

## **Spare Parts Planning: come aumentare profitti e livelli di servizio**

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# Una situazione ben nota...



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**Le domande di oggi...**



**RIPARARE O ACQUISTARE?**

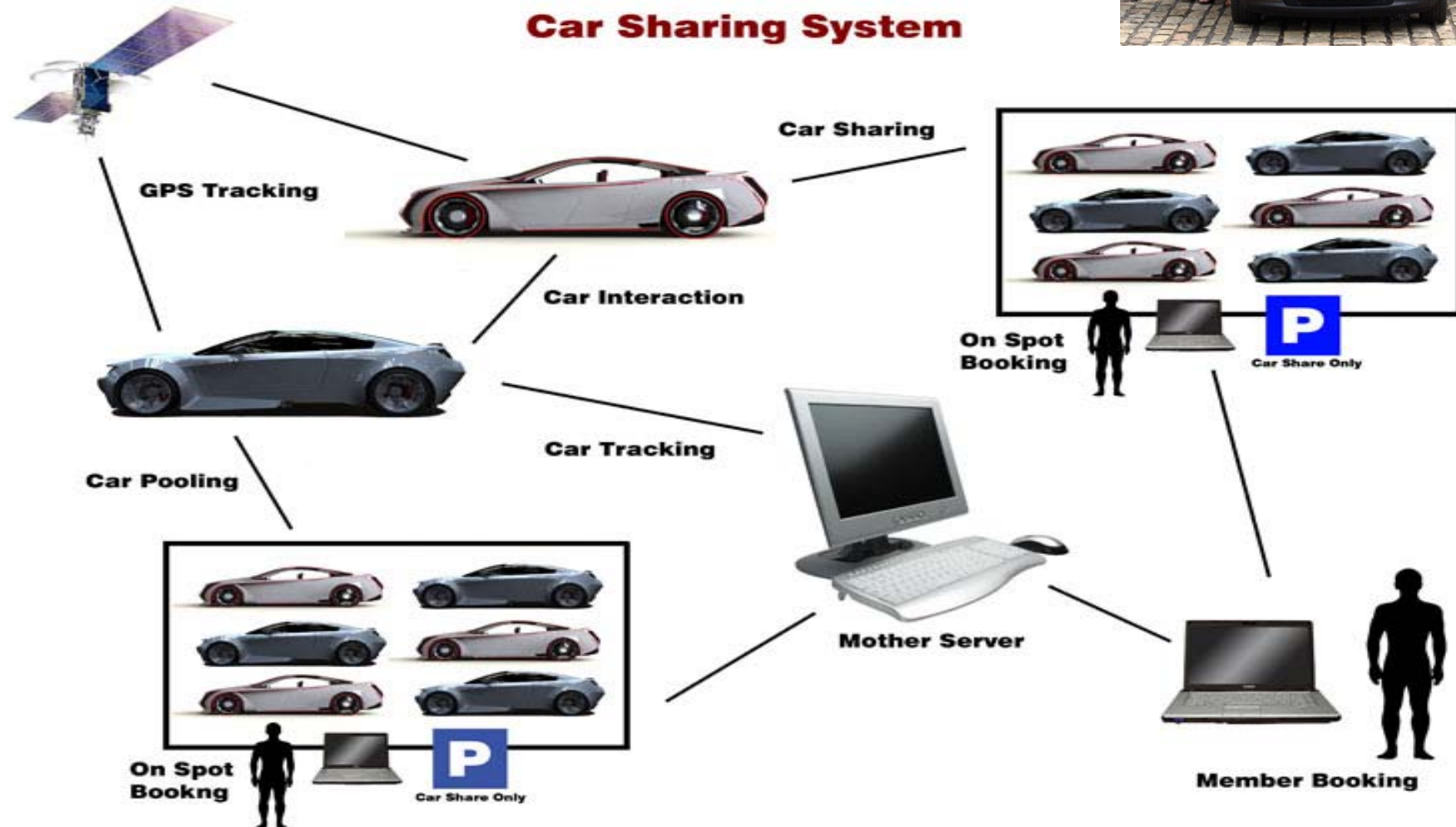


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# La mobilita' di domani?

