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Trends, Myths and Reality in Supply Chain

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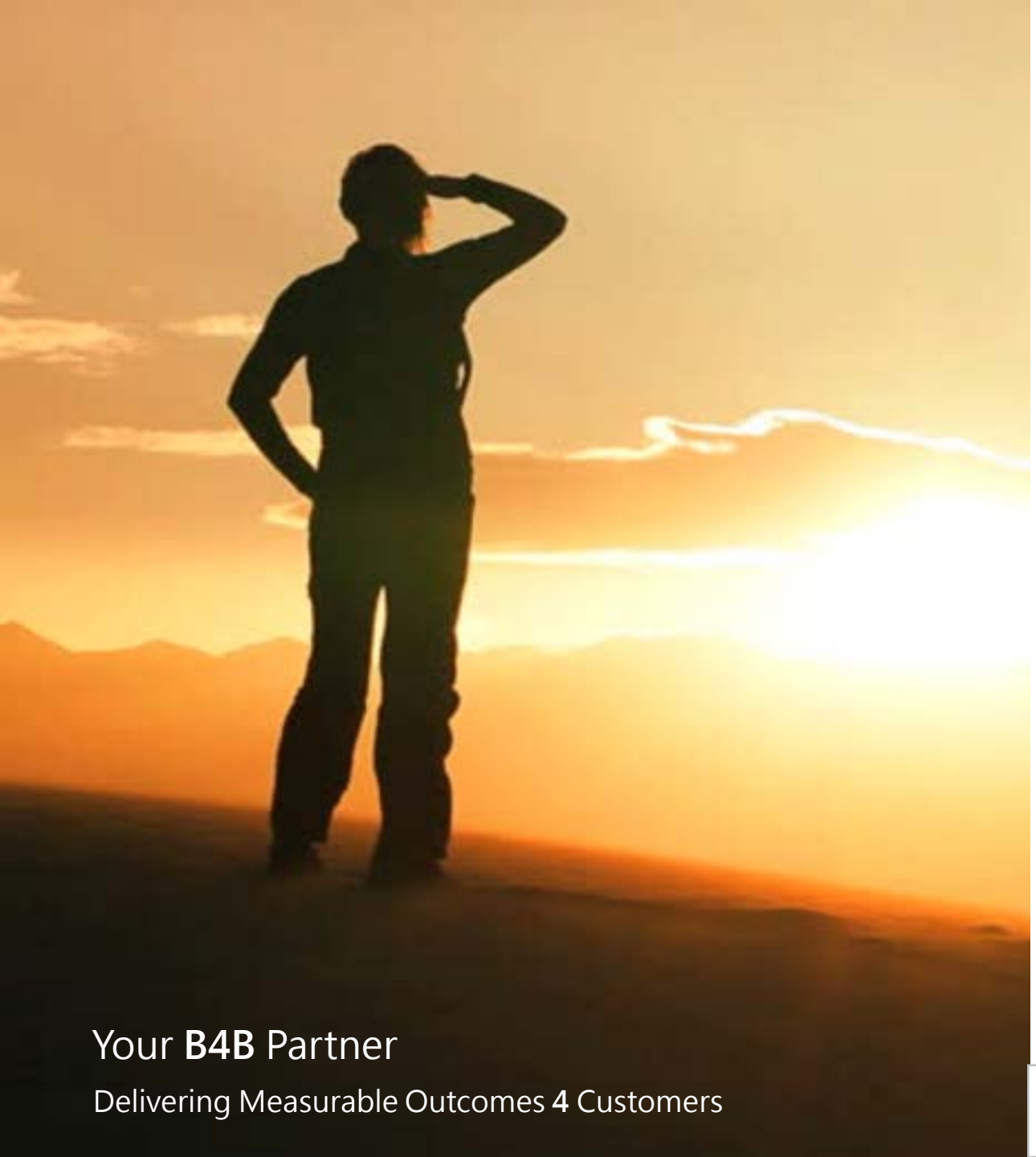
CEO Tools*Group*
September 2017



Your **B4B** Partner

Delivering Measurable Outcomes **4** Customers

Global Vision

Accelerating Business Performance

By efficiently delivering service to the customers of our customers

Global E2E Approach

Leveraging Market Driven Demand Analytics and Supply Chain Optimization

EUROPE	AMERICA	ASIA	MIDDLE EAST	AFRICA
Amsterdam	Boston	Malaysia	Israel	Cape Town
Milan	Ontario	India		
Munich	Mexico D.F.	Japan		
Barcelona				
London				
Stockholm				

Microsoft Cloud Solution Provider (CSP) | SAP® Certified Integration with SAP HANA® | Microsoft Dynamics | excellence | Gartner Magic Quadrant | NUCLEUS RESEARCH

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Agenda

1. Trends
2. Increasing uncertainty. New challenges of SC outcomes
3. Functional approach to probabilistic SC planning and optimization
4. Questions and discussion

1. Trends

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Outcome as a Service

Outcome as a Service

Business Process Outsourcing - Monitoring and Control – Reporting - KPI’s

Software as a Service

Full Automation - Supply Chain Planning Solution - Machine learning - Advanced Algorithms - - Complex Networks - Long Tail

Platform as a Service

Infrastructure as a Service

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Example of technological evolution to BPO: Communication

