



Saint-Petersburg
2019

Automation of demand forecast process & stock refilling
with Novo Forecast Enterprise



About Novo BI

- ❑ > 10 years in forecasting software development & BI solutions
- ❑ The deep experience encapsulated in our software
- ❑ The customers – > 200 companies & > 12 000 users



Distributor's goals & pain points

Top goals

- Revenue & EBITDA growth
- Market share growth

Sales / Supplies

- Growth of Sales
- Margin of Sales
- Out-of-stocks reducing
- Overstock reducing
- Effective interaction with suppliers

Finance

- Working capital management
- Credit burden decrease
- Control of cash flow
- Effective financial planning

Logistics

- Stock refilling in time
- Logistics costs decrease

Accurate demand forecast & sales plan is “must have”.
On this basis you can create all plans in logistics & SC & Finance
with certain planning horizon that makes your decisions meaningful

What is necessary for accurate demand forecast & sales plan?



A sophisticated math methods with machine learning & AI that can precisely describe the future on the deep analysis of the past



Regular (everyday) adjustment of demand forecast by all planned events in the future (promo, blocked factors, new positions & etc.) + **continuous monitoring & analysis**

Collaboration of all responsible employees in **a single (common, unified) information space** – makes your result great & really data-driven

What does?

Demand forecast



Forecast for logistics, supply chain



Forecast in Finance

Novo Forecast Enterprise (NF Ent) makes Demand Forecast with all adjustments by factors that influence the forecast's accuracy

The process of planning & approval factors and adjustment of forecast by factors can add 20-30% to Demand Forecast Accuracy (DFA)

DFA is a basis for all plans and budgets

In the particular implementation NF Ent can be extended by :

- Stock refilling functions – orders for delivery, lists of excesses – out-of-stock & over stock control
- Financial plans

The software system of Demand Forecast with factors that influence the forecast's accuracy



- ☐ Increase DFA to «98%»
- ☐ Reduce of working capital requirement by «30%»
- ☐ Net Income growth by min «3 – 5%»
- ☐ Reduce «out of stock» & «over stock» by «15%»
& «50%», accordingly
- ☐ Making clever decision faster – in minutes instead
of days
- ☐ The total profit – hundred million rubles a year

What unique features give the result?

Fully **automatic cycle** of demand forecast creation:



Data preparation using the unique method



Using more than 3000 combinations of math models for time series description

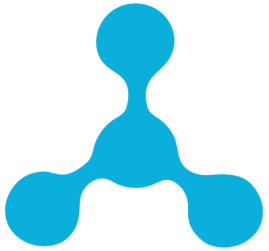


The forecast adjustment by factors (promos, novelties, blocks (of spare parts, customers, geolocations, orders with big quantity of spare part & etc)



Data discovery analytics with associative models (working as you think)

What do you get more with



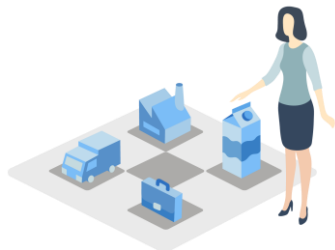
Saving of all forecasts' results in your database



Easy to use – nothing special knowledge is required.
Your present staff is more than enough

