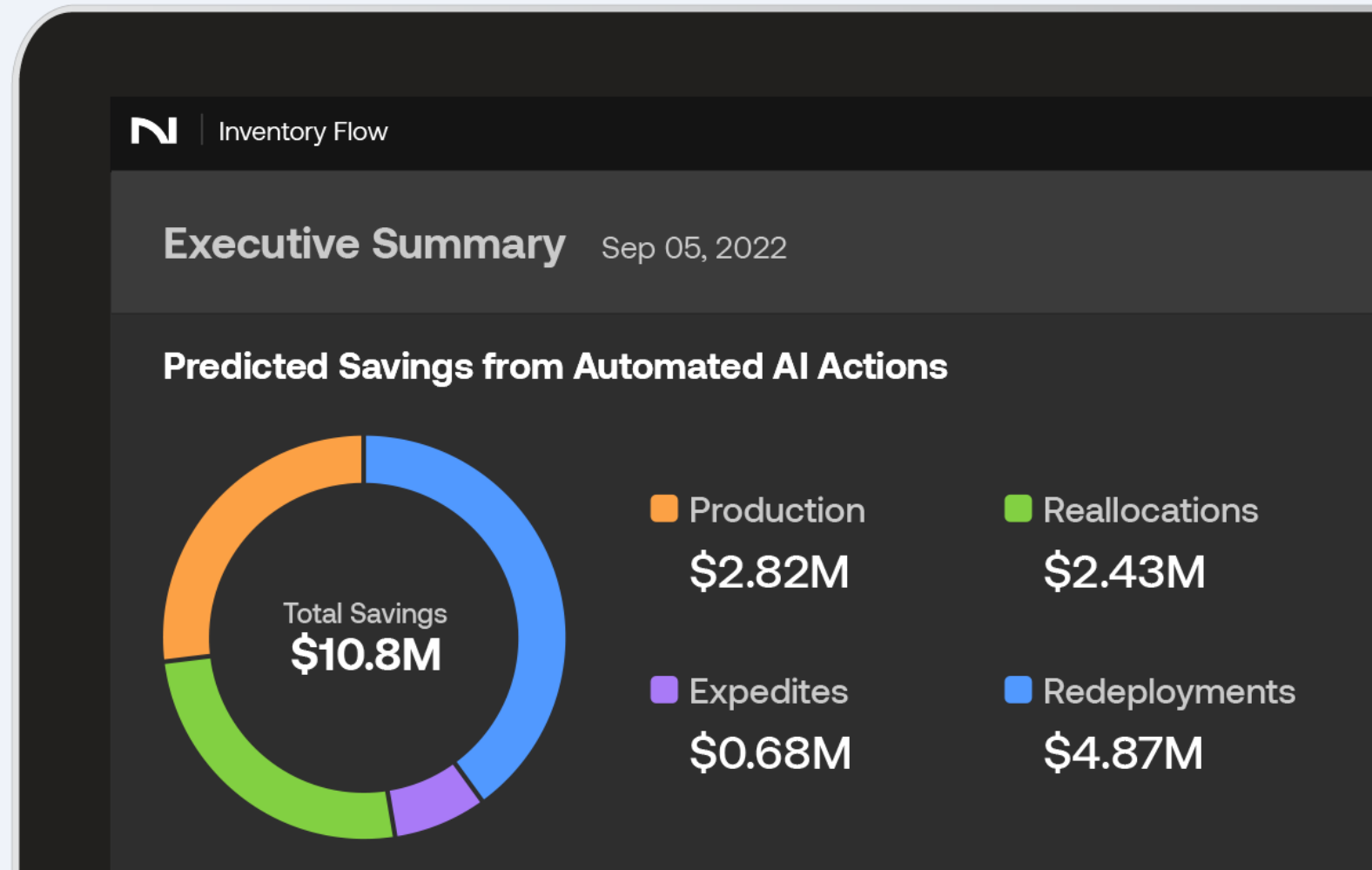


# Inventory Flow recommends actions to mitigate expected Value-at-Risk

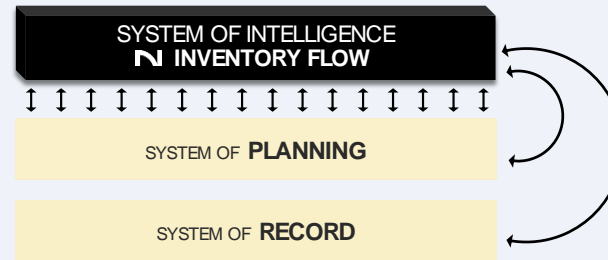
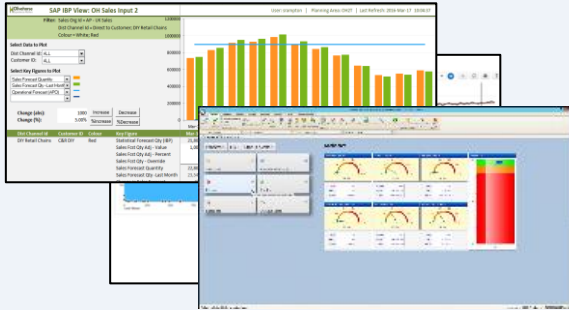
Tells planners to how solve issues, or executes identified actions automatically

## Potential Actions to Mitigate VAR

Expedite  
De-expedite  
Increase allocation  
Decrease allocation  
Re-deploy  
Increase production  
Decrease production  
Etc.



# See how Kellogg is making “better bets” with Inventory Flow



**VAR**  
VALUE AT  
RISK

## PROBLEM

Traditional systems cannot truly handle volatility & uncertainty

- Forced to use ad hoc tools
- Rely on experience and ‘gut’
- Manually intensive and reactive

## SOLUTION

Noodle provides System of Intelligence built on unique AI/ML approaches

- Predicts and quantifies risks
- Generates actions to mitigate

## BENEFIT

Improve key metrics by >25% in less than 6 months, saving \$100M’s annually

- Customer Service
- Inventory
- Supply Chain Costs



# Wrap Up

## Probabilistic Planning:

Stop gambling. Tilt the odds in your favor. Make better bets.





# Where to Find More Information

---

**<https://noodle.ai>**

- Learn how to manage supply chain risk to conquer hidden waste and boost profits.

**<https://noodle.ai/products/inventory-flow>**

- Learn how to rescue the money that your supply chain planning system is losing.

**<https://noodle.ai/customers>**

- Read stories of customers who are using Noodle.ai to make their supply chains more intelligent.

**<https://noodle.ai/case-study-kellogg>**

- Read how Kellogg's was able to significantly increase ROI in just 12 weeks.

