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

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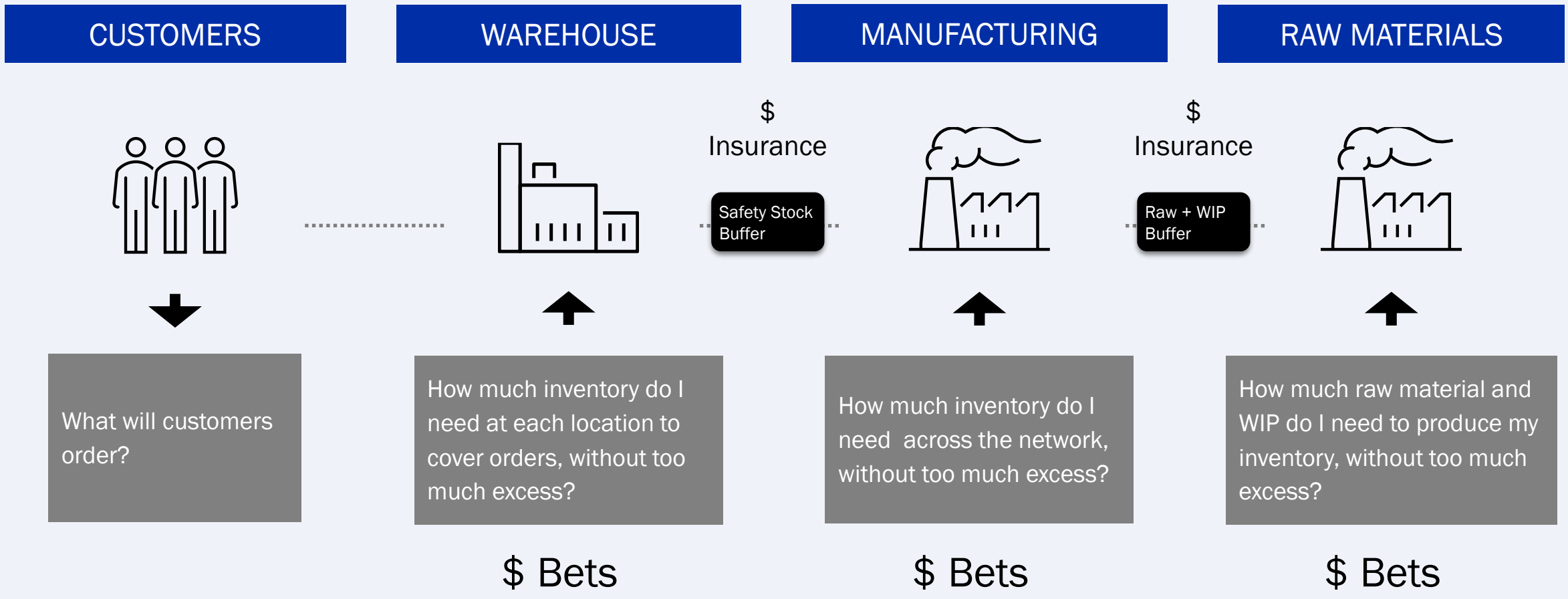
What We'll Cover

- 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


Any gamblers
in the room?