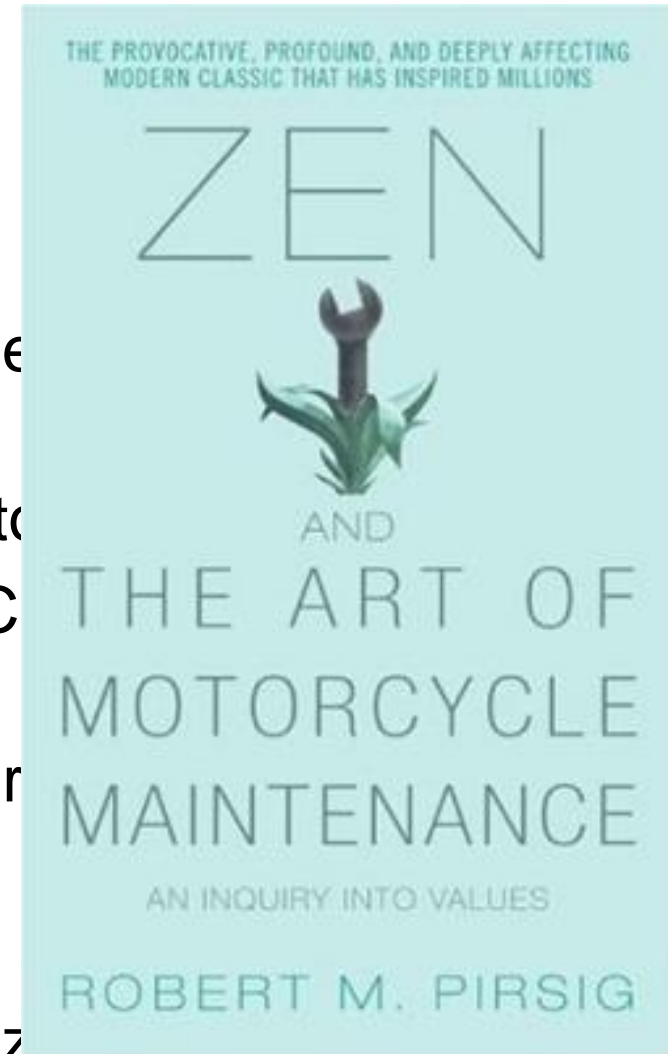


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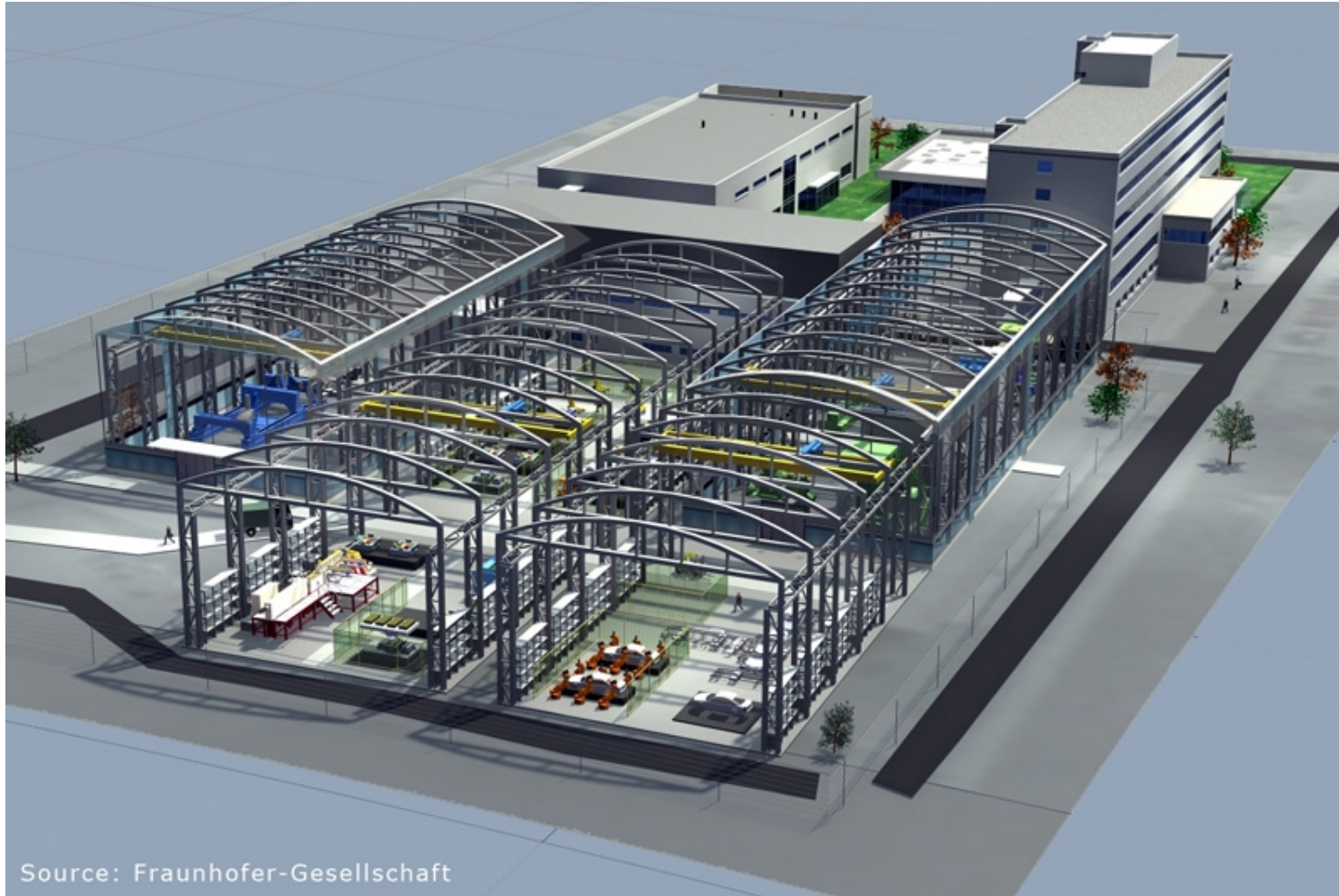
# Il fabbisogno di parti di ricambio aumenterà

- Paesi emergenti
- Crescita Demografica
- Reddito pro capite in diminuzione e contemporaneamente
- Risorse energetiche in esaurimento
- Esigenza di Mobilità alternativa (Ciclo e Transport)
- Esigenza di Mobilità ecologica (Ibrido e Elettrico)
- Sempre più Macchine Agricole
- Sempre più Macchinari da Costruzione



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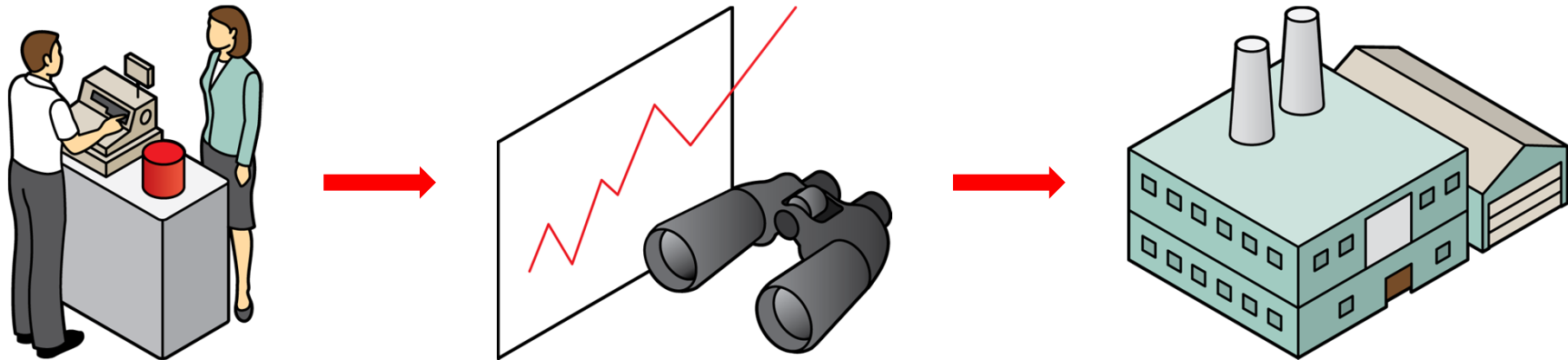
**Non importa che aspetto avra' la fabbrica del futuro..**



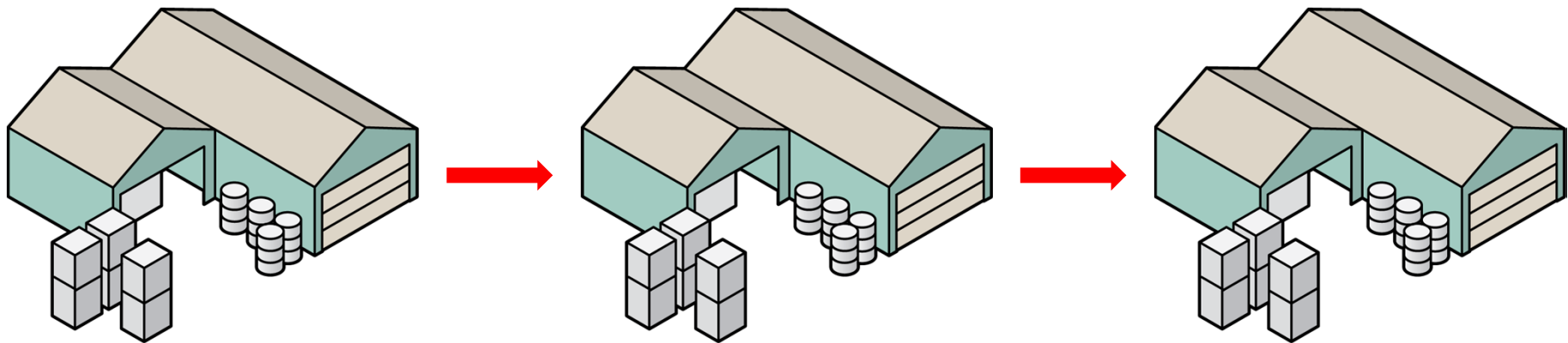
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# Il processo sara' piu' o meno lo stesso