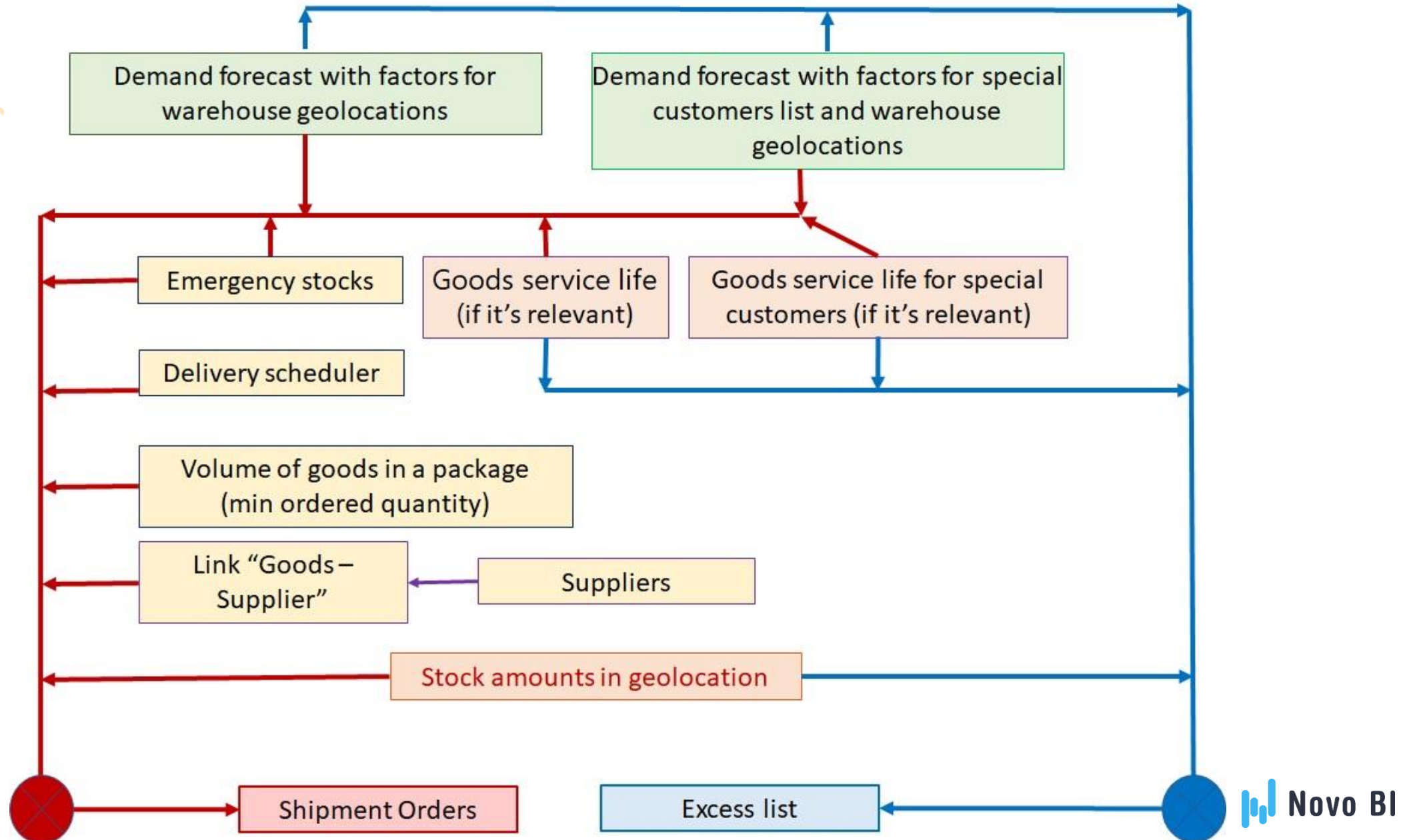


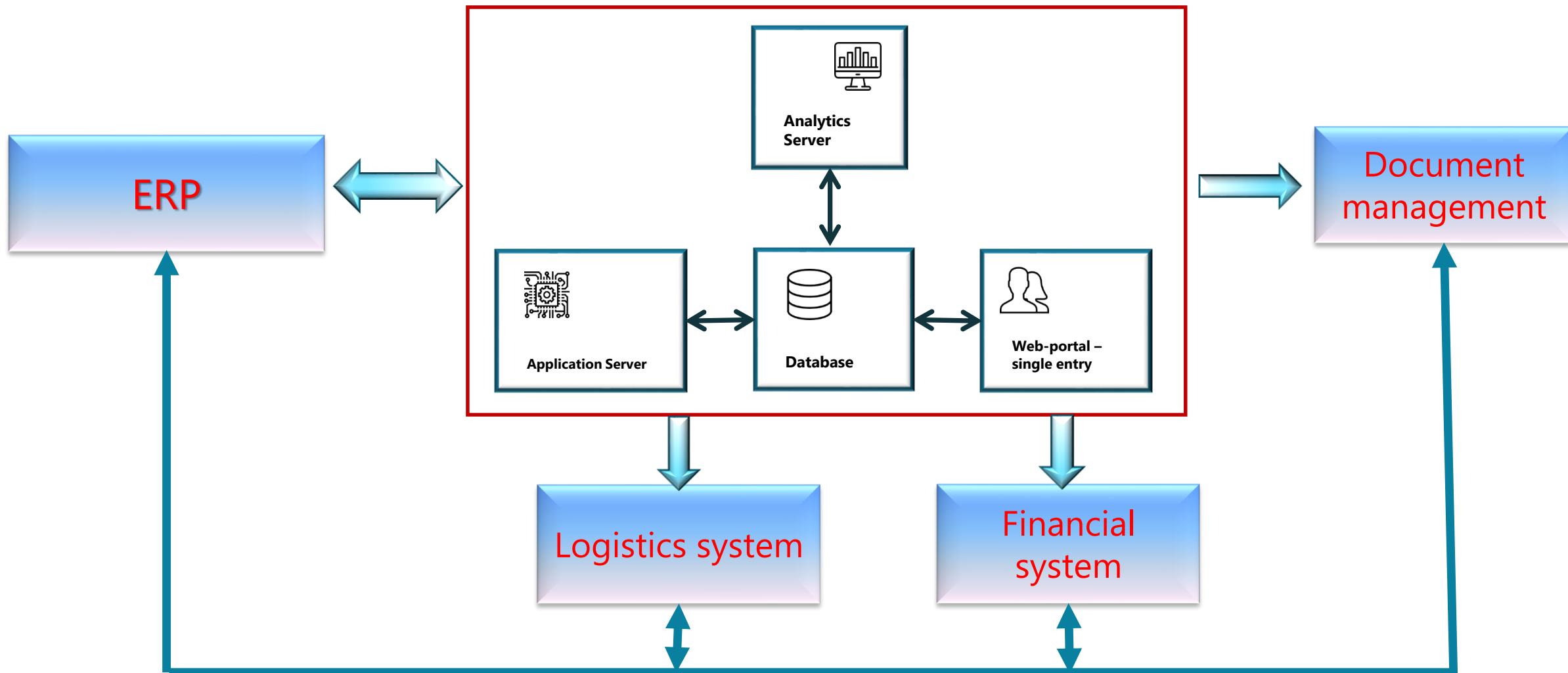
All data can be exported into your operational systems
(ERP & etc.)



Other processes' automation – for example, stock refilling
(management of Out-of-Stock и Over-Stock situations –
out of the box)

Stock refilling (Out-of-Stock и Over-Stock) in







Forecasting

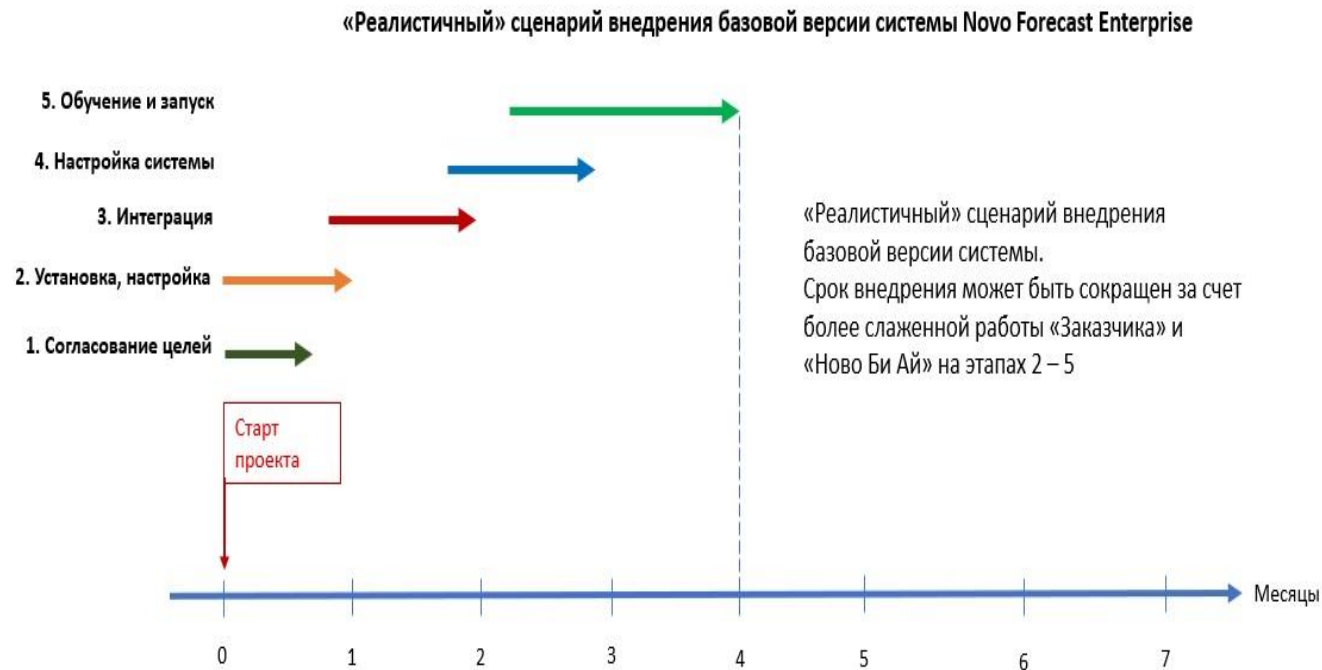
- 1 Data normalization & preparation**
- 2 Forecasting groups creation**
- 3 Forecast calculation**
- 4 Analytics & Monitoring**

Factors management

- 1 Business processes of factors' management & approval**
- 2 Factor's characteristics calculation (forecast, analogs)**
- 3 Security - Access to the parts of the system**
- 4 Adjustment forecast by factors**

Implementation of Novo Forecast Enterprise

Out of the box Solution

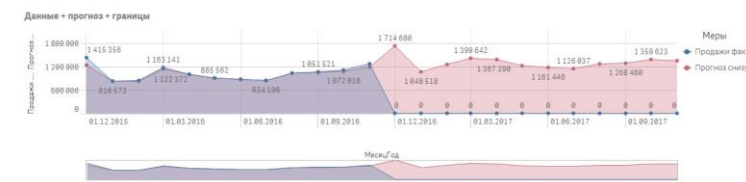
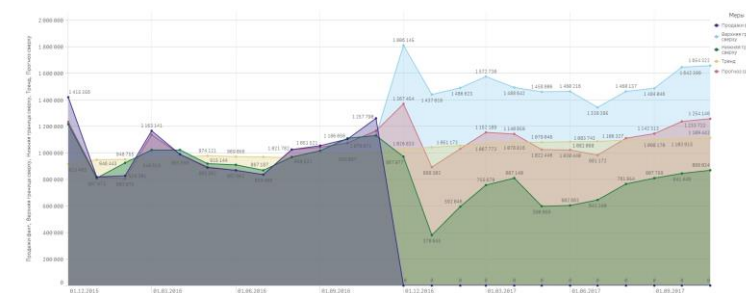
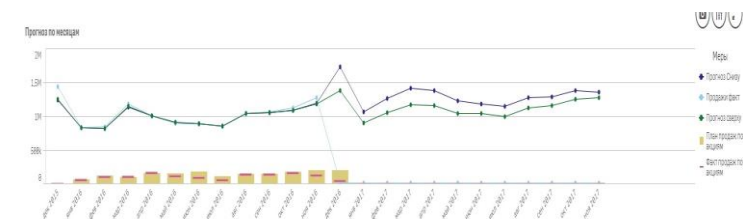


Implementation time – 90-120 days
Model of forecasting Guarantee

If you need something else ...