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

↓

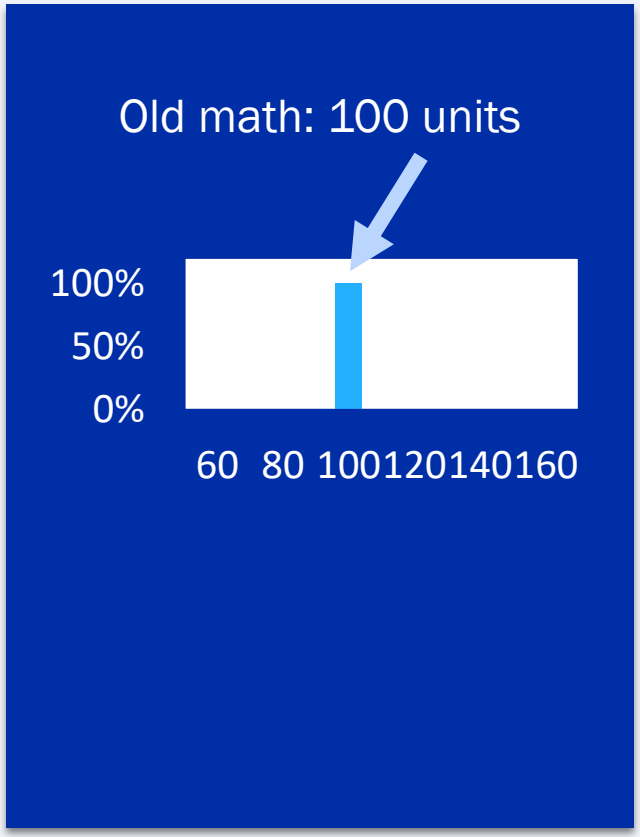
Inventory Projection
40% Error

↑

Supply Orders / Plans
96% Lead Time Error,
77% Quantity / Timing Error

Old math uses fixed supply and demand inputs for making bets

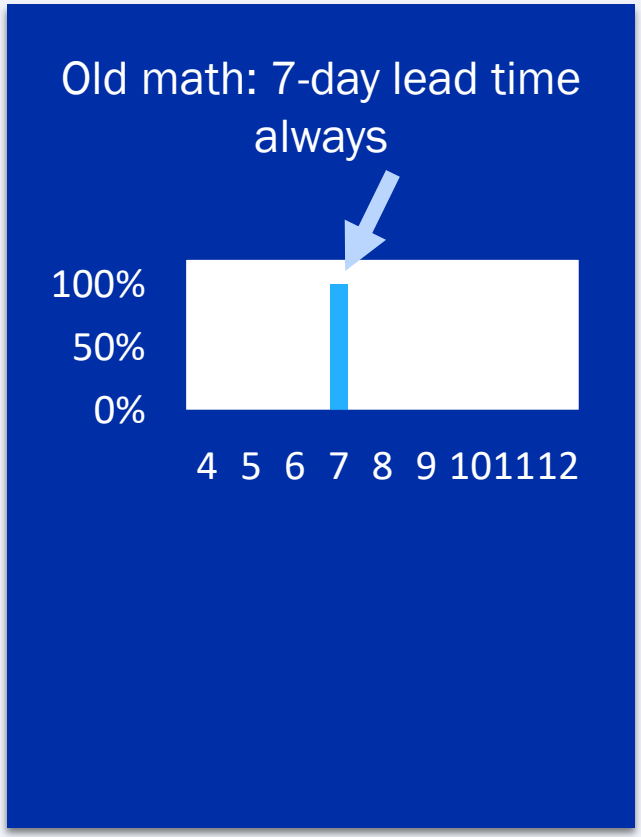
Demand



Inventory

Old math: planned inventory level is good

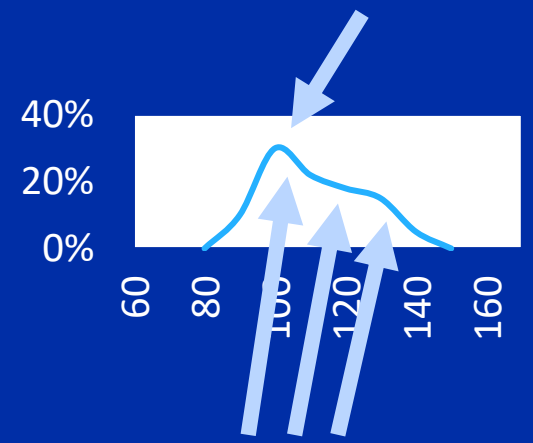
Supply



New math uses probabilities to make “better bets”

Demand

Old math: 100 units



New math: Significant probability of orders coming in high

Inventory

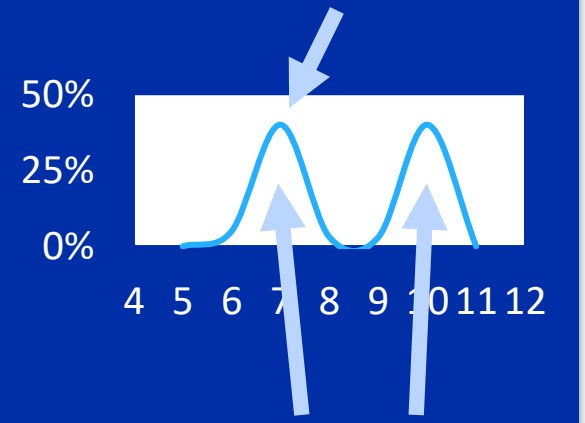
Old math: planned inventory level is good