**La fabbrica deve produrre cio' che il mercato richiede e prevedere la domanda è spesso un task complesso**

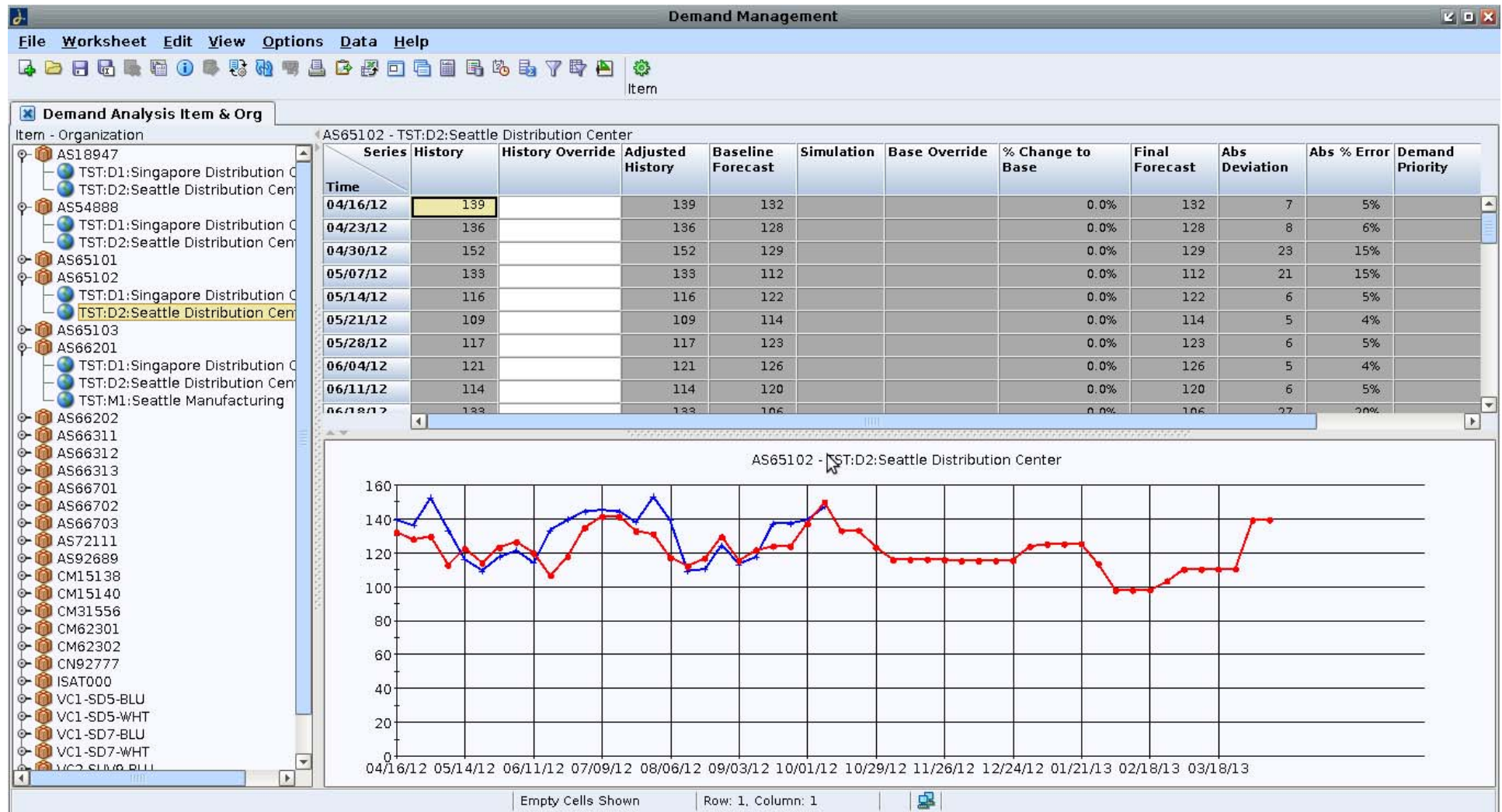


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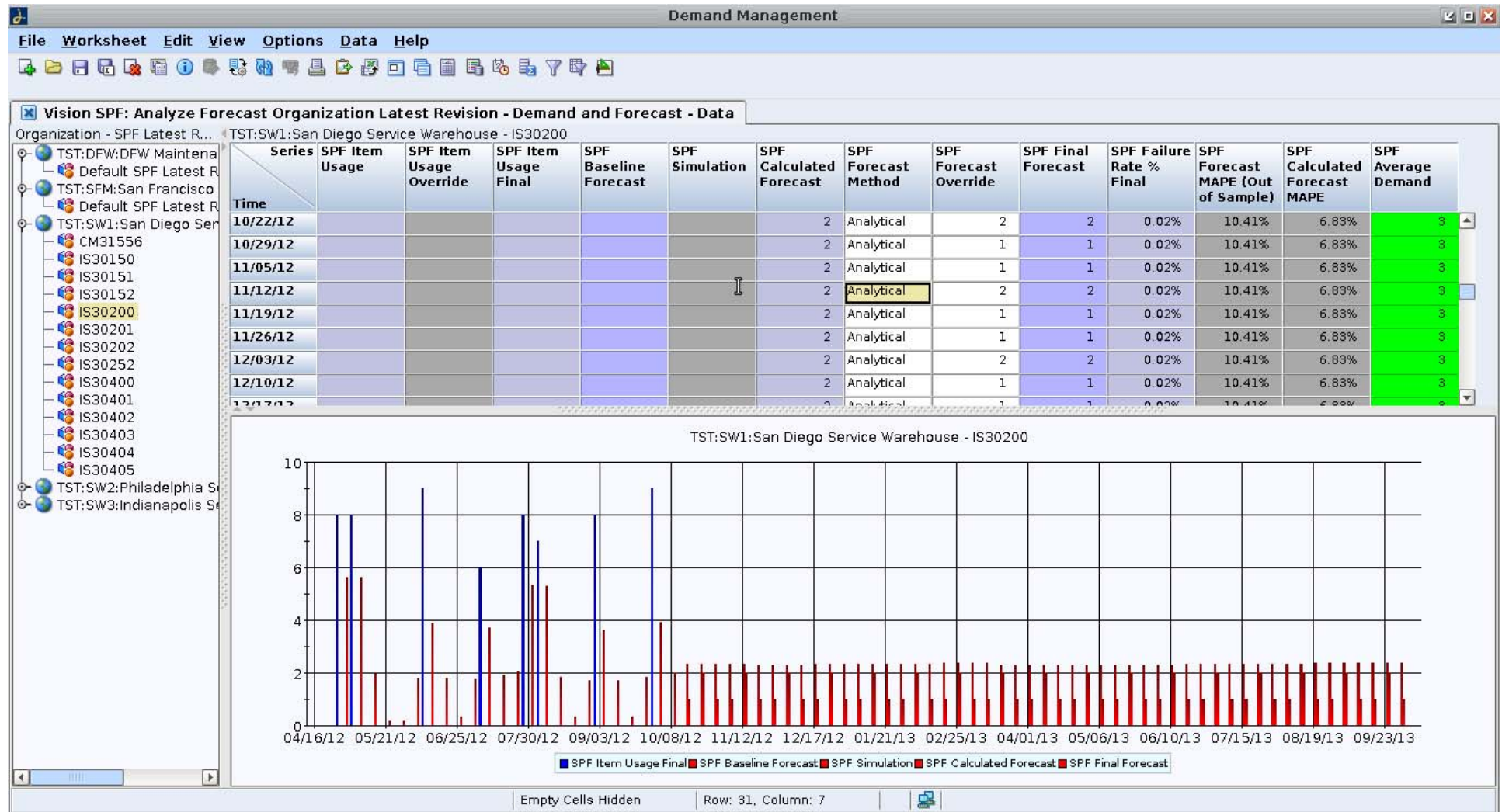
# Profilo di Domanda continua



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# Profilo di Domanda Intermittente