1. It better to create & implement in Phase 2
2. Because you'll be an experienced user at that moment and understand what you need better
3. We both develop a technical project
4. Then we create a solution, test & implement it
5. And you have a technical support

- Fully automatic cycle of forecasting with factors
- Stock refilling functions – orders for delivery, lists of excesses
- All output information can be exported into operational systems
- Every day the actual demand forecast exists
- Increase staff's productivity
- The single point of planning
- Finally you'll have:
 - Optimized working capital
 - Decrease of «out of stock» и «over stock» and optimized stock refilling
 - Revenue growth



The total benefits confirmed by implementations

- **P** – annual profit from DFA increasing
- **V** – annual turnover
- **H** – Warehouse & Logistics cost, %
- **H1** – Cost of obsolescence, %
- **Δ** – Demand Forecast accuracy increasing, %
- **LT** – System Life Time, years

$$P = V * (H + H1) * \Delta * LT$$

Example:

V = 5 billion/year

H = 10%

H1 = 1%

Δ = 15%

LT = 5 years

$$P = 5\,000 * (0,1 + 0,01) * 0,15 * 5 \approx 400 \text{ millions}$$

Если говорить о совокупном экономическом эффекте, то, учитывая масштабы деятельности «Алиди», речь идет, как минимум, о сотнях миллионах рублей в год. Рост точности прогноза позволил выстраивать более плодотворные отношения с поставщиками, повысить удовлетворенность наших клиентов и эффективнее планировать и выстраивать внутренние процессы компании.

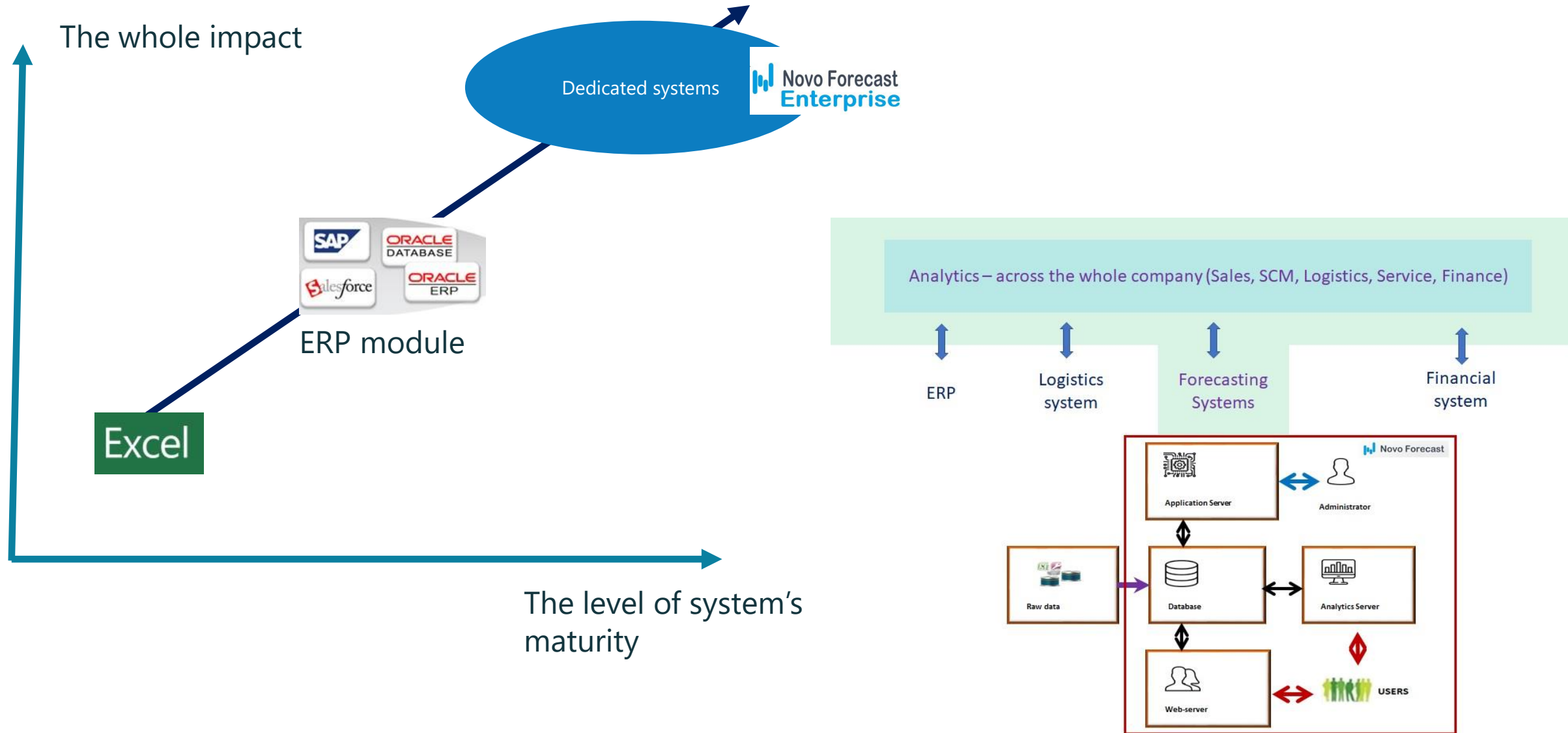
— Дмитрий Фризен, заместитель директора по логистике компании «Алиди»



Мы уверены, что система Novo Forecast обеспечит нам устойчивое конкурентное преимущество и позволит оптимизировать работу компании по всей цепочке создания добавленной стоимости. По нашей оценке, уже в течение первого года после внедрения, эффект от использования системы составит, как минимум, несколько десятков миллионов рублей.

— Владимир Акименко, заместитель генерального директора по логистике компании «Генеральские колбасы»