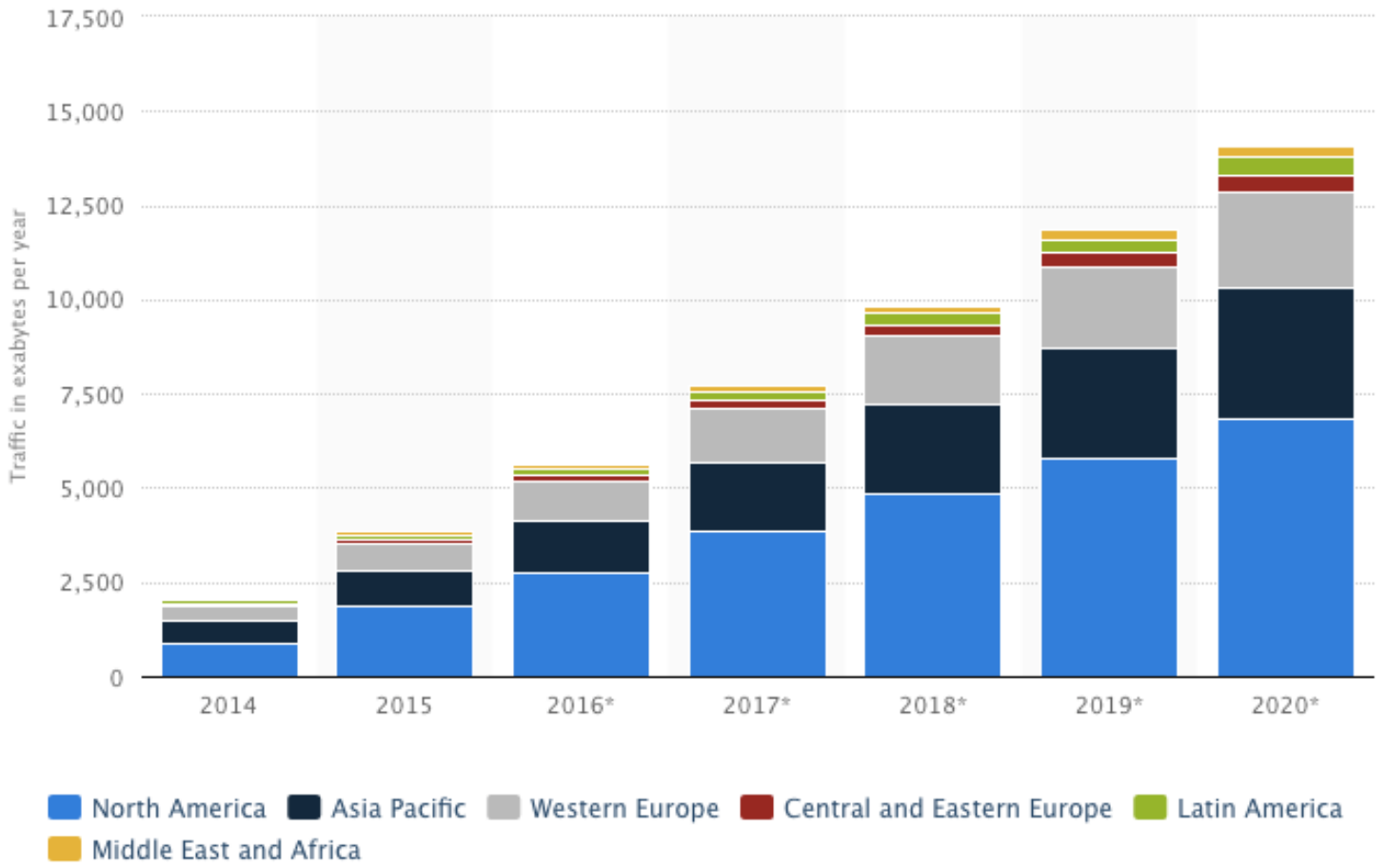
Help Desk BPO: Outcome as a Service

Communication as a Service

Automated internal switch board

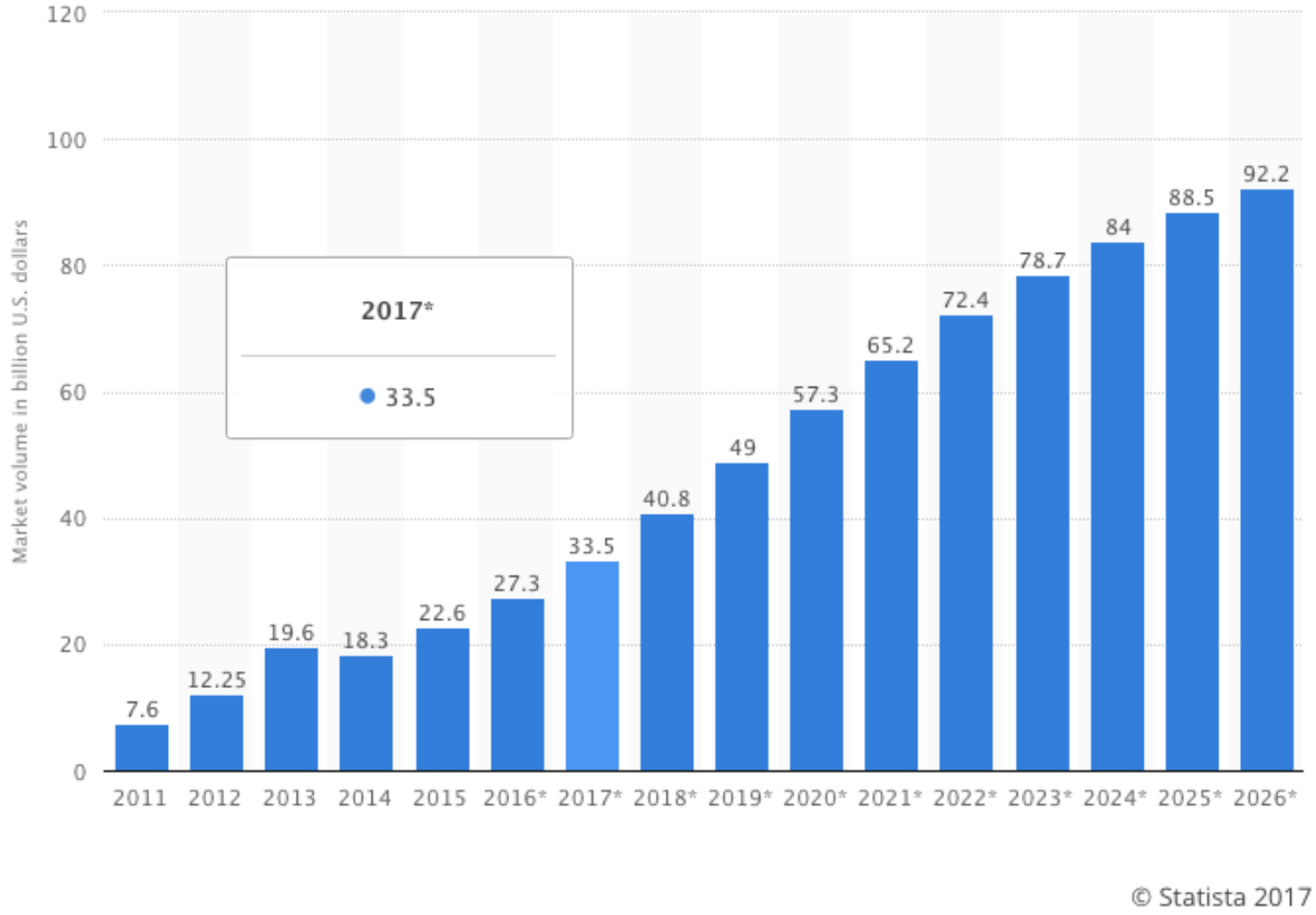
"In the basement"