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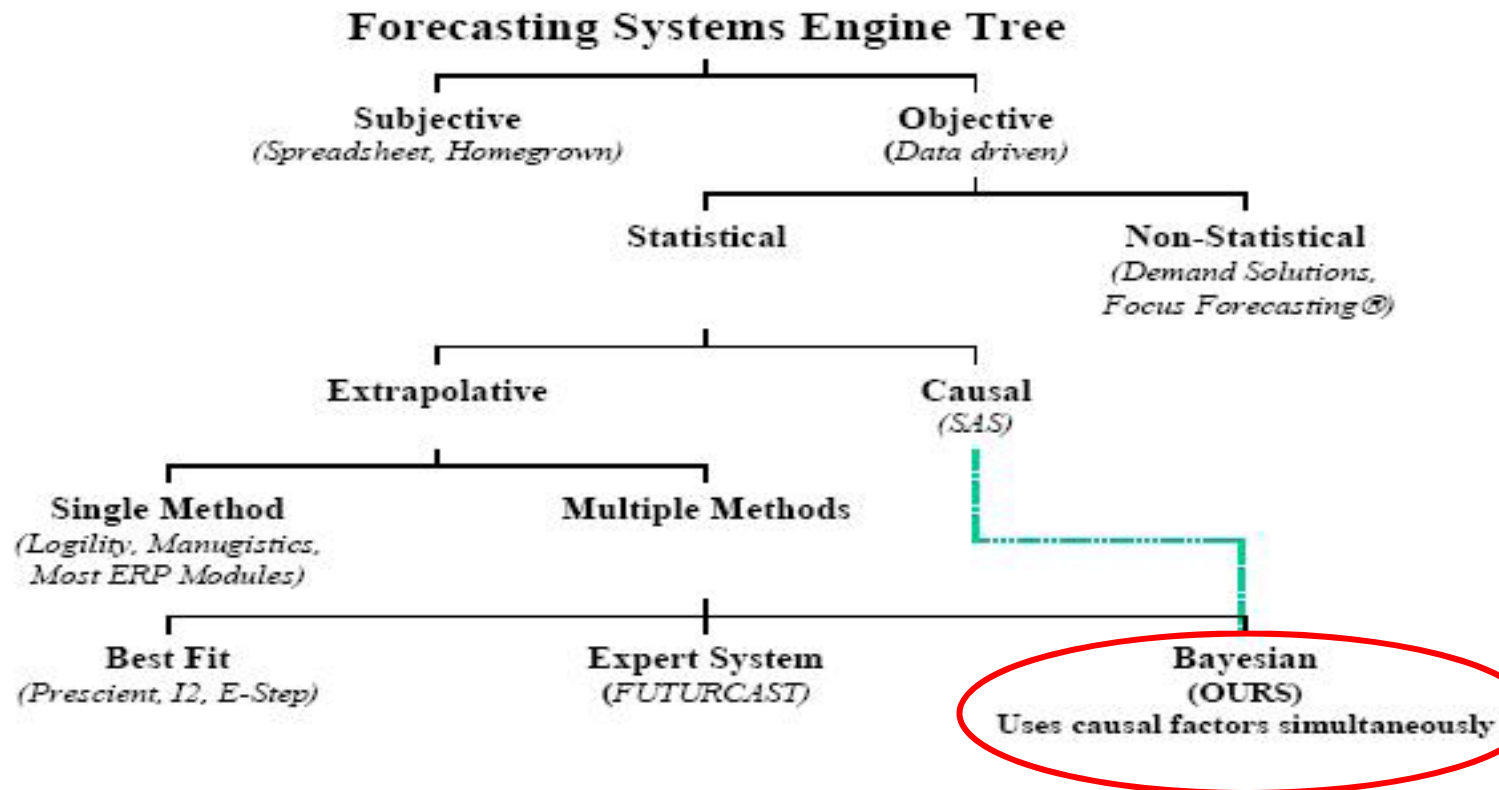


## Parti di Ricambio e Domanda

- Profilo Discontinuo
- Difficile da prevedere al di là dei replenishments programmati
- Impatto su scorte, fornitori e catena distributiva potenzialmente sfavorevole.
- Come fare?

# Forecast Systems Today

- Benché la maggior parte dei motori di Forecasting si basi su uno o più metodi statistici l'approccio Demantra permette di combinare i vantaggi di ogni modalità per generare la miglior accuratezza grazie alle tecniche probabilistiche statistiche presenti nel motore



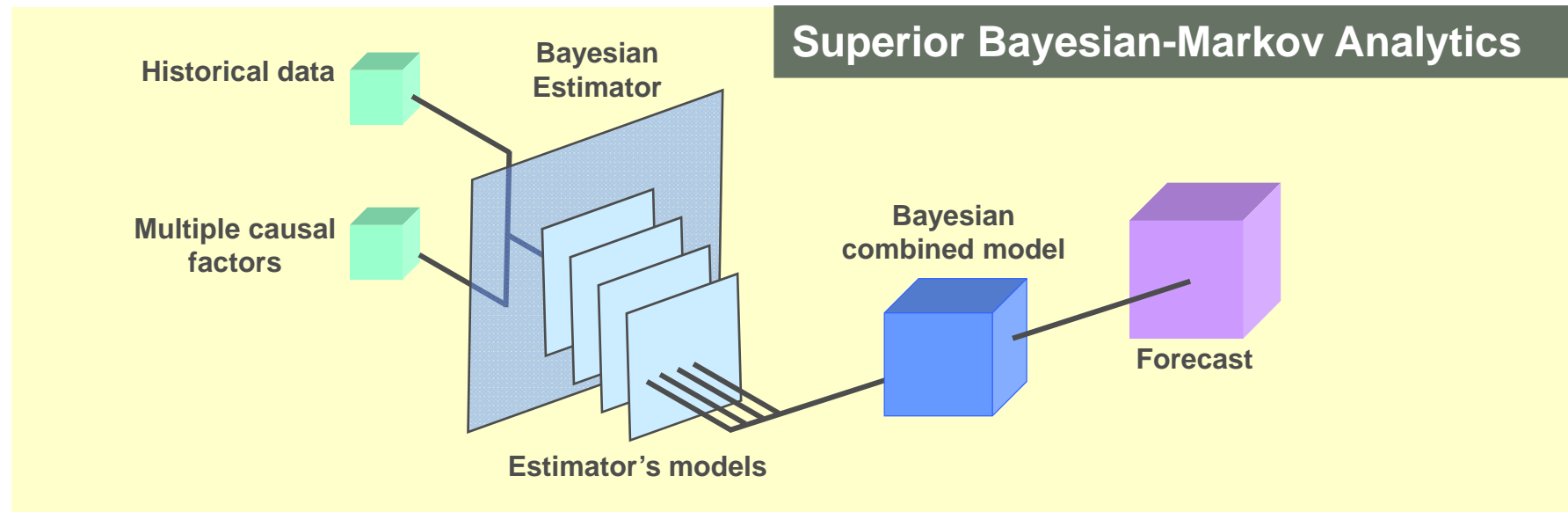
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# Improve Forecast Accuracy

Designed for planners, not programmers (“PhD in a box”)



- **Bayesian mix modeling**
- **15 model library**
  - Auto-regressive moving average (ARMA)
  - Regression integrated winters
  - Logistic and logarithmic models
  - Ridge regression, Markov chain regression
  - Intermittent regression
- **Unlimited causal factors**
  - Seasonality, weather, market indicators
  - Base + price + multi-event lift decomposition
- **Promotion effects**
  - Cross-product and cross-location effects
  - Pre and post event
- **Automatic outlier detection**
- **Trend long, short, dampening**
- **Missing data interpolation**
- **Shape modeling and auto-correction**
- **Regime change**
- **Fit and forecast validation**