# Key Points to Take Home

---

- Make-to-Stock supply chains require betting
- Current planning technologies – “old math” – make bad bets
- It is possible to make better bets with “new math” – predictions and probabilities, akin to counting cards
- Probabilistic methods uncover risks that fixed-input systems miss
- Planners can prioritize their work and make better decisions by using expected Value at Risk
- Probabilistic Planning is the future, because it can create the kind of trust required to get to autonomy
- Noodle.ai built Inventory Flow using “new math”
- Inventory Flow not only uncovers expected Value-at-Risk, but it can also recommend actions for planners to take
- Some Inventory Flow customers trust the solution to the point that they have totally automated its recommendations
- The era of bad bets is over with probabilistic planning



# Thank you! Any Questions?

---

Jeff Alpert

<https://www.linkedin.com/in/jeffrey-alpert-9063168>

Please remember to complete  
your session evaluation.



# SAPinsider



## SAPinsider.org

PO Box 982Hampstead, NH 03841  
Copyright © 2023 Wellesley Information Services.  
All rights reserved.

SAP and other SAP products and services mentioned herein as well as their respective logos are trademarks or registered trademarks of SAP SE (or an SAP affiliate company) in Germany and other countries. All other product and service names mentioned are the trademarks of their respective companies. Wellesley Information Services is neither owned nor controlled by SAP SE.

---

SAPinsider comprises the largest and fastest growing SAP membership group worldwide, with more than 600,000 members across 205 countries.

---