Global cloud traffic worldwide



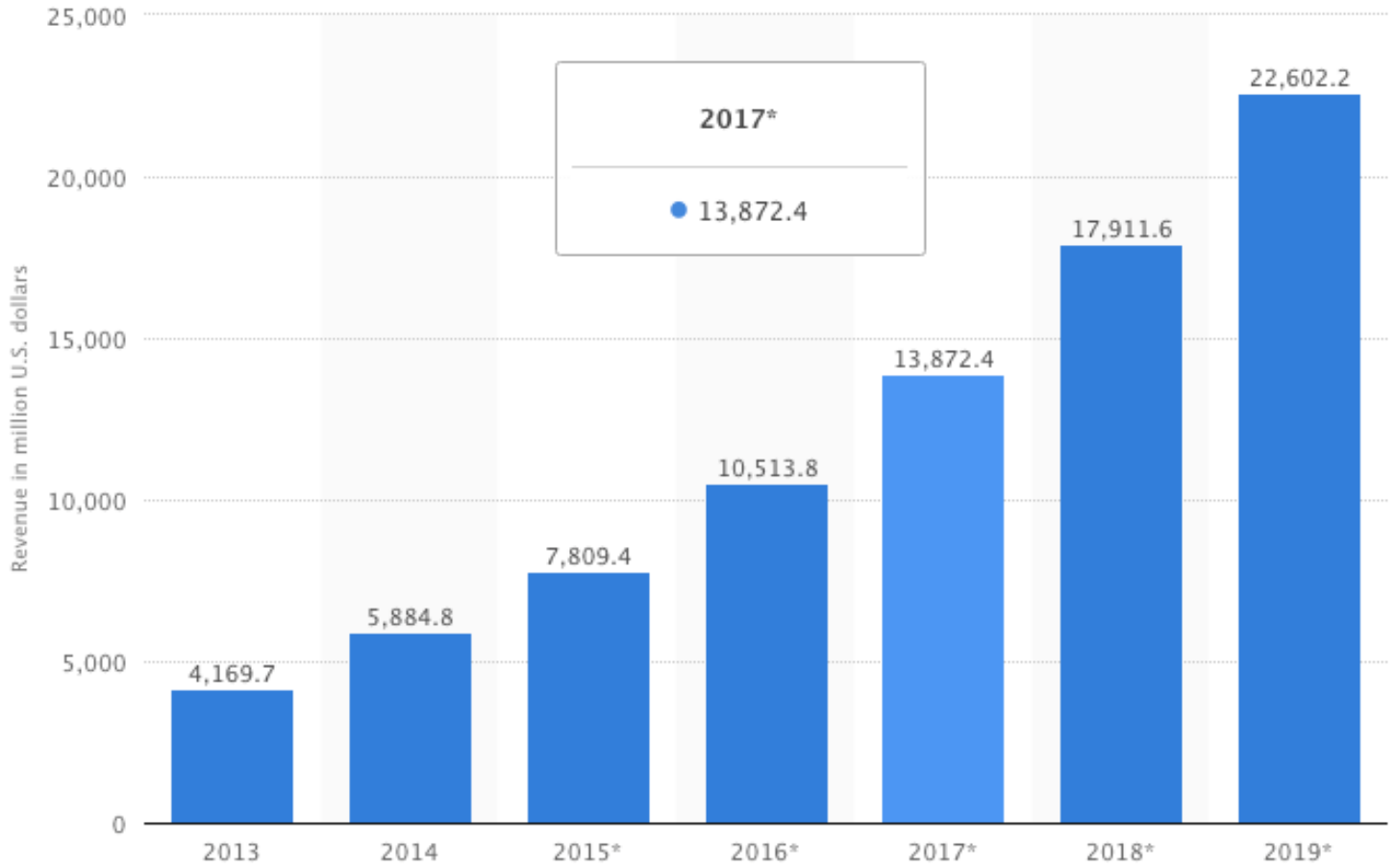
In Exabyte

Forecast of Big Data market size



Based on revenue (billion U.S. dollars)

Competitive public cloud Platform as a Service (PaaS) revenue forecast



Worldwide data. From 2013 to 2019 (in million U.S. dollars)

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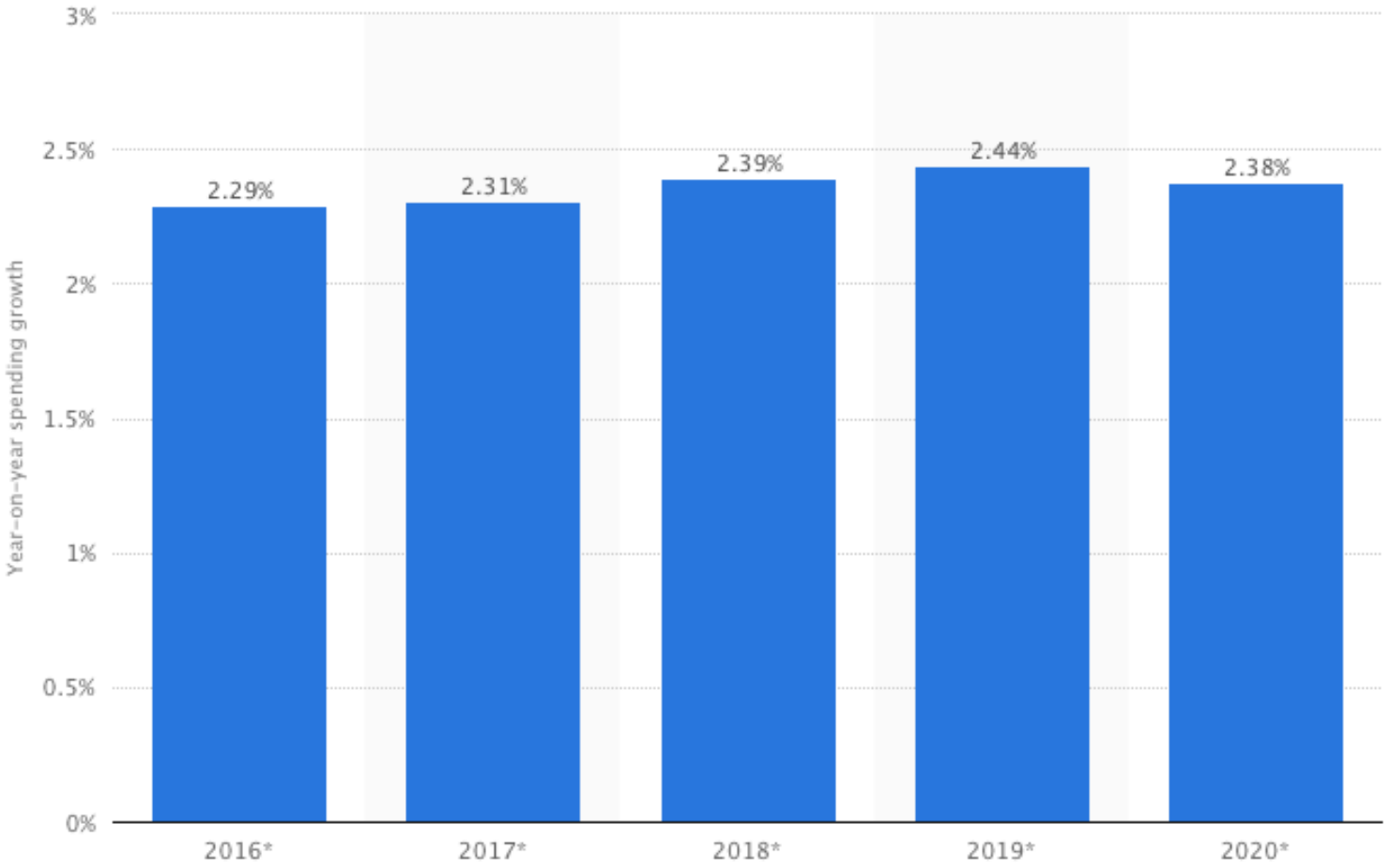
Growth forecast of information technology support services spending



Worldwide data. From 2016 to 2020

Outcomes as a Service

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2. Increasing uncertainty

New challenges of Supply Chain outcomes

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After Walmart introduced in the 90's Low-cost "Service-level" Amazon introduced Low-cost Customer "Service-Time"

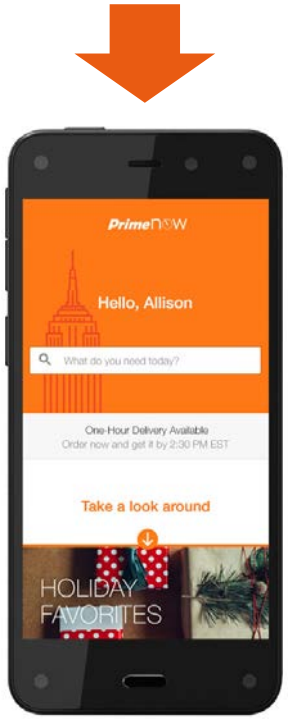
Amazon using economy of scale logistic efficiency to drive e-commerce customer service improvements through faster delivery

Remember when two day shipping was considered fast (and was expensive)?