New math: significant risk of out of stock

PLACE A DIFFERENT BET

Supply

Old math: 7 day lead time always

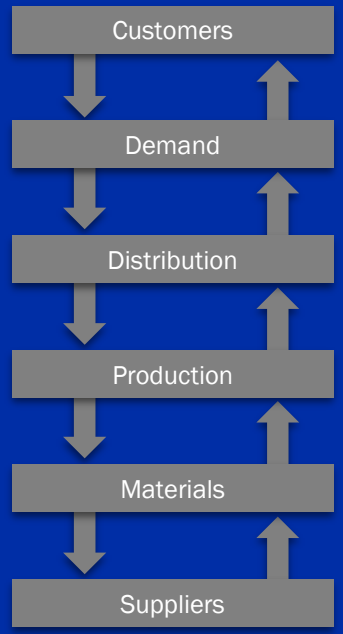


New math: Equal odds shipment comes on time or 3 days late

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

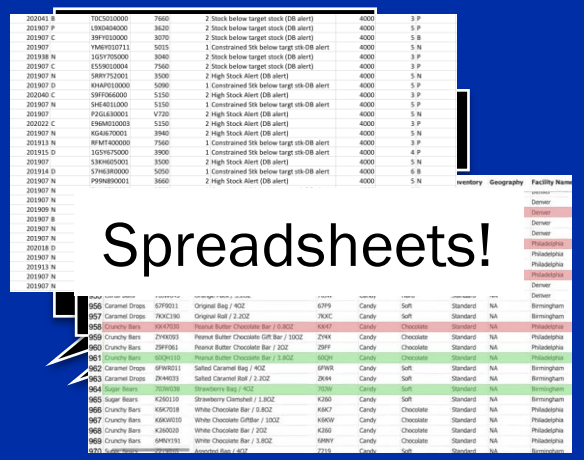
Old Math Process

Cascaded or Concurrent Plan



✗ *Higher degree of error*

✗ *Fixed inputs per step*



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

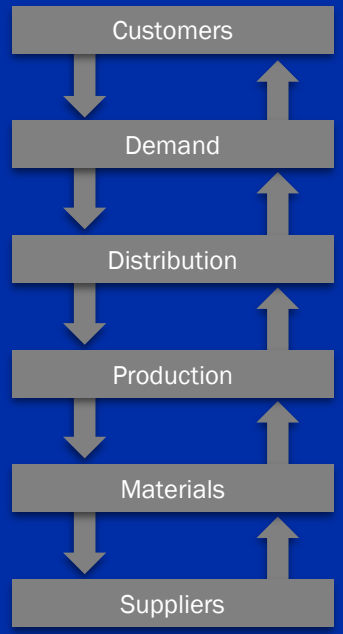
Planner: “highest importance are the highest expected Value-at-Risk items”

✓ No bias

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

Old Math Process

Cascaded or Concurrent Plan



✗ *Higher degree of error*

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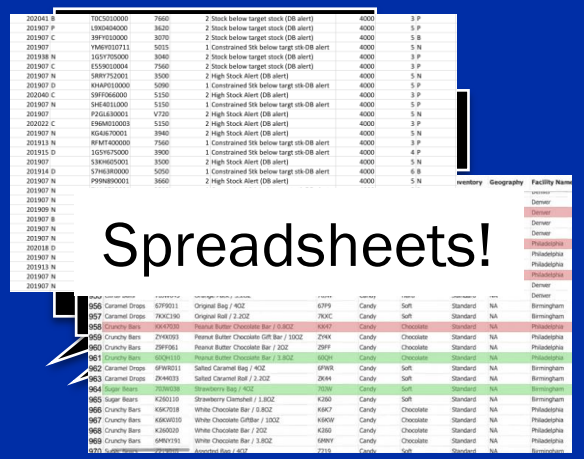


Planner: "Should I believe these alerts? Which ones are important???"