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# Unique Demantra Forecasting principle

- The main principle of forecasting is to find the model that will produce the best forecasts, **not the best fit to the historical data**. The model that explains the historical data best may not be best predictive model for several reasons:
  - The future may not be described by the same probability as the past.
  - The time series could be nothing more than a non-recurrent historical record.
  - The model may involve too many parameters. Overfitted models could account for noise or other features in the data that are unlikely to extend into the future.
  - The error involved in fitting a large number of parameters may be damaging to forecast accuracy, even when the model is correctly specified



# Demantra's Bayesian approach

- Because the behavior of items can differ from item to item, and in some cases from location to location, using one pick-best model to generate forecasts **is not recommended**
- When using one pick-best model not all item-location combination are forecasted with the same accuracy and often a **statistical expert** is needed to deploy **overfitting** (the stretching of a statistical model to accommodate the largest possible Data Population)
- **Bayesian analysis**, in contrast, allows **multiple data models of comparable high quality to be combined by assigning probabilities to each model**. In addition to improving the accuracy and robustness of predictive abilities, this approach also adds considerable flexibility to the system and **only basic statistical knowledge** is needed for most implementations

# Causal Factors

## Global

- Global causal factors (global factors) apply to all combinations varying only by time
- Default Causal's
  - Trend
  - Month of the year
  - Constant
  - Winter
  - Summer
- Typical Causal's
  - Month Week
  - Holidays

## Local

- Local causal factors varies by item/location/time
- Default Causal's
  - Price
- Typical Causal's
  - Number of stores
  - Events
  - NPI

## Promotional

- Greatly vary by business needs
- Enable decomposition to base and lift
- Have additional functionality not available to other causals
- Typical Causals
  - Discount
  - Promotion Type
  - Length of promotion



# Un caso pratico di fattori Causali. Macchinari sotto contratto

Demand Management

File Worksheet Edit View Options Data Help

La base installata fornisce indicazioni sul parco oggetto possibile di riparazione

La diffettosità ci aiuta a capire la probabilità di rottura (asse temporale in settimane o percorrenza)

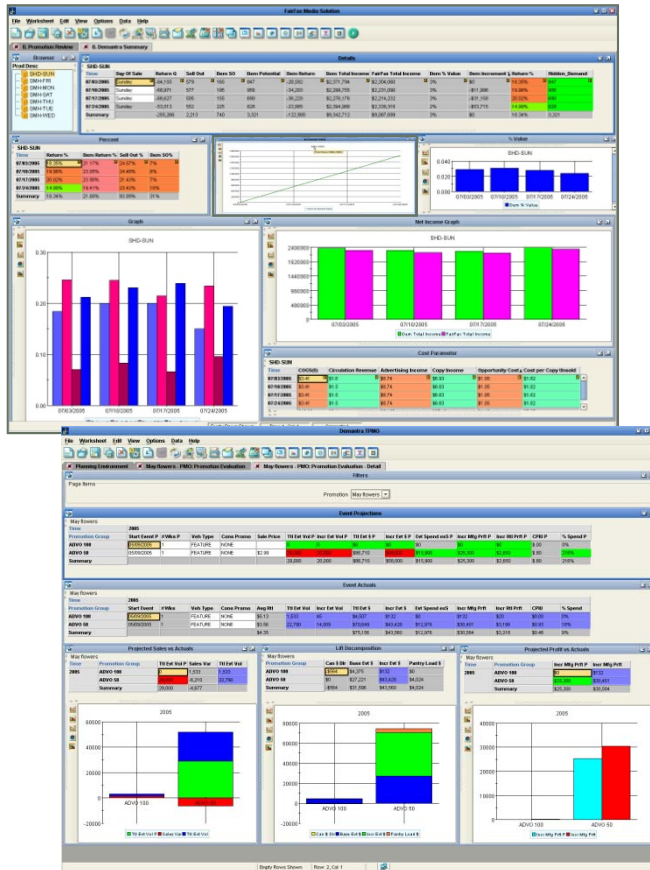
....Aiutandoci a Generare un Forecast dove sarebbe altrimenti  
Difficile e poco affidabile

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# Sense Demand Real-Time

Involve all constituents and forecast closer to the point of consumption



- **Sense demand real-time, at more granular level, and closer to the point of consumption**
  - Report and measure demand in the ways important to your business - role-based Collaboration Workbench for coordinated demand response
  - Support different demand data for each customer and channel
  - Easily add additional sources of information, such as external syndicated and POS data, using data integration profiles
  - Use multiple units of measure and multiple currencies
  - Collect information from multiple source ERP instances
  - Out-of-the-box integration for Oracle EBS, JDE E1
- **Leverage built-in intelligence to automatically select which level's data to use for forecasting**
  - Roll up data across unlimited hierarchies
  - Forecast at any level of time, product, and location aggregation
  - Completely meta data driven – change on the fly
  - Weekly and daily forecasting support
  - Simulate and compare different demand scenarios
- **Automate collaboration through workflow**
  - Ensure all constituents submit numbers on time
  - Configurable push exception management automates review process

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# Sense Demand Real-Time

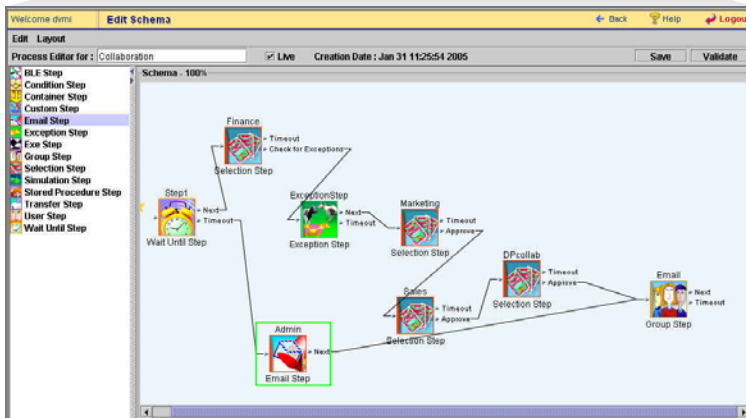
Quickly identify and react to demand changes and exceptions



Done?	Message	Select value	Source	Assign date	Due date
<input type="checkbox"/>	<a href="#">Retail Data Loaded</a>	None	CPFR Process	Wed Feb 02 14:27:37 2005	Tue Mar 01 14:30:00 2005
	Exceptions are attached, please review				
<input type="checkbox"/>	<a href="#">New Store - Walmart</a>	None	New Ship To Introduction Process	Tue Feb 01 13:07:37 2005	Mon Feb 28 13:10:00 2005
	Establish new store				
<input type="checkbox"/>	<a href="#">New Title Release</a>	None	New Product Introduction	Tue Jan 25 14:00:37 2005	Mon Feb 21 14:03:00 2005
	Generate forecast & replenishment for new SKU				
<input type="checkbox"/>	<a href="#">Check the Report</a>	None	John B	Thu Jan 20 11:59:07 2005	Fri Jan 21 11:59:59 2005
<input type="checkbox"/>	<a href="#">Demand Filter too high</a>	None	Real Time Alert	Sat Jan 15 08:01:00 2005	Sun Feb 06 16:27:40 2005
	Demand higher than initial forecast				
<input type="checkbox"/>	<a href="#">Demand Filter too low</a>	None	Real Time Alert	Sat Jan 15 08:00:00 2005	Sun Feb 06 16:26:40 2005
	Demand lower than initial forecast				