Prime Now Service- customers in major cities can get up one hour same day delivery service and two hours free

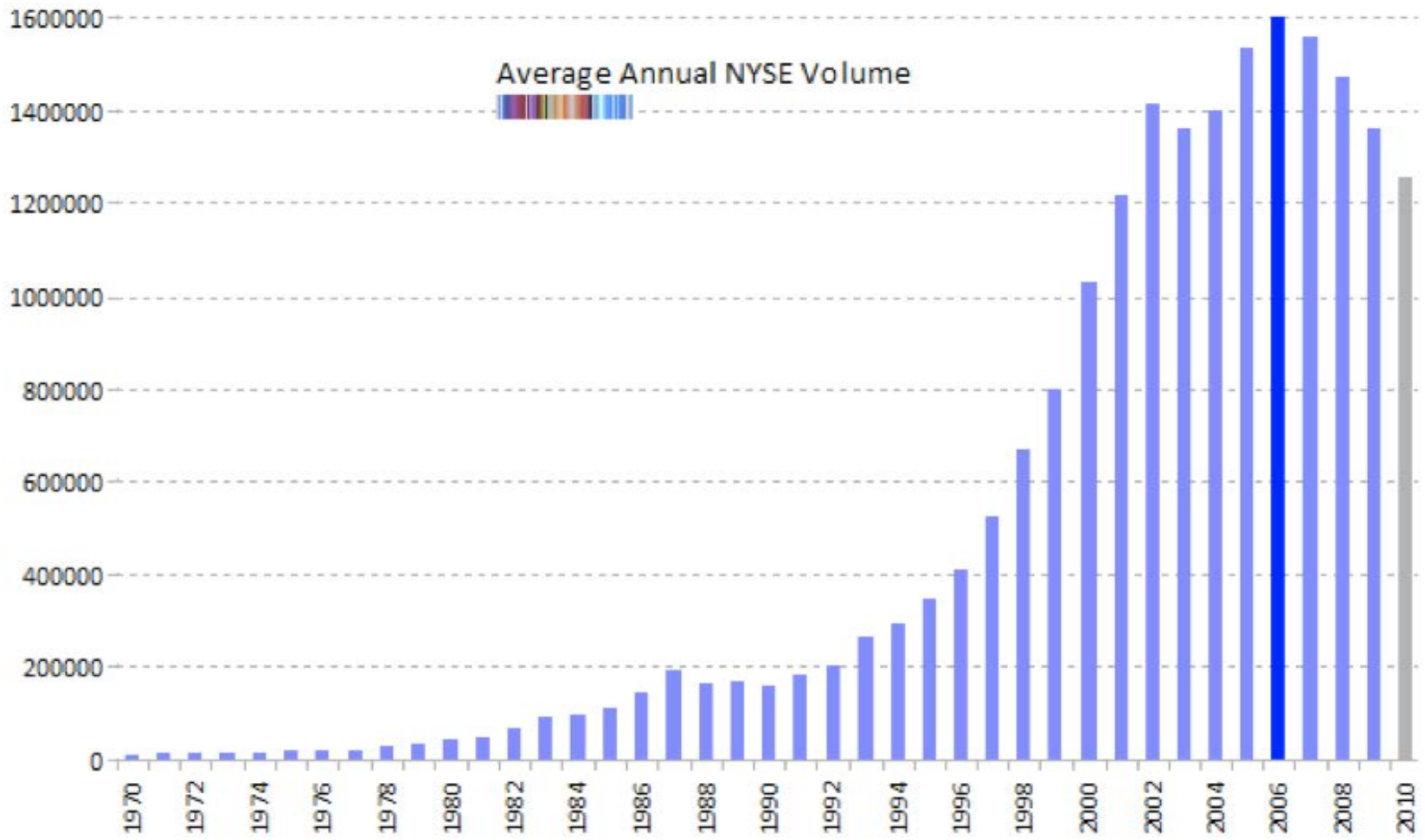
PrimeNOW
SKIP THE TRIP. ONE-HOUR DELIVERY.