Evolution of forecasting systems and IT architecture

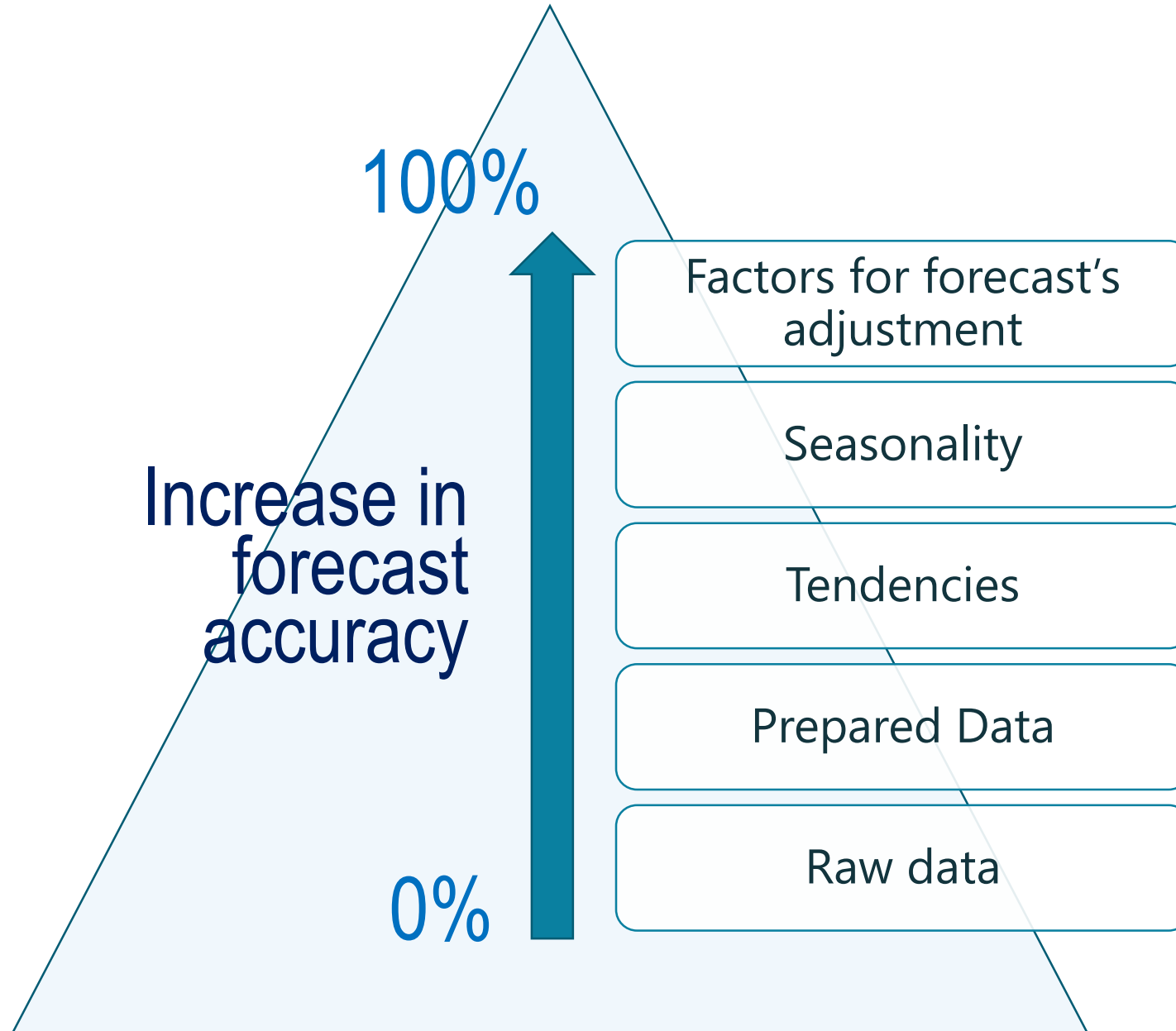




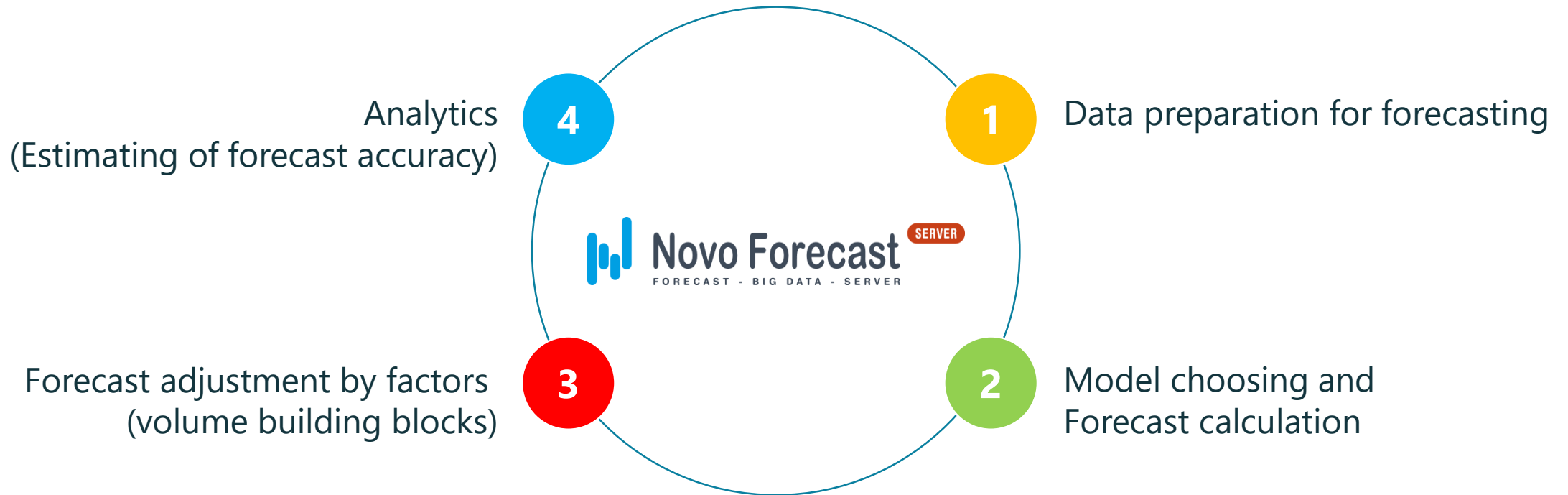
In details



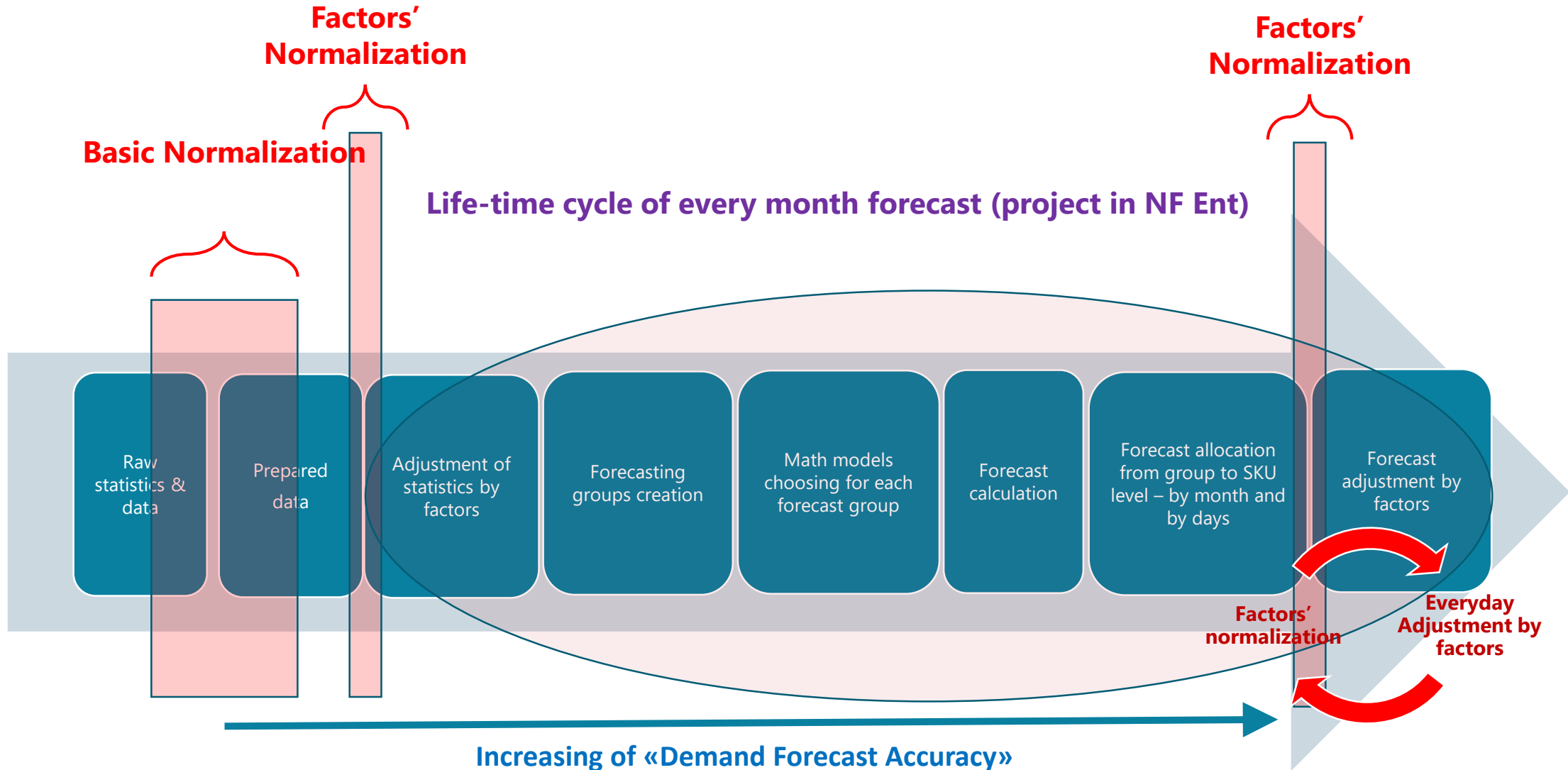
Model of forecasting in



The Cycle of Forecasting in



Stages of the forecast process



Tools for data preparation

- Factors for model adjustment
- Forecast Groups making
- Clearing data from emissions