✗ Subject to bias

New Math Process

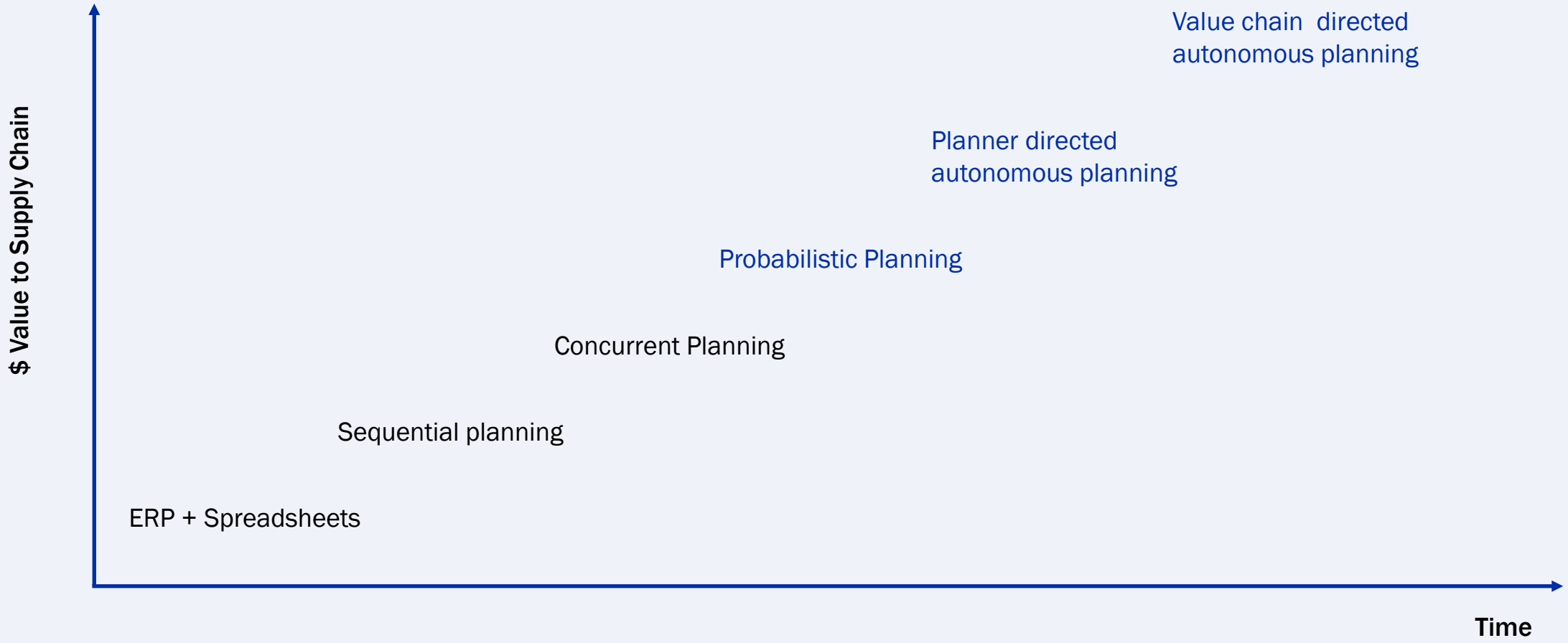
Item	Expected Value Loss $
Pecan	$ 1,500
Chocolate	$ 1,200
Blueberry	$ 1,000
Coconut	$ 850
Classic	$ 750
Peanut	$ 500