23 minute candy delivery in Manhattan

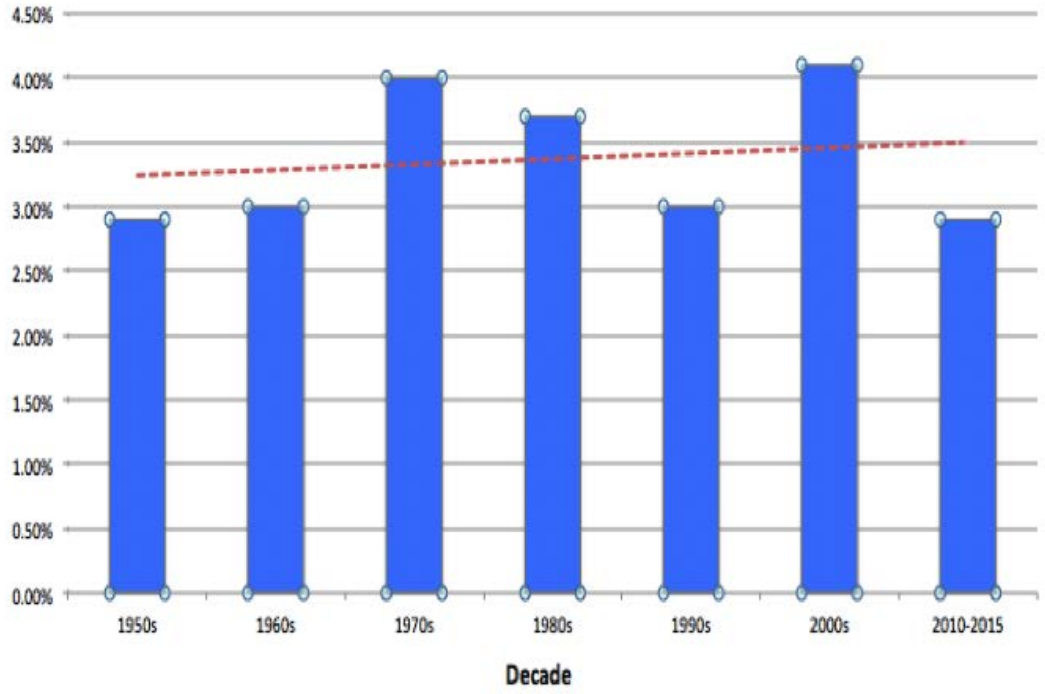


Increased Activity in the Market

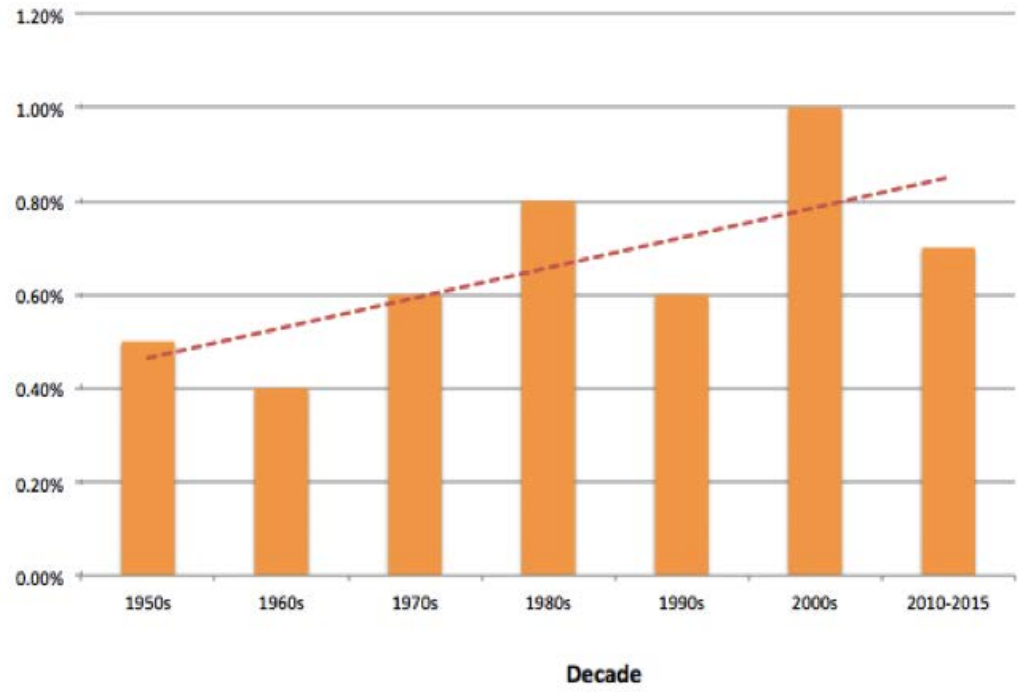
- Volume and number of transactions have risen
- Driven by rise of Online Brokerages in 1990s, together with surge in HFT (High Frequency Trading) in 2000s
- Hyper reactivity to news and signals affects stock prices more dramatically than in the past



Stock Market Volatility: The time-period makes the difference



Deviation of Annual Monthly Returns



Deviation of Daily Returns

- Intermediate and long-run volatility have not increased
- Short-term volatility has risen

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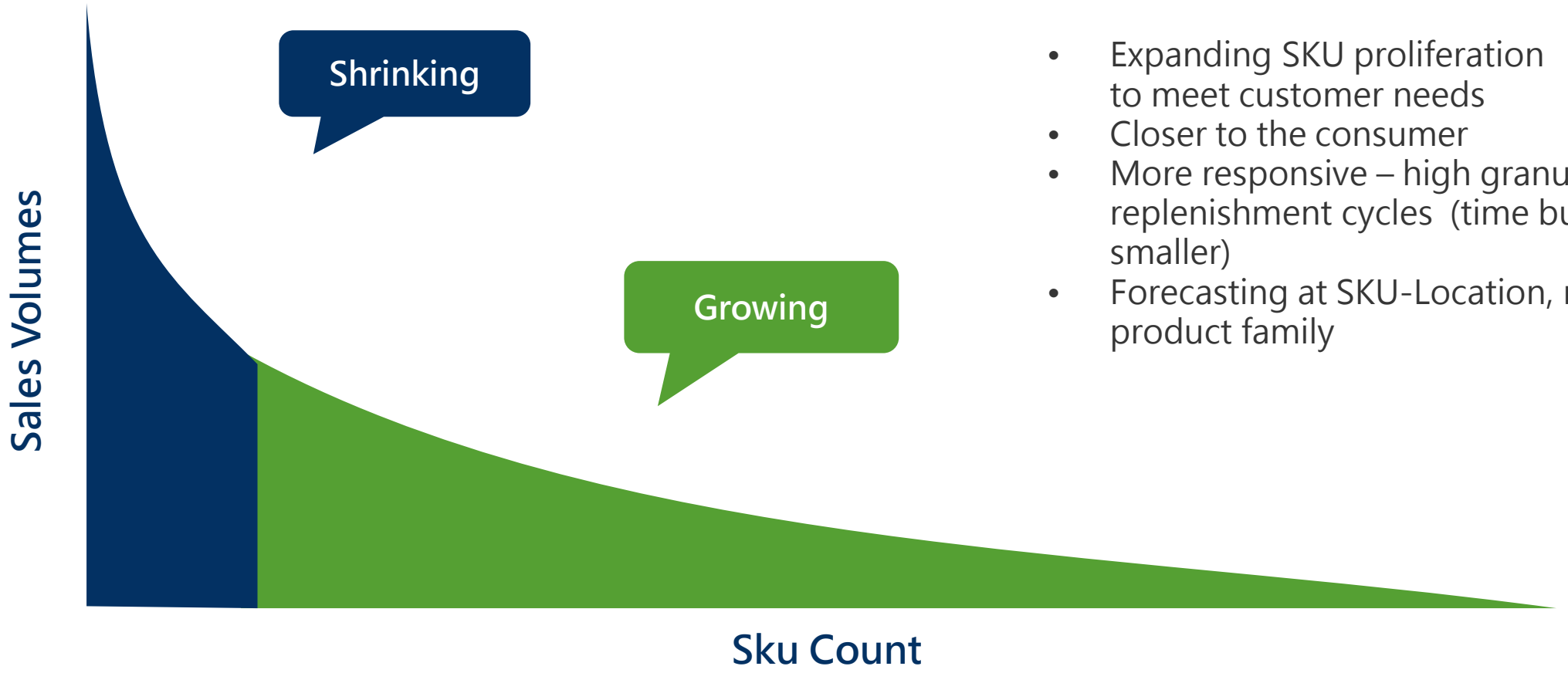
Things have Changed – The "Long Tail" is Here



Drivers

- Expanding SKU proliferation to meet customer needs
- Closer to the consumer
- More responsive – high granularity replenishment cycles (time buckets smaller)
- Forecasting at SKU-Location, not product family

Why Automation and Outcome as a service is becoming important

- Increasing uncertainty
- Increasing control frequency
- Product-Line extensions
- Lack of talent in SCP

Increasing decision making by an order of magnitude

Why management wants a better forecast when Forecast accuracy is bound to decrease in time?