Mark all as read Create Task Save & Refresh

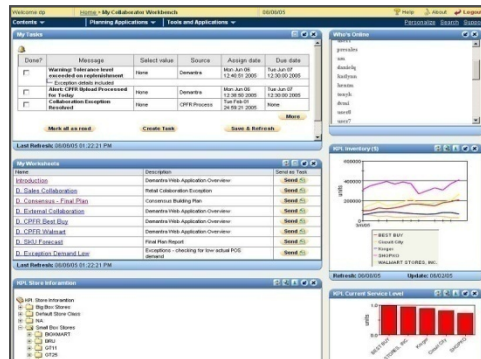
Last Refresh: 02/10/05 06:48:59 PM



- **Adapt quickly to new demand signals**
  - Incremental forecasting
- **Tailor planning processes to resemble unique company business requirements**
  - Easy-to-use drag and drop interface
  - User definable performance indicators
- **Task and exception driven user dashboards**
  - Queue for workflow and manually generated tasks
  - Alerts and actions can be triggered by people, the systems, or the analytic engines
- **Automated escalation ensures response**

# Improve Demand Planner Productivity

Configurable user interface replaces need for individual spreadsheets while ensuring enterprise database access and security



- Task oriented dashboards
- Excel like worksheets
  - Context sensitive
  - User configurable workspaces
  - Copy and paste multiple cells and rows
  - Create new worksheets based on 20 seeded ones (Historical forecast performance, Forecast accuracy, Top and bottom 5 customers year to date, Revenue analysis, and more)
  - Shared and private worksheets
  - View in any unit or currency
- View data at multiple levels in hierarchy of choice
- Simultaneous update and view multiple worksheets and perform side-by-side comparisons
- Color coding based on exceptions
- Flexible formulaic expressions
- Online notes with audit trail
- Off-line mode with automatic sync and MS Excel integration

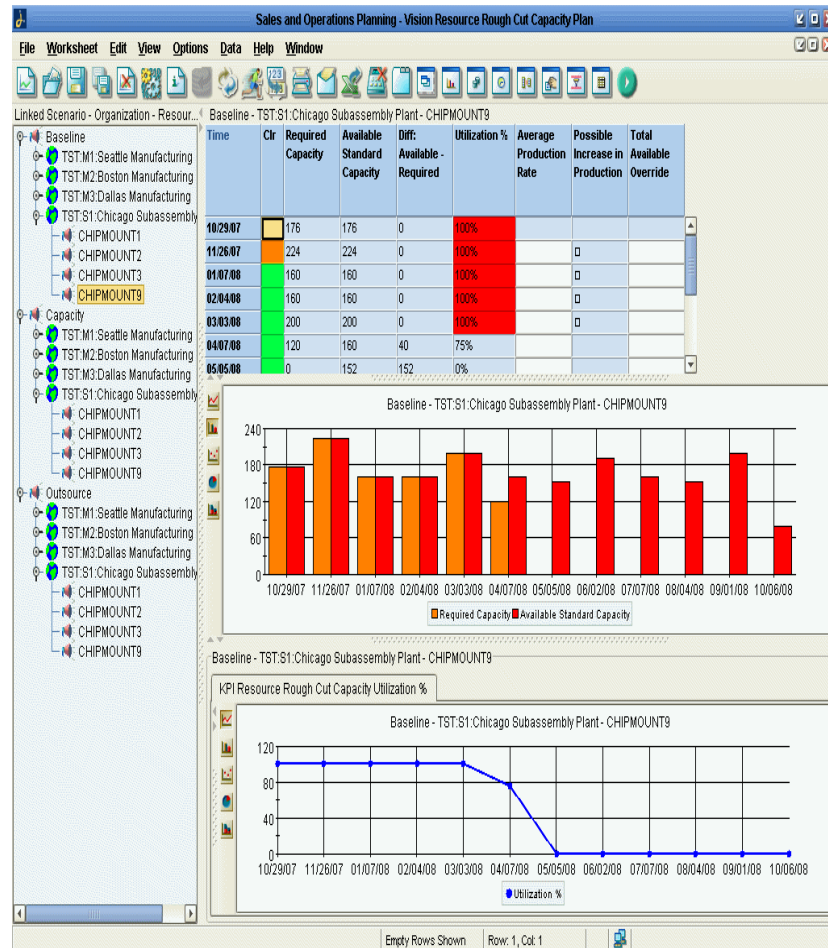
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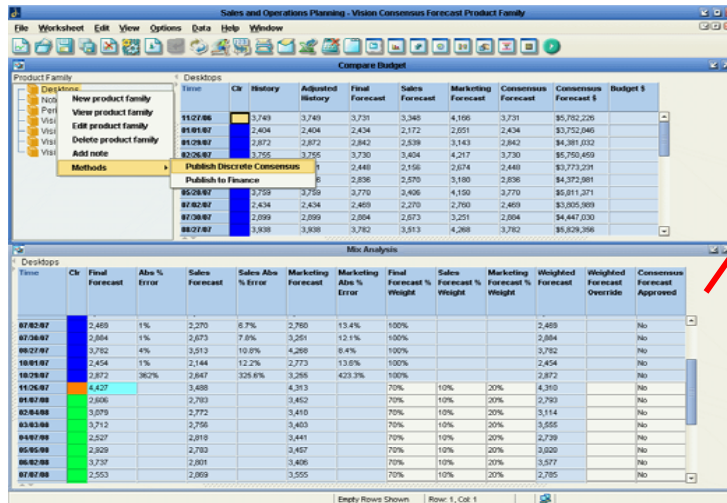
# Balance supply, demand and budgets

Maximize sales and improve operations through a continuous S&OP process

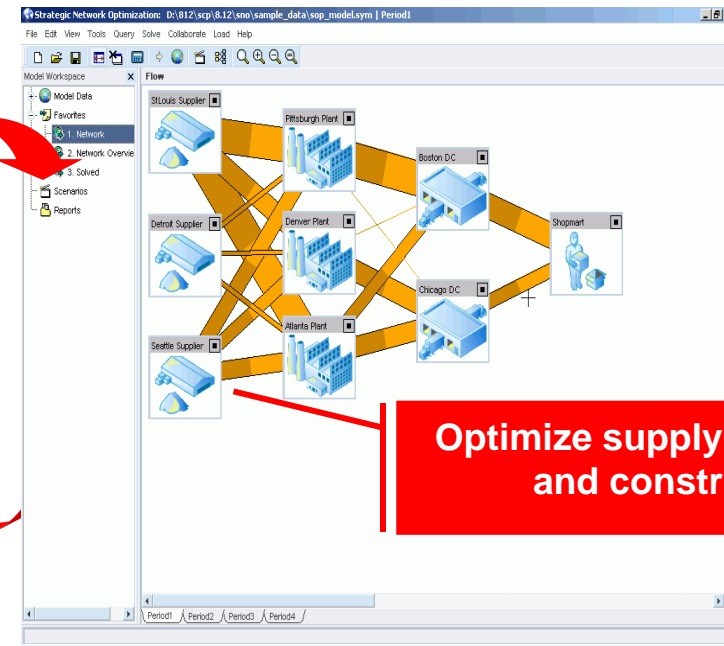


- Balance supply, demand, and budgets
  - Compare consensus forecast with constrained forecast
  - Resource rough-cut capacity (RCCP)
- View supply Information at all levels of aggregation
  - Planned production
  - Available capacity
  - Required capacity
  - Supplier rough-cut capacity
  - Production plan
  - Inventory plan
- Make allocation decisions while trading off service levels and cost
  - Evaluate the allocation of constrained supply to demand
- Balance needs of many customers in different channels
- Examine throughput on the most critically constrained resources and profitability by product family