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

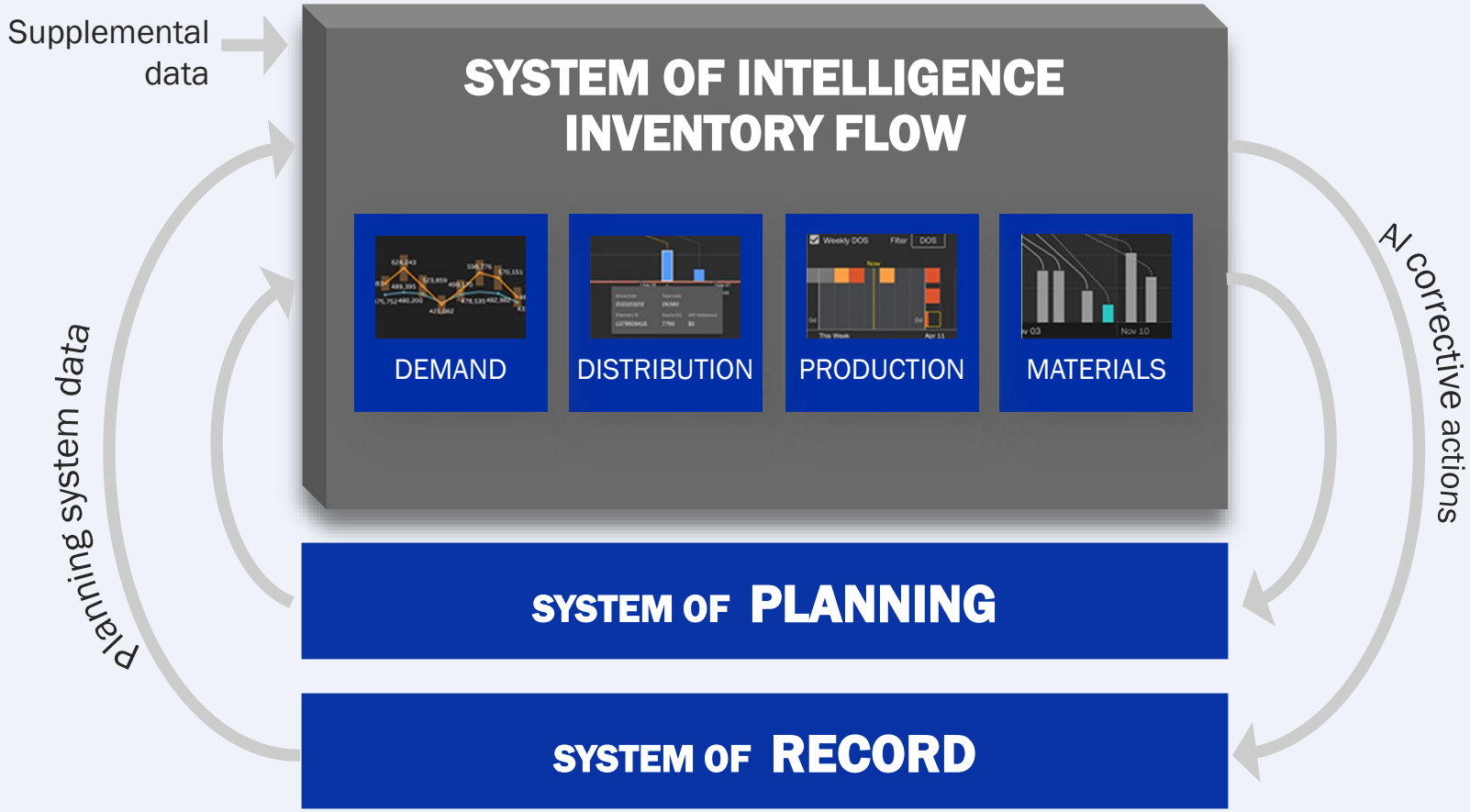
A new class of tools is emerging that has the potential to eradicate trillions of waste