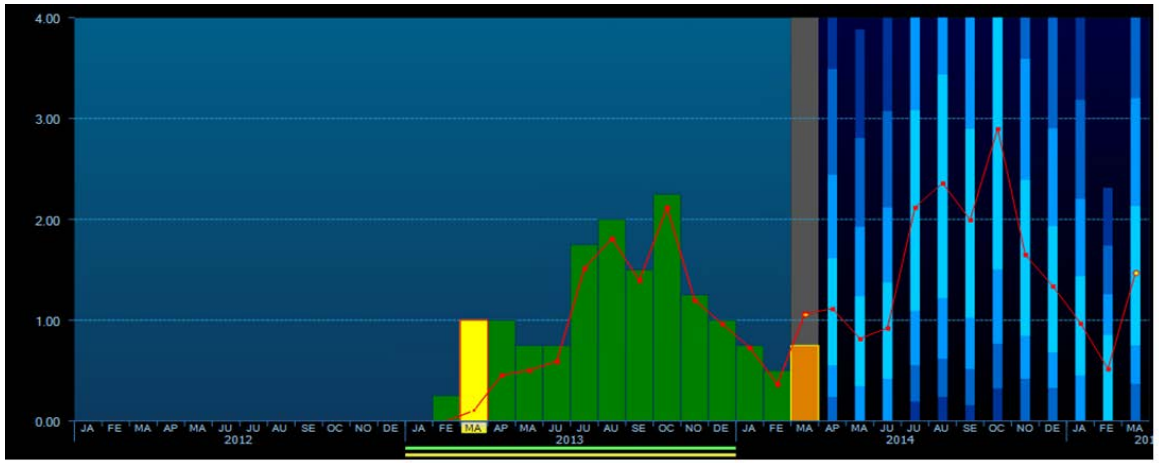
- On average by improving short term forecast error by 30% one can reduce inventory by 5%
- On average by applying inventory optimization one can reduce inventory by 20%

…In making decisions under uncertainty people replace the complex task of assessing probabilities with limited and simplified heuristic principles that can lead to severe systematic errors.

Judgement under Uncertainty: Heuristics and Biases (Science, 1974)

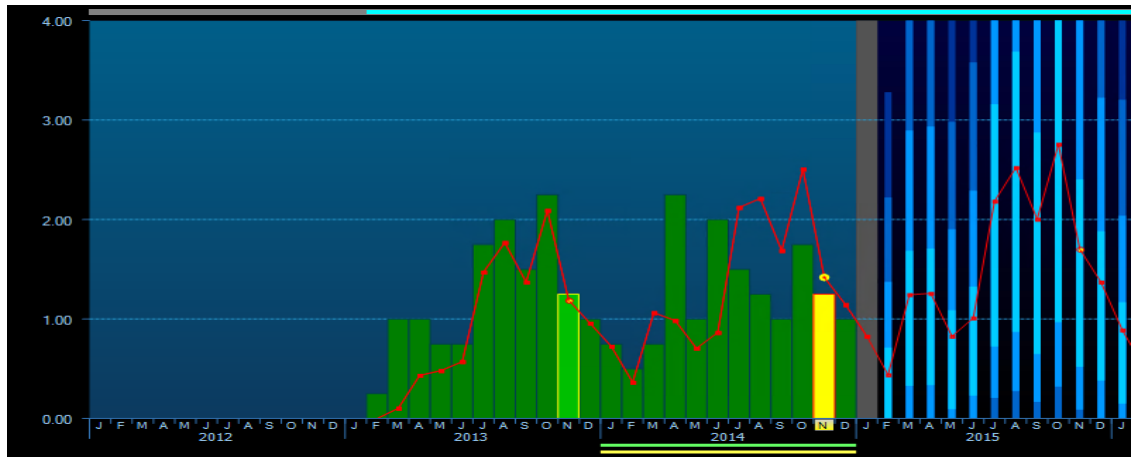
Amos tversky and Daniel Kahneman.

“Illusion of Validity”: Over-fitting



The peaks of August and October are random fluctuations or a seasonal variation.

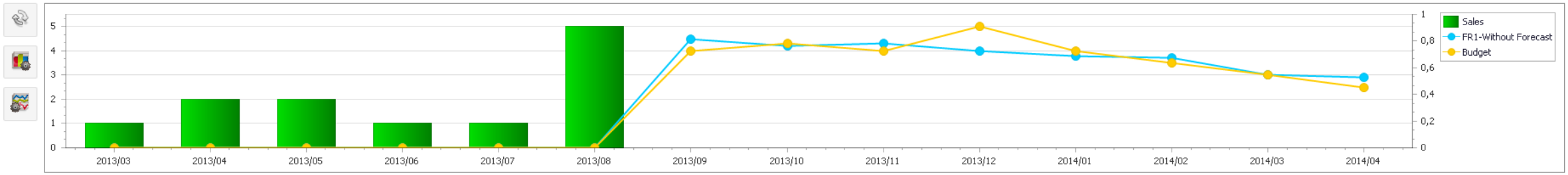
Over-fitting provides “high quality of the match between selected outcome and the input” ; an illusion of consistency



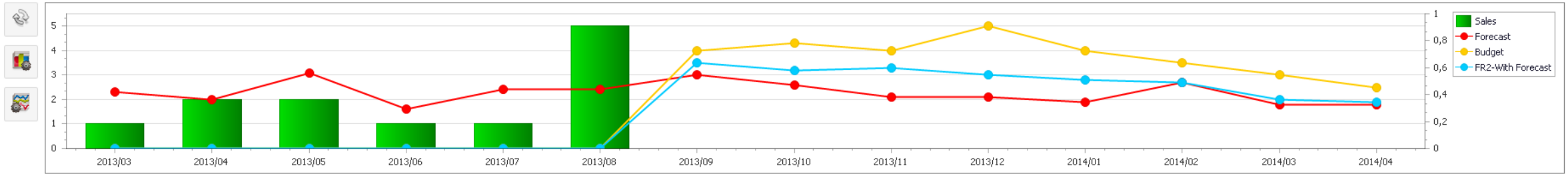
Unfortunately, the accuracy of the March 2014 forecast for the rest of the year is poor as random fluctuations dominate the demand.

Availability Heuristics: Anchoring

Manual forecast in the presence of the budget

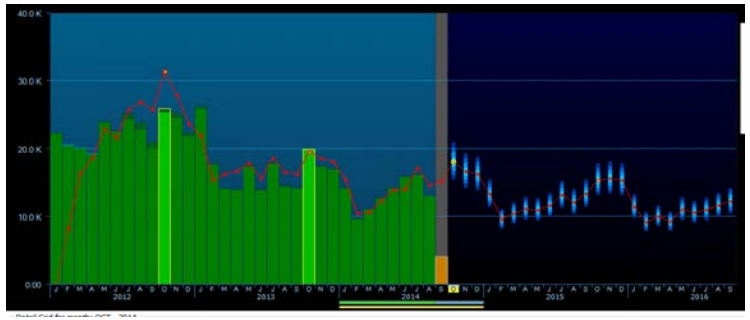


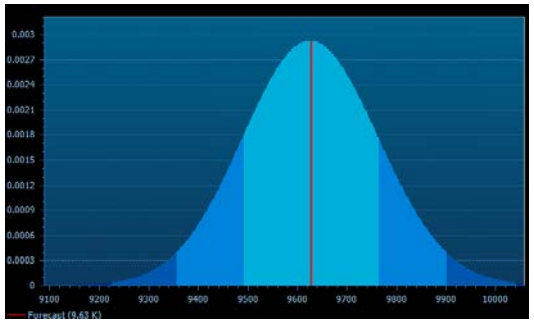
Manual forecast in the presence of the budget and Statistical Forecast