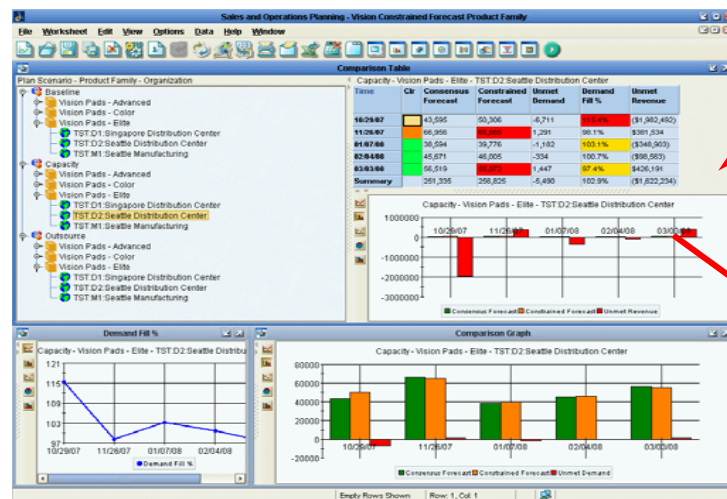
# Highly Interactive Simulation and Analysis



**Publish working consensus forecast**



**Optimize supply network and constrain**



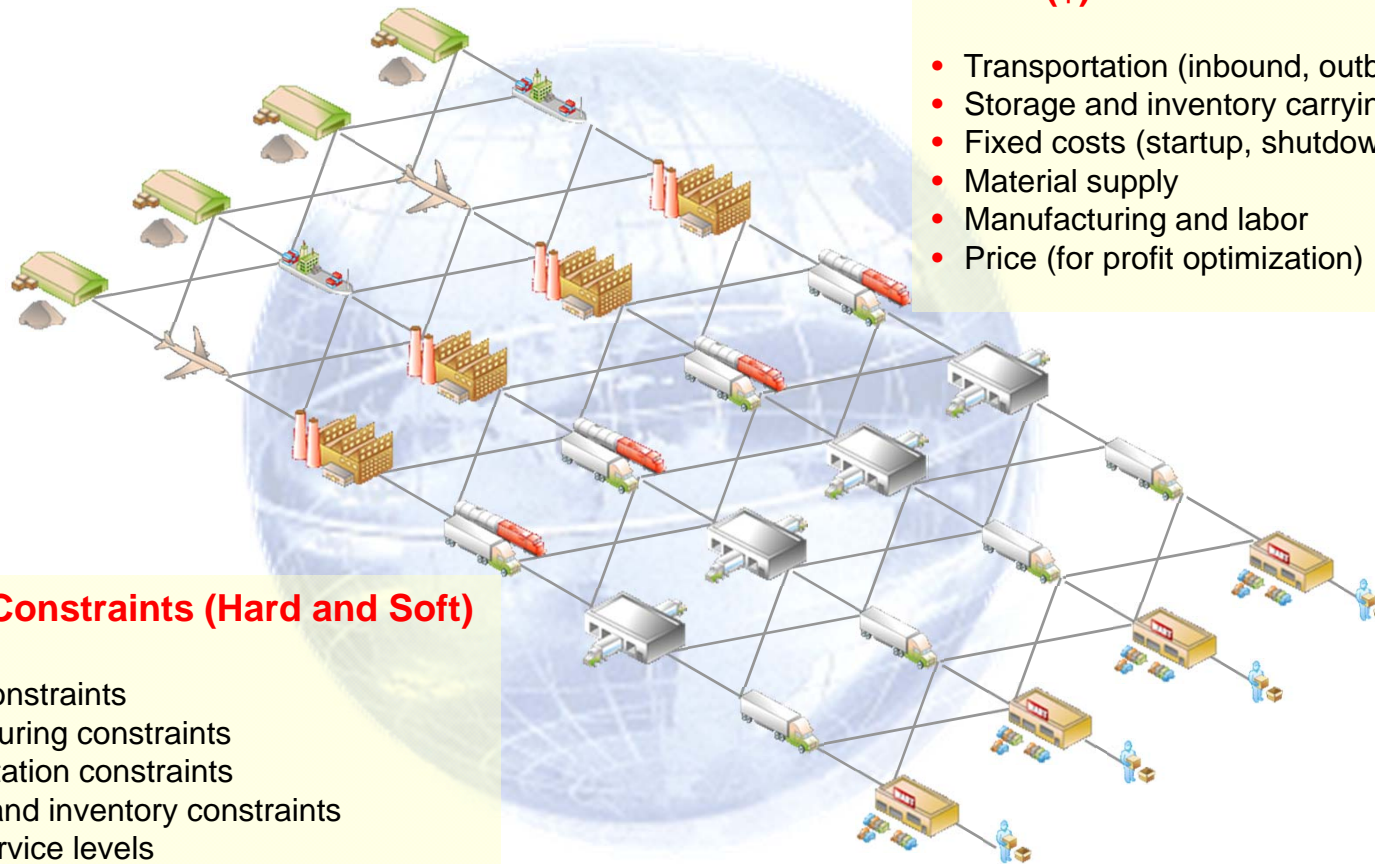
**Compare scenarios for decision making**

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# Oracle Strategic Network Optimization

Consider all costs and constraints that impact the decisions



## Costs (\$): Variable and Fixed

- Transportation (inbound, outbound)
- Storage and inventory carrying costs
- Fixed costs (startup, shutdown, operating)
- Material supply
- Manufacturing and labor
- Price (for profit optimization)

## Capacity Constraints (Hard and Soft)

- Supply constraints
- Manufacturing constraints
- Transportation constraints
- Storage and inventory constraints
- Target service levels
- Dynamic safety stock

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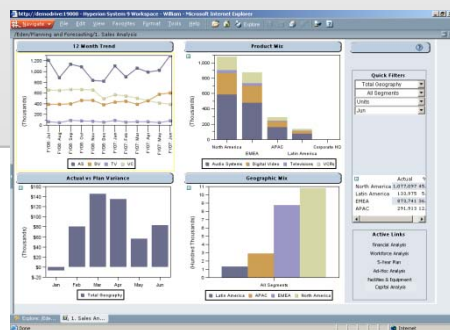
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# Connect Finance and Operations

Challenge: misalignment between financial and operational plans

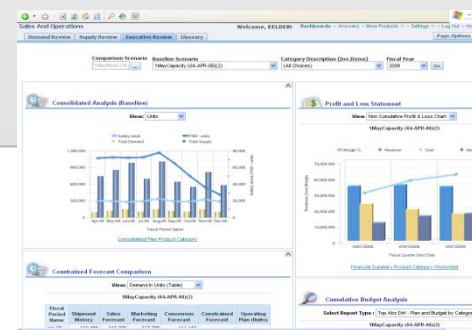
## Financial Planning

- Financial plans do not reflect operational realities
- Revenue forecast is unreliable as it not adjusted to reflect operating forecast
- Strategic financial plans lack bottom up validation
- Financial planning uses discrete periods and looks backwards



## Sales and Operations Planning

- Operating plan not directly aligned to financial targets
- Impact of demand and supply changes not visible to finance
- Operating plan has little top-down validation and decisions made without considering financial impact
- Operating plan is continuous and forward looking



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# Connect Finance and Operations

Solution: Integrated business planning via Hyperion integration



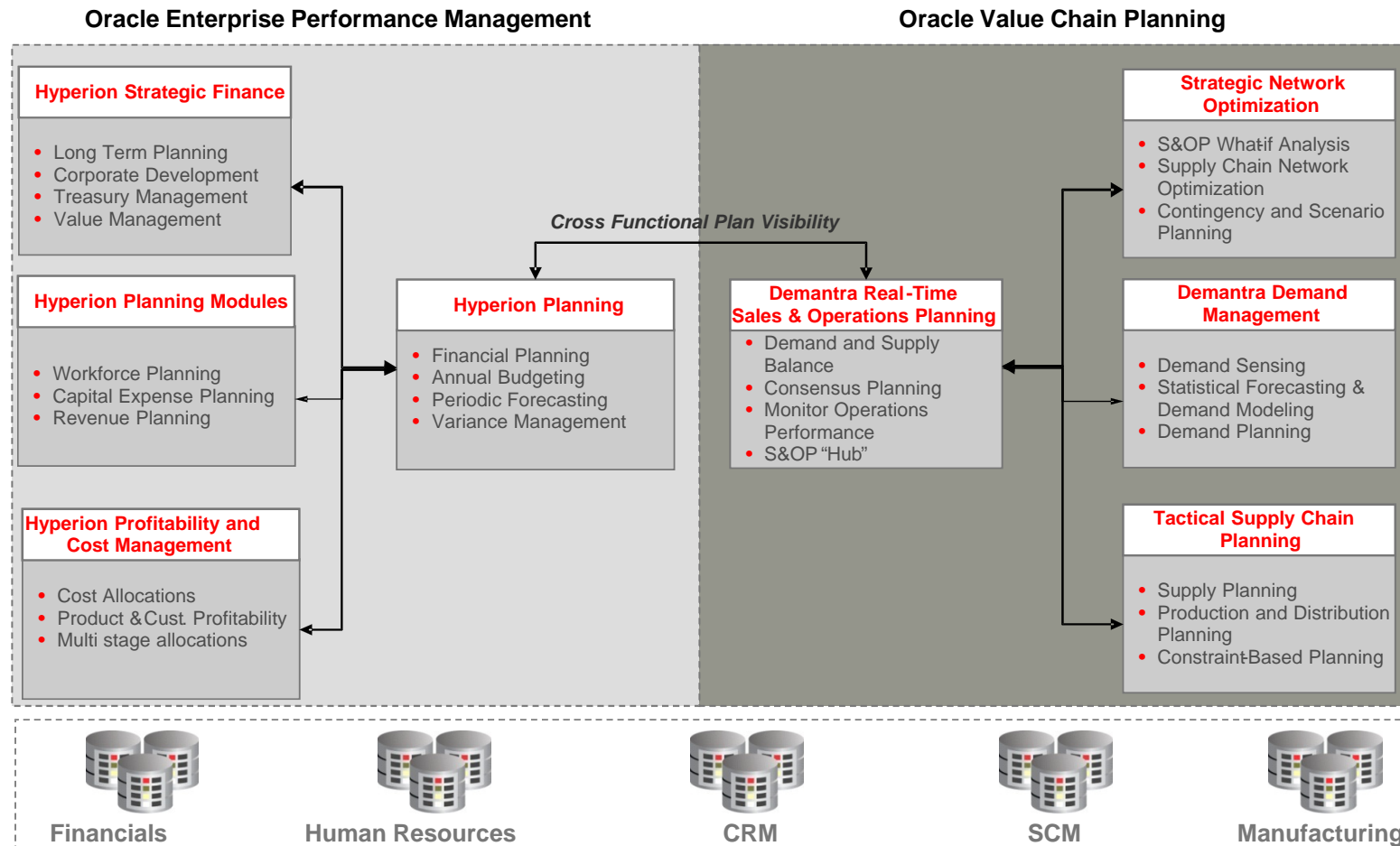
- Replace manual, intermittent, and disconnected process with a continuous, interactive, holistic Integrated Business Planning process
- Inject operational reality into Financial Plans and ensure financial viewpoint is embedded in the Operational planning process; top-down \$'s to bottom-up units synchronization
- What-if simulation to examine alternative scenarios and evaluate financial impact of decisions
- Out-of-the-box AIA-based integration

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# Integrated Business Planning

Enabling Oracle's vision for the next generation S&OP



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# Selezione di Clienti

## Automotive

### Consumer Packaged Goods



### Medical Devices



### Consumer Durables



### High Tech



### Retail/Wholesale



### Media & Entertainment



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- Retail Wholesale
  - Automotive Parts
  - Automotive Assembly

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**CARQUEST products meet or exceed**  
original-equipment specifications and performance.



**The CARQUEST Advantage - Steering and Suspension Systems**  
CARQUEST provides a full line of steering and suspension system components that match or exceed the specifications of original equipment (OE). Today, CARQUEST is an industry leader when it comes to the breadth, depth and quality of our steering and suspension system products and our ability to deliver them to our customers in an accurate and timely manner.



**Suspension Components**  
CARQUEST suspension products feature innovative and specific problem-solving designs that are the perfect choice for professional technicians and automotive enthusiasts. They consistently deliver long life and dependability by improving on OE technologies, providing easy-to-install products and leading-edge technology. Many of CARQUEST's suspension products also use powdered-metal gusher bearings with grease grooves that resist wear better than conventional designs. These designs allow grease to flow through the bearing to the stud, providing a smooth, durable surface that extends service life.



**Rack and Pinion**  
CARQUEST remanufactured rack-and-pinion products have been re-engineered to prevent typical OE component design failure. Each





# Business Issues



- Parts proliferation, shrinking product lifecycles, and rapid growth in a number of store locations with increasing supply chain complexity
- Legacy supply chain and processes were not driven by forward looking views of demand at the lowest level (item/store)
- Inventory levels rising while off-the-shelf fill rates declined and lost sales increased
- Infrequent reviews of sales performance by item caused massive waves of product moving in and out of stores when stock adjustments were required
- Legacy systems failing with increasing maintenance costs



# Work Performed



- Facilitated workshops to define future state vision and process
- Developed detailed business and technical requirements to support future state
- Defined implementation roadmap and strategy
- Leveraged 3-yrs of POS and pseudo-POS data, **Bayesian modeling**, and basic causal factors to generate weekly baseline forecast at SKU/Location level
- Set daily alerts to highlight exceptions and actionable information (e.g., continuous stock rebalancing)
- Designed and implemented custom automated chaining solution for replacement parts
- Developed new organizational structures for both supply chain planning and execution
- Implementing Demand Management and Real Time Sales & Operations Planning – **Complete replacement of legacy planning systems in less than 12 months**
- Also implementing other Oracle EBS APS applications (ASCP, Constraint-Based Planning, Inventory Optimization, Strategic Network Optimization)



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## Benefits and Results



- Identified \$39 million in annual gross benefits from inventory reductions and improved inventory turns
- Identified one time \$50 million reduction in inventory
- Introduced supply chain planning best practices into the organization
- Delivered one enterprise-wide, consensus forecast
- Forecasts now driven down to customer level with online collaboration

# Questions