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

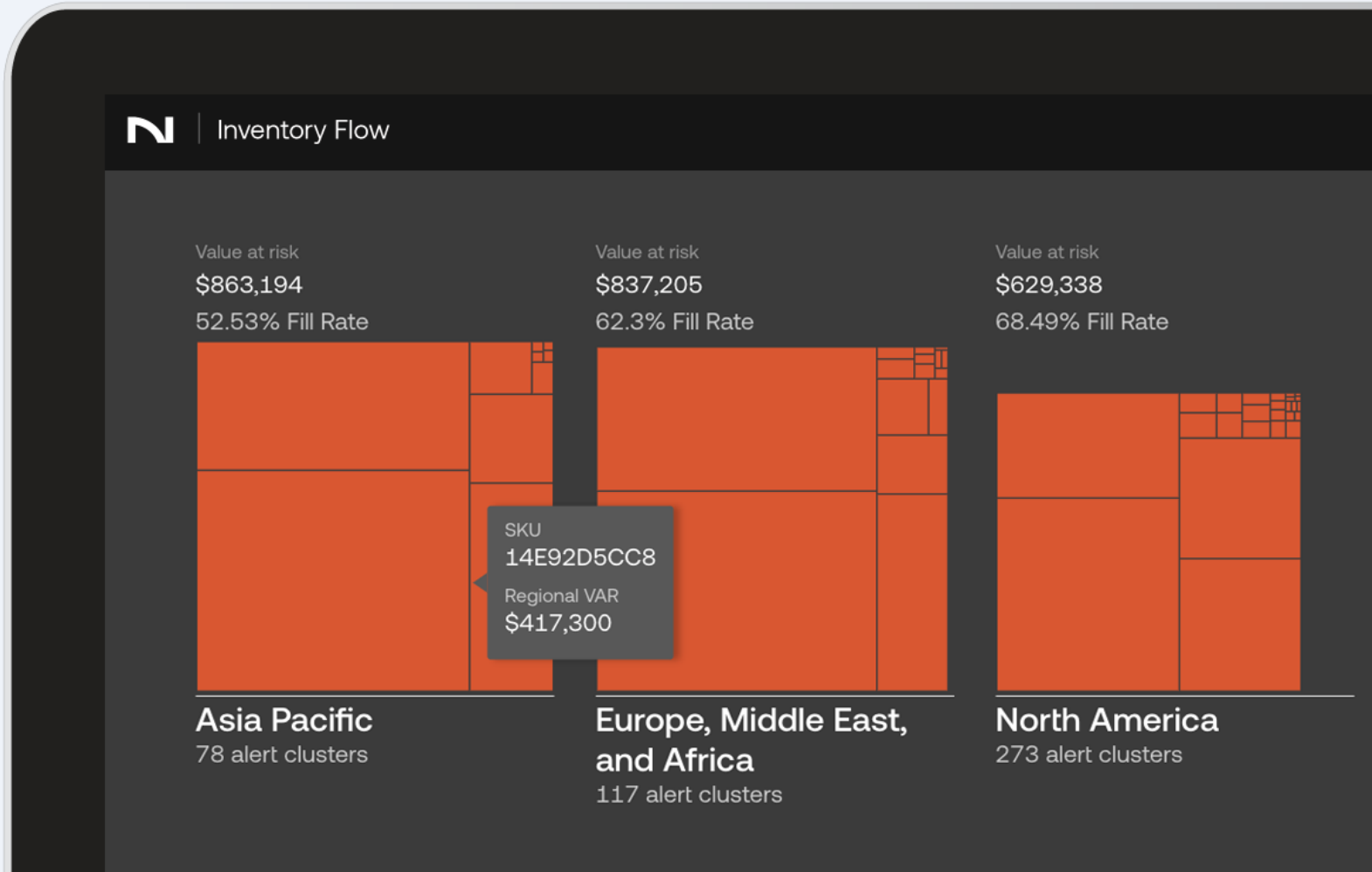
Predicts Value-at-Risk, pinpointing where to recoup lost profits