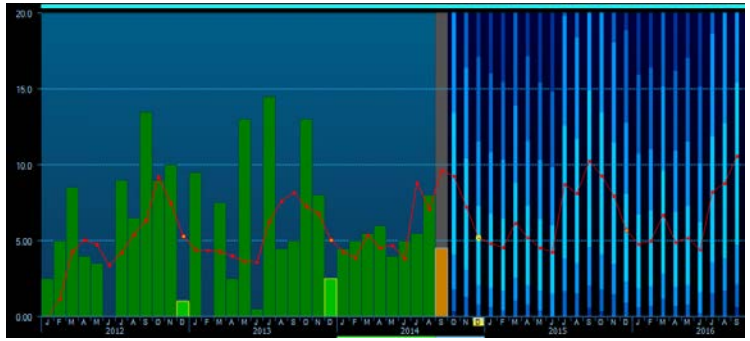
"Judgment Under Uncertainty" (Kahnemann and Tversky)

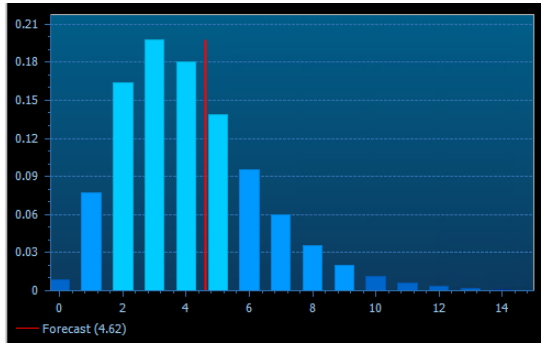
Availability Heuristics: Forecast Vs. Expectation



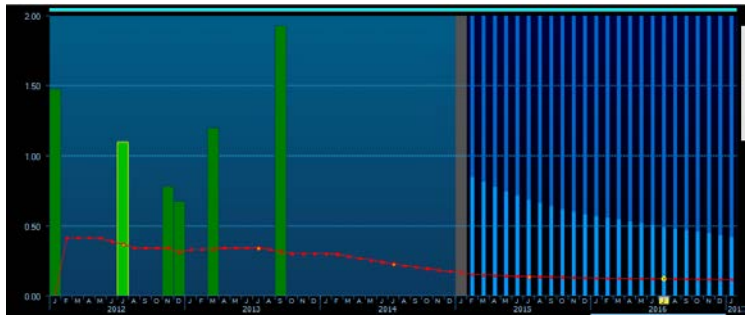


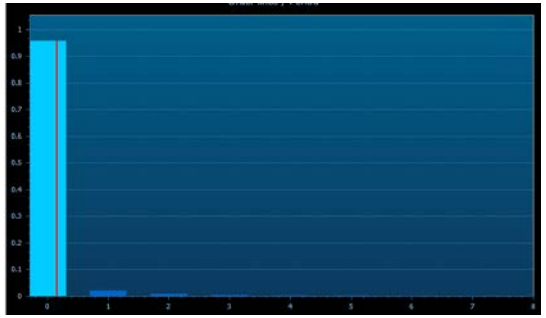
When demand is stable or “Normal”, the expected value and most probable value are similar.





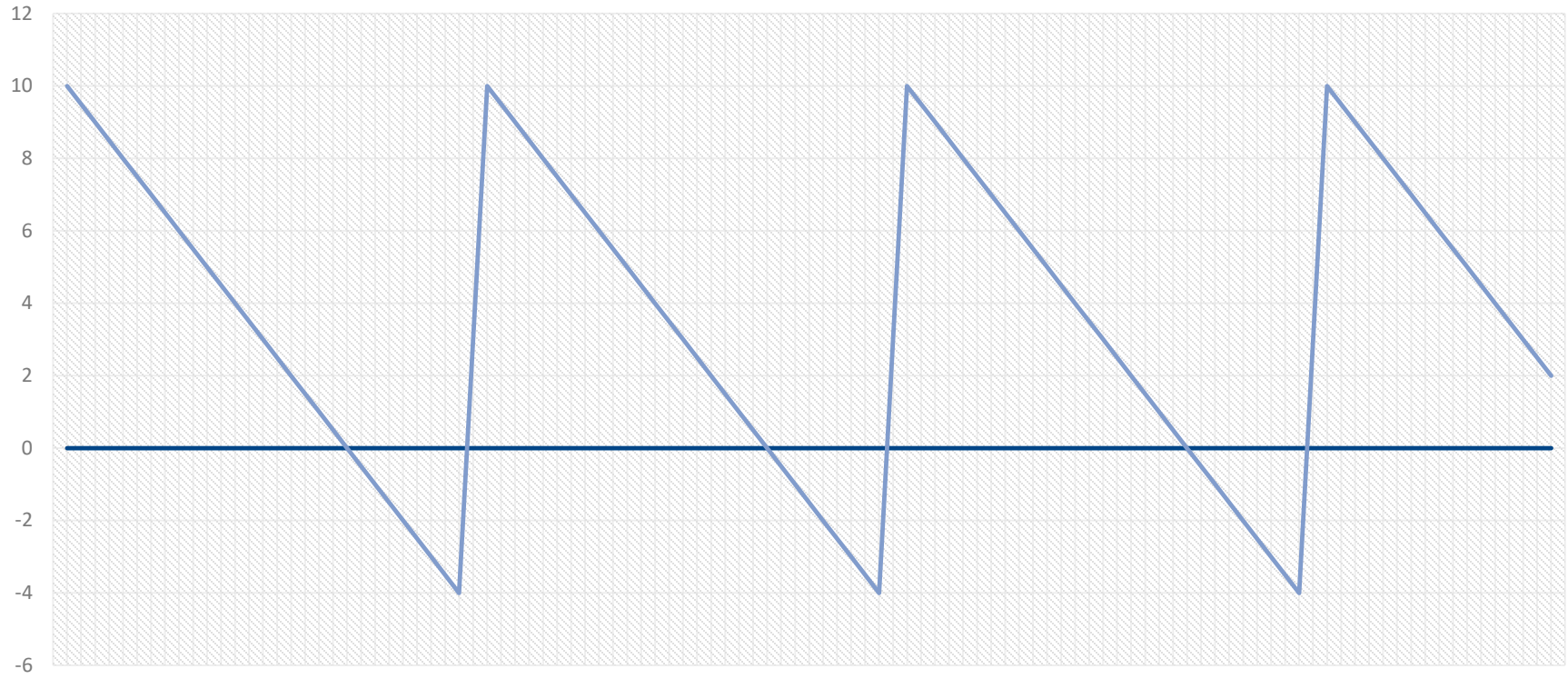
When demand is lumpier with skewed distribution, the mode is at the left of the expectation.





In “Tail” items with intermitted demand, the most probable value is zero! But the forecast is never zero. With zero forecast one keeps zero stock and provides no service.

Representativeness Heuristics: “misconception of chance”



Representing a case of 72% service level with classical saw tooth, measurement during short periods of time can provide either 100% or zero service level with “hysteric” consequences.