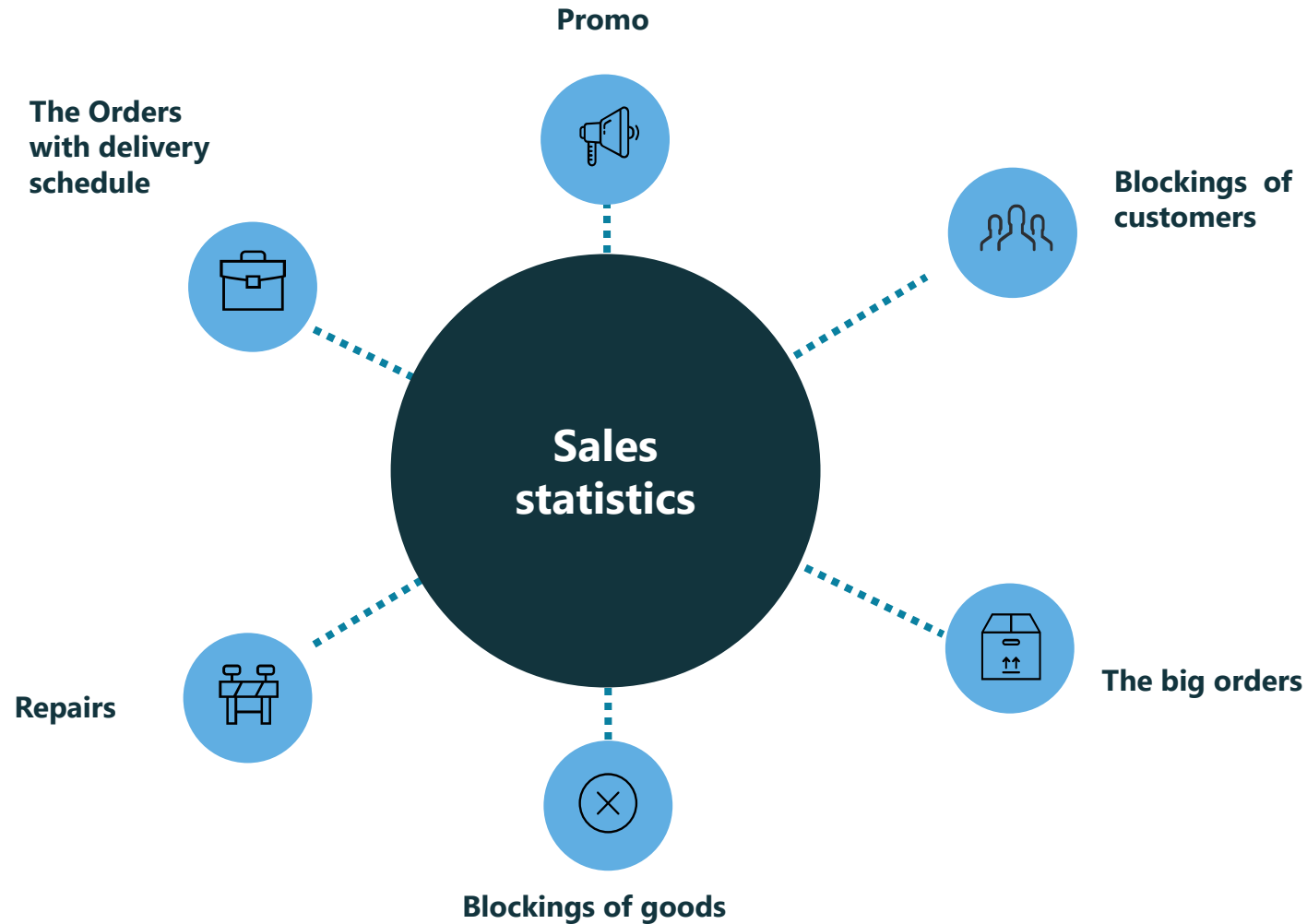
Data preparation

Model choosing and
Forecast calculation

Forecast adjustment
with factors

Estimating of forecast
accuracy

Factors for adjustment in Data preparation step



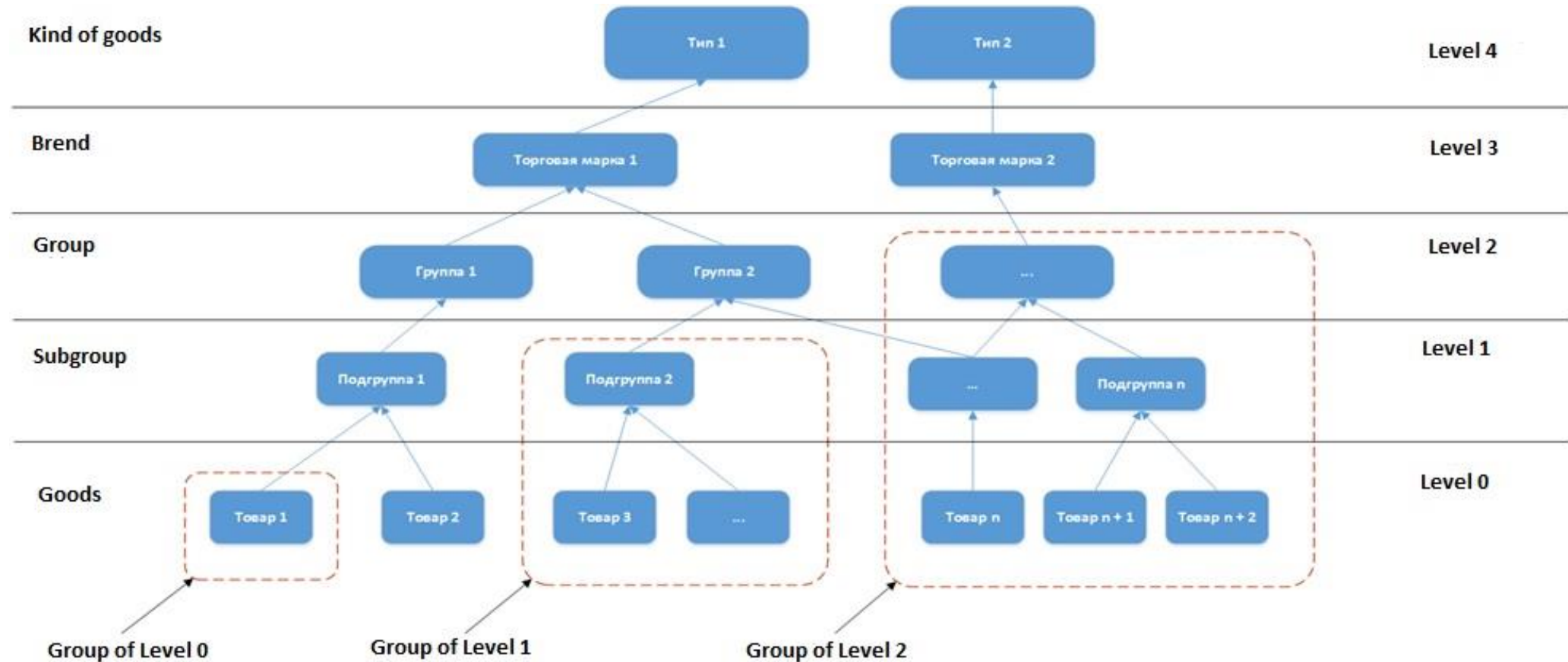
Data preparation

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accuracy

Making of forecast groups - auto-detection of forecast levels



Data preparation

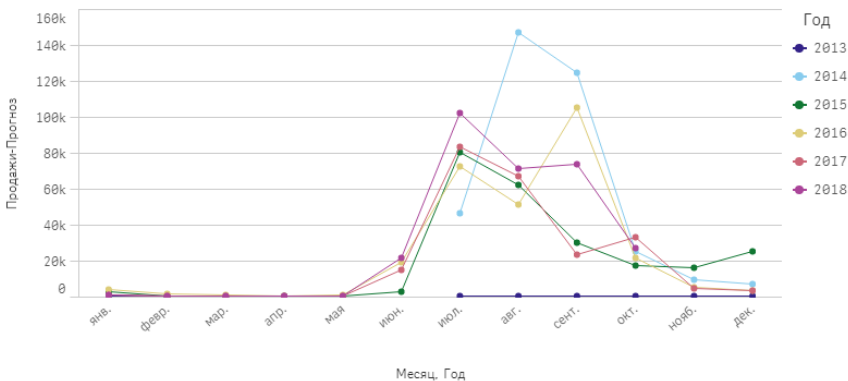
Model choosing and
Forecast calculation

Forecast adjustment
with factors

Estimating of forecast
accuracy

Forecasting Groups

Сезон



Факт и прогноз

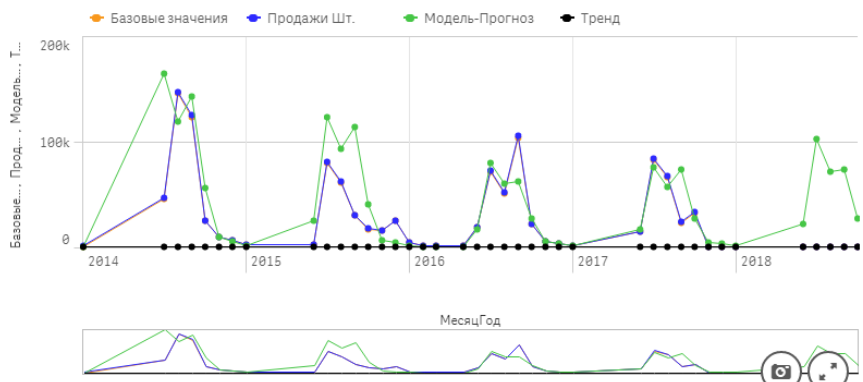
Год	январ.	февр.	мар.	мая	июн.	июл.	авг.	сент.	окт.	нояб.	дек.
2014	180	-	-	-	-	45 900	146 384	123 755	24 355	8 880	6 100
2015	1 950	-	-	-	2 005	79 725	61 220	29 590	16 630	15 410	24 279
2016	3 220	690	135	25	18 395	71 810	50 530	104 295	21 195	4 320	2 625
2017	90	-	-	-	14 120	82 770	66 330	22 755	32 300	4 077	2 545
2018	96	-	-	-	20 764	101 800	70 509	73 128	26 464	-	-

ProductForecastGroupFullPath

._Supplier_1_SubSupplier_1_ГОТОВАЯ ПРОДУКЦИЯ_!Календари_Календари листовые_Календари листовые

._Supplier_1_SubSupplier_1_ГОТОВАЯ ПРОДУКЦИЯ_!Изделия для планирования_Изделия для планирования 7БЦ_Ежедневники недатированные

._Supplier_1_SubSupplier_1_ГОТОВАЯ ПРОДУКЦИЯ_!Изделия для планирования_Изделия для планирования 7БЦ_Планинги_026416



!Календари
Календари листовые
Календарь настенный листовой А1ф 60х90см на 2015г-Замок в горах-
Календарь настенный листовой А1ф 60х90см на 2017г с укрупненной сеткой
Год Петуха-
Календарь настенный листовой А1ф 60х90см на 2018г с укрупненной сеткой
Дворец-
Календарь настенный листовой А1ф 90х60см на 2013г-Богоматерь Казанская-С правосл. постами и
Календарь настенный листовой А1ф 90х60см на 2013г-Замок с озером-
Календарь настенный листовой А1ф 90х60см на 2013г-Золотая осень-
Календарь настенный листовой А1ф 90х60см на 2013г-Родные просторы-

Квартал	Месяц
Q1	январ.
Q2	февр.
Q3	мар.
Q4	апр.
	мая
	июн.
	июл.
	авг.
	сент.
	окт.
	нояб.
	дек.

ProductForecastLevel

№ проекта

38

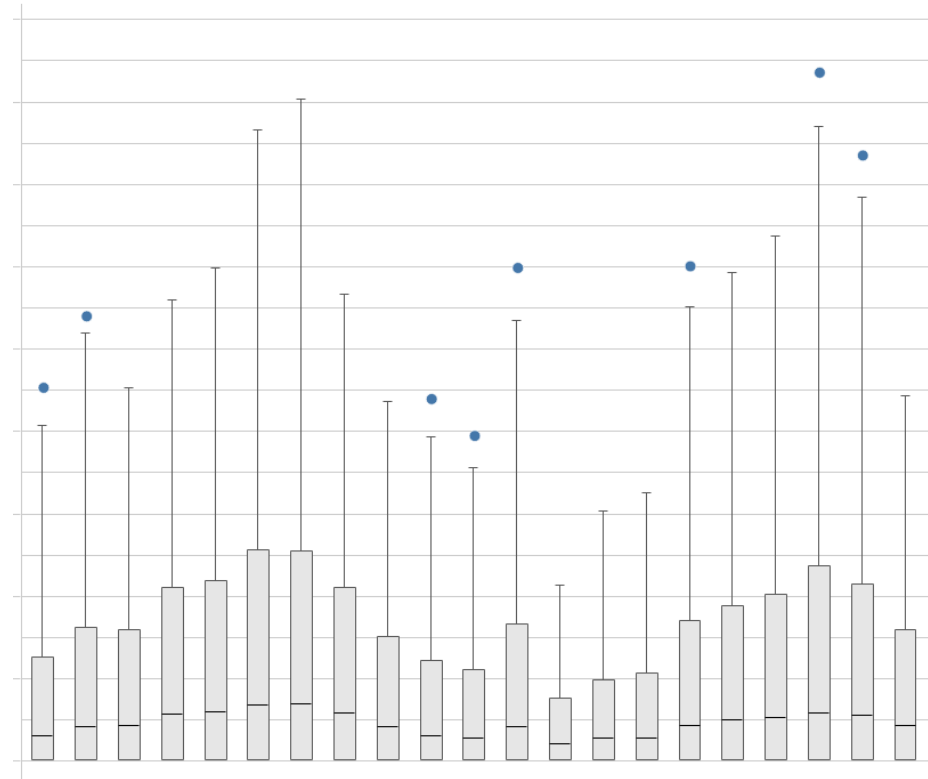
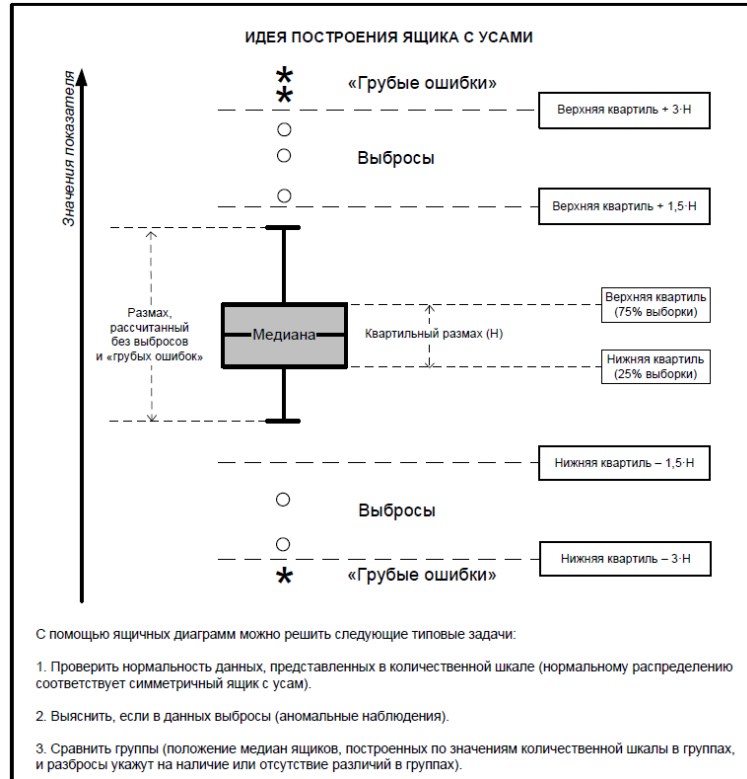
Data preparation

Model choosing and
Forecast calculation

Forecast adjustment
with factors

Estimating of forecast
accuracy

Clearing data from emissions



Data preparation

Model choosing and
Forecast calculation

Forecast adjustment
with factors

Estimating of forecast
accuracy

Model choosing & Forecast calculation

- Using of forecast groups
- Estimation of time series
- Testing of more the 3000 math models
- Forecast calculation



Time series behavior

- 1 Growth of time series
- 2 Slowing growth, time series falling
- 3 Last sales information are important for forecast
- 4 Long tendencies are important for forecast
- 5 Complete & incomplete time series
- 6 Permanent and irregular sales
- 7 Seasonality & absence of seasonality



Data preparation



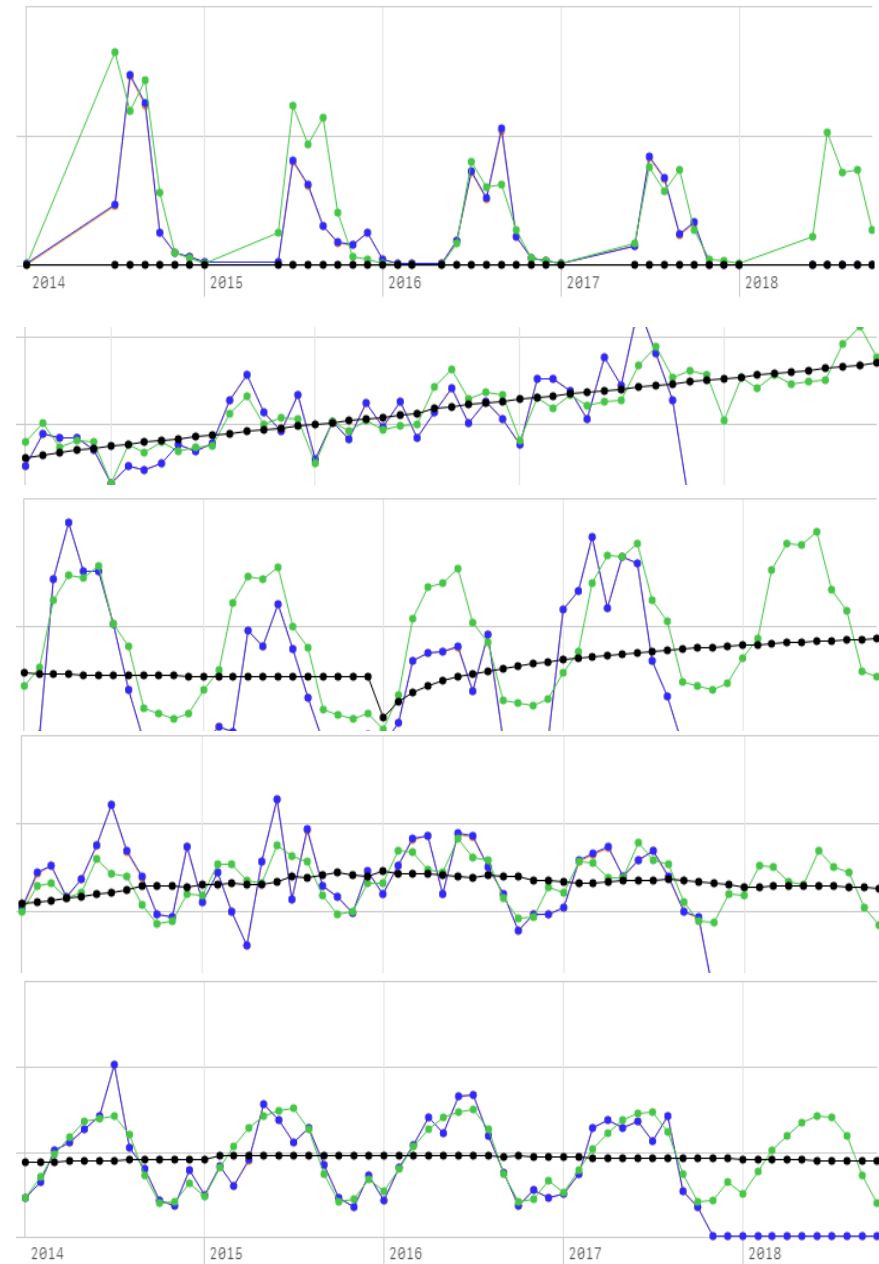
Model choosing and
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Forecast adjustment
with factors



Estimating of forecast
accuracy

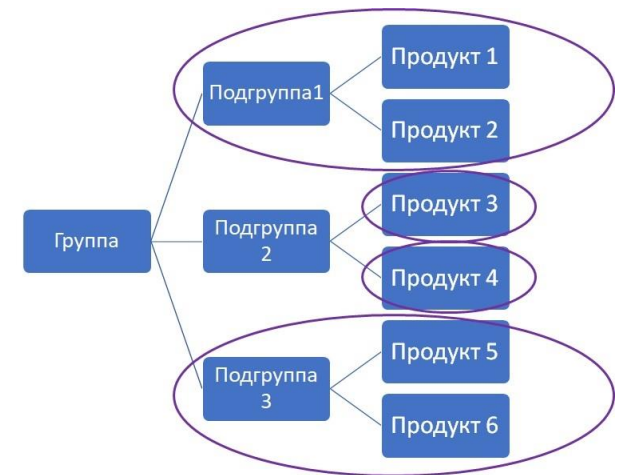


Model choosing and forecast calculation

The Goal:

For each time series we should find a math model that corresponds its properties

To make a forecast using the model with a min error in test interval



Data preparation



Model choosing and
Forecast calculation



Forecast adjustment
with factors

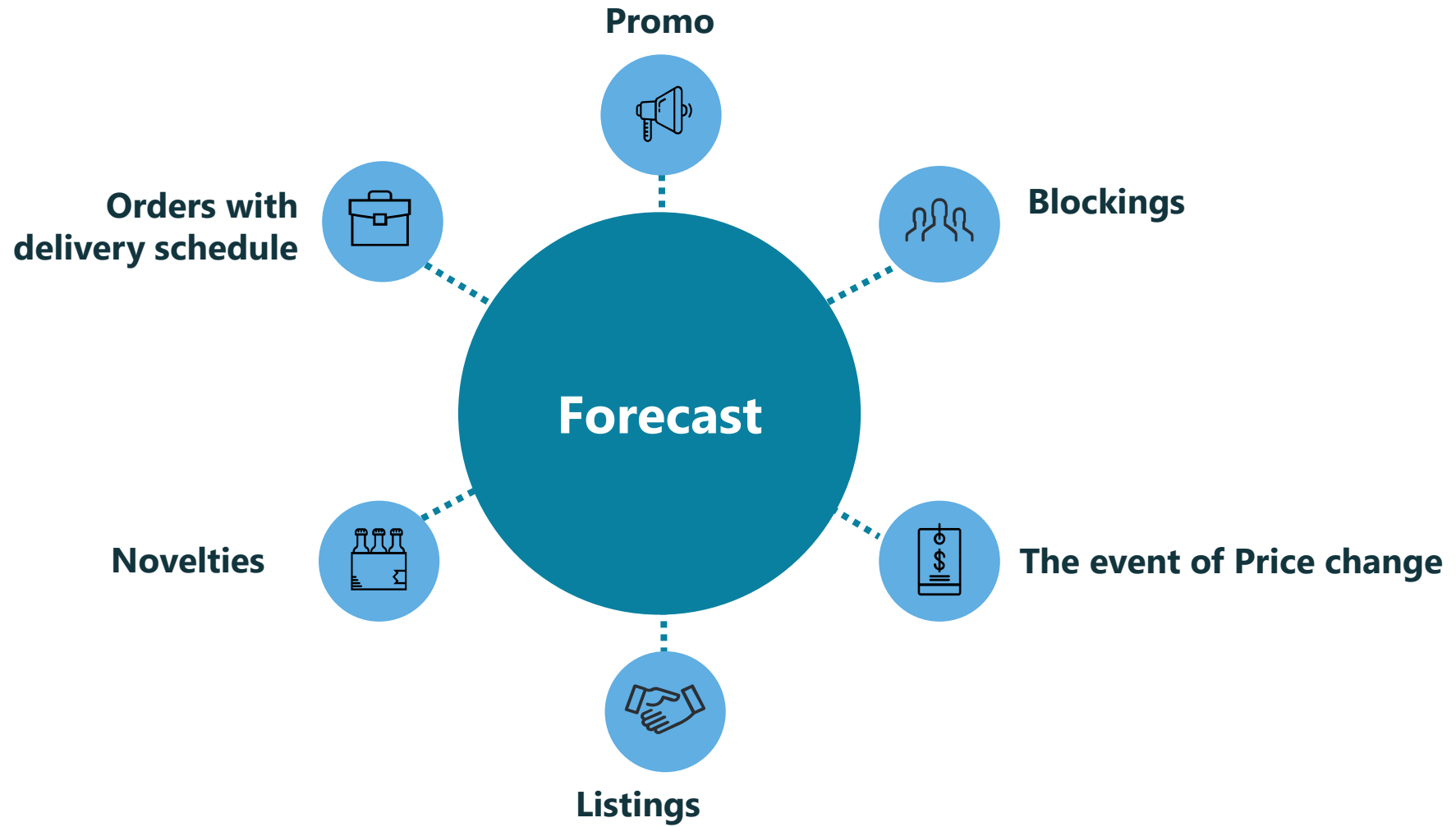


Estimating of forecast
accuracy

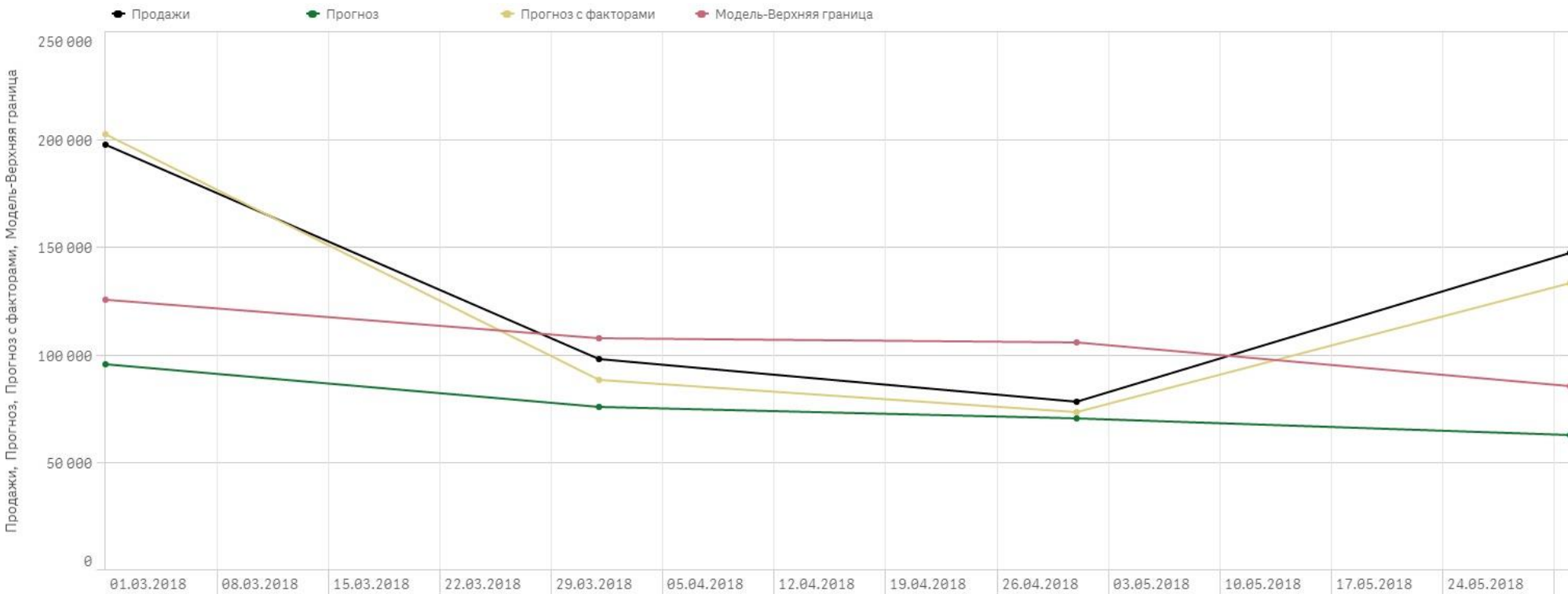
Adjustment a forecast by factors



Participating factors



«Factors VS No Ones» - The important point of high DFA's reach



SKU	Продажи	Прогноз с факторами	Точность
Итоги	519 307	495 299	89,9%
SKU 1	70 003	71 363	98,1%
SKU 2	64 374	59 234	92,0%
SKU 3	195 132	214 026	90,3%
SKU 4	189 798	150 677	79,4%

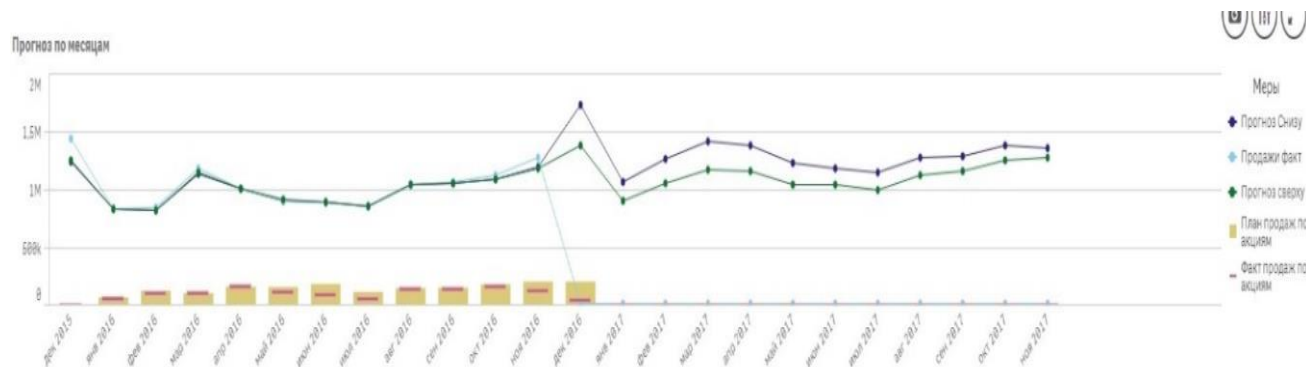


The forecast accuracy estimation



The forecast accuracy estimation

1. Monitoring, compare fact & math models data, forecast data, upper & low bounds of forecast – analytic views by forecast groups, SKU, geolocations, customers & etc.
2. Using this analytic tools on Qlik Sense platform you can immediately find an answer for your question
3. The rich graphics with interactive objects



- $DFA (\%) = 1 - (\sum |Forecast - Fact| / \sum Forecast)$
- $MPE (\%) = \sum ((Fact - Forecast) / Fact) / n$
- $MAPE (\%) = \sum (|Fact - Forecast| / Fact) / n$



Data preparation



Model choosing and
Forecast calculation