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

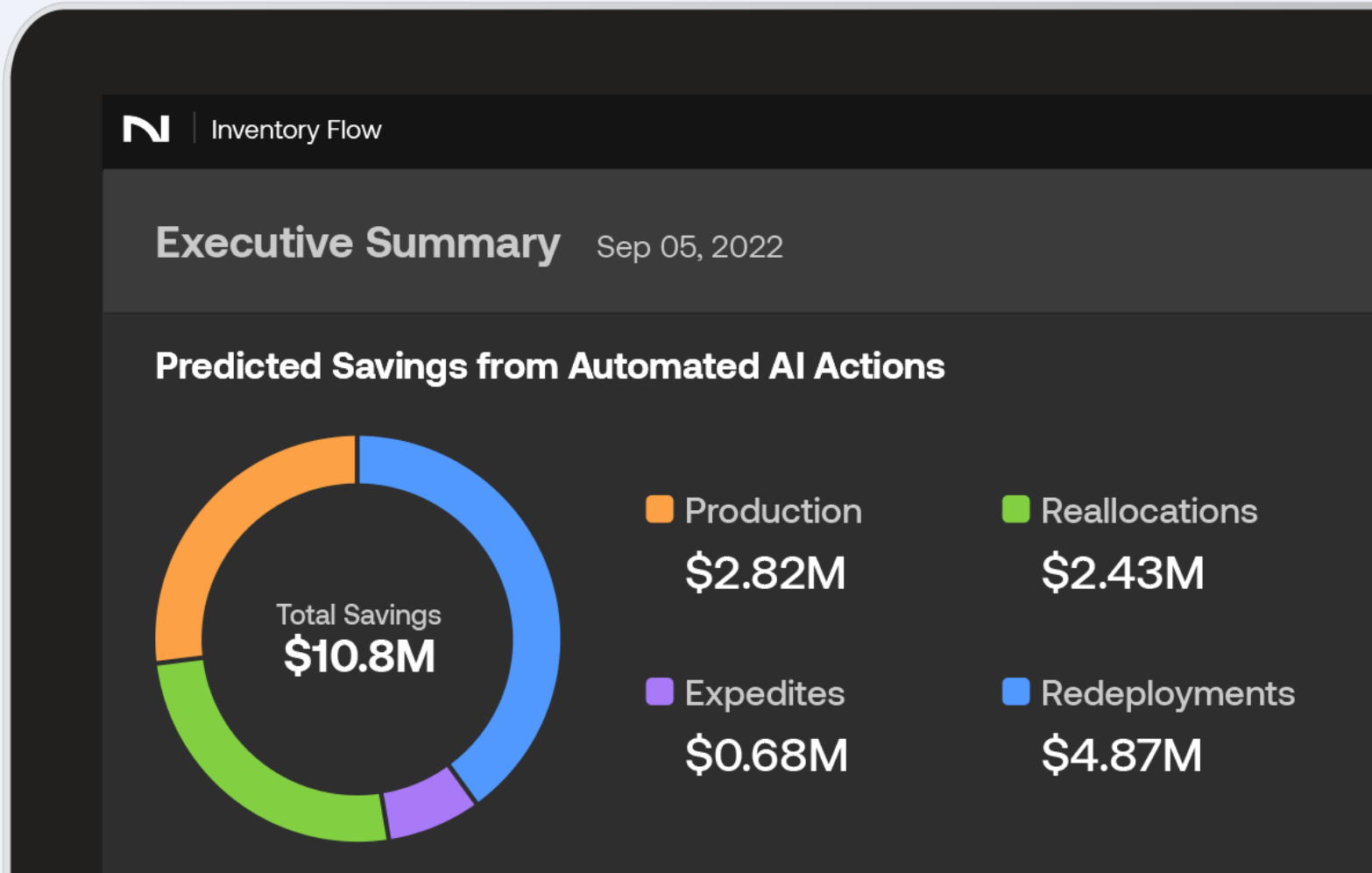


Inventory Flow recommends actions to mitigate expected Value-at-Risk

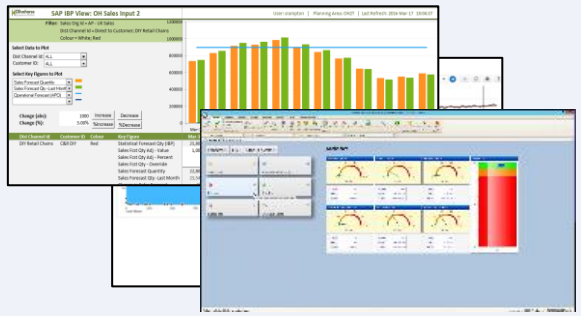
Tells planners to how solve issues, or executes identified actions automatically

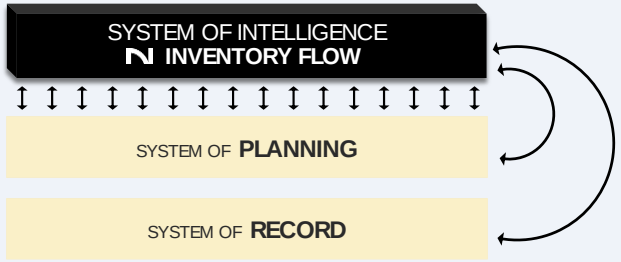
Potential Actions to Mitigate VAR

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

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