3. Functional approach to probabilistic SC planning and optimization

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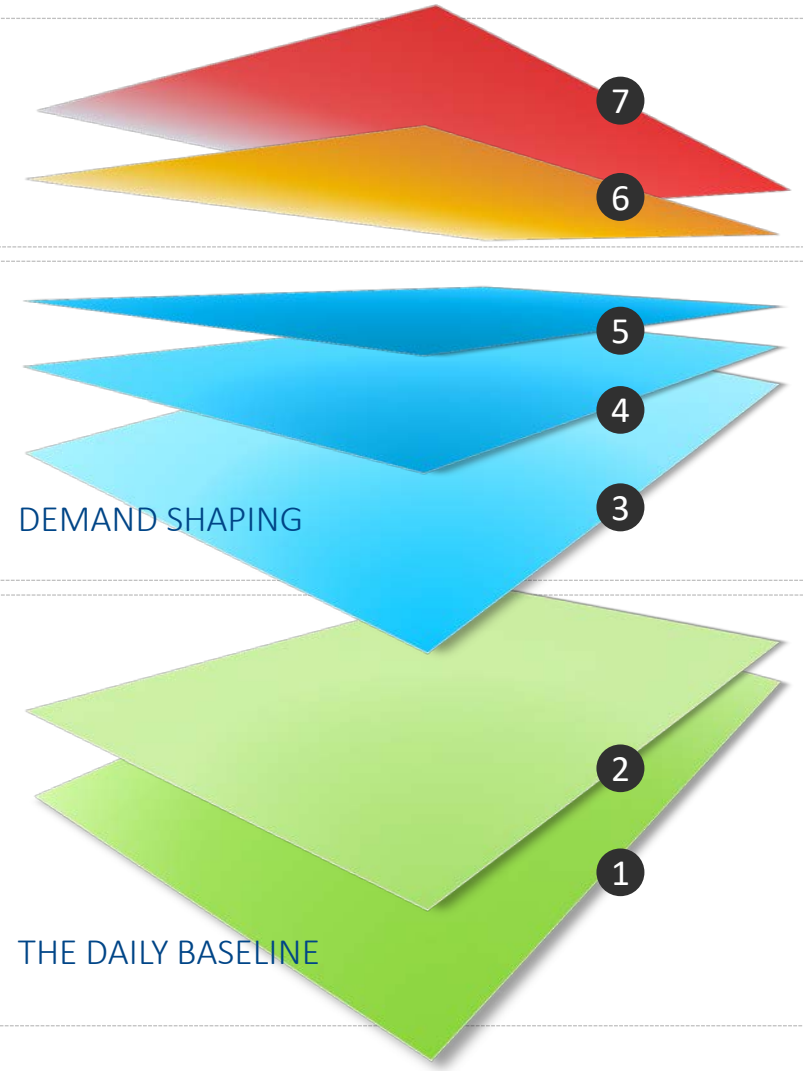
Advanced Modeling of Demand reduces its Volatility

DEMAND INSIGHT INCREASING



Market Intelligence

Special Events

PLANNER

Web indicators / sentiment

New Product Introduction

Media event effect

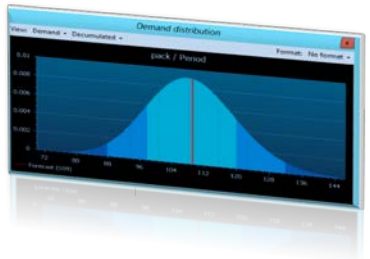
Trade Promotion

MACHINE LEARNING

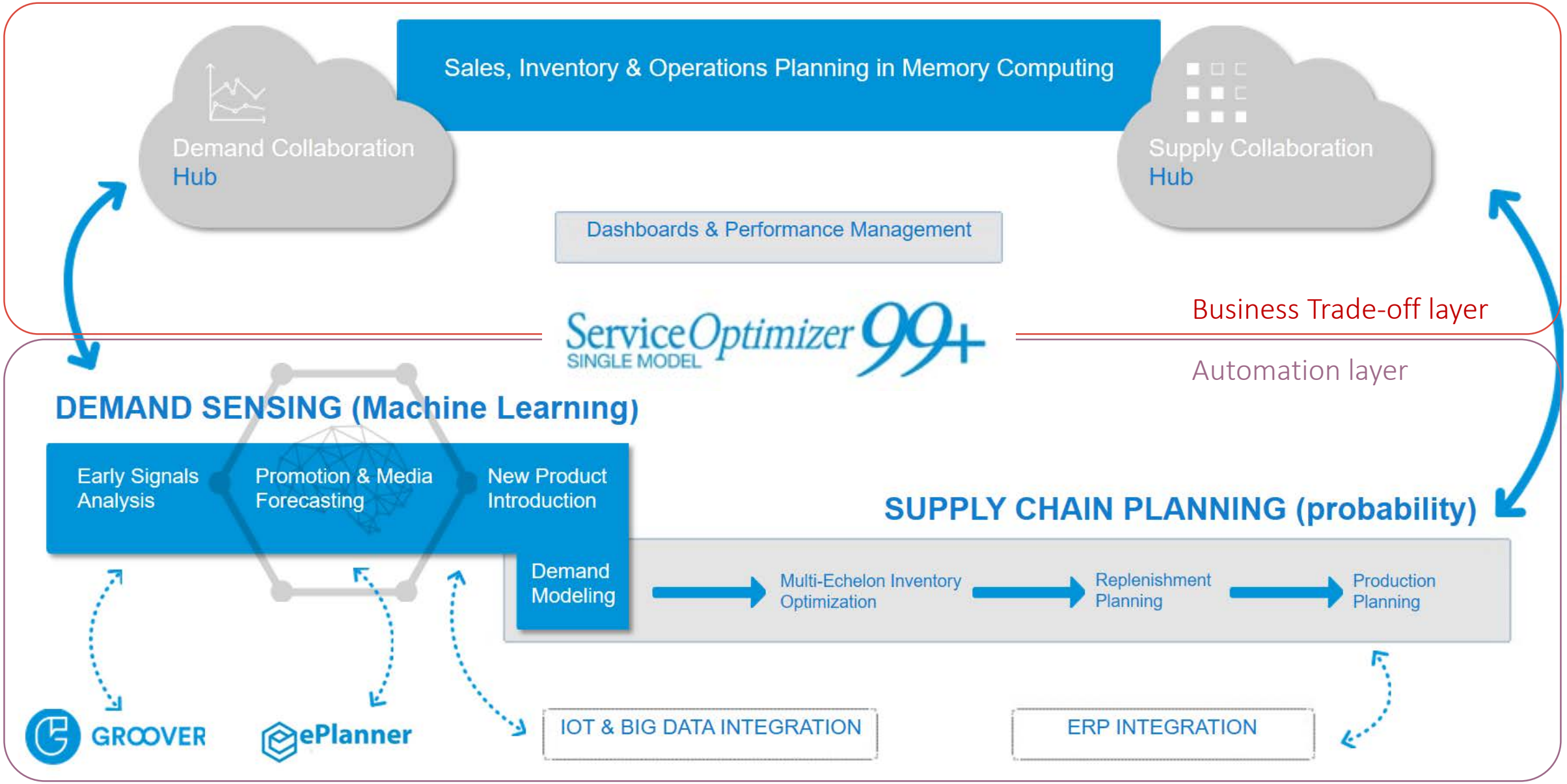
Trend, Seasonality, calendars and daily sale patterns

Statistical forecast

STOCHASTIC MODELING



S&OP: "WHAT-IF" SCENARIOS



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4. Myths and reality

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Recent Myths in Supply Chain

- Machine Learning can model and drive the high compelexity of SC if provide with all relevant input parameters
- One can simplify the complex supply chain and manage it with few “lean-principles” (DDMRP)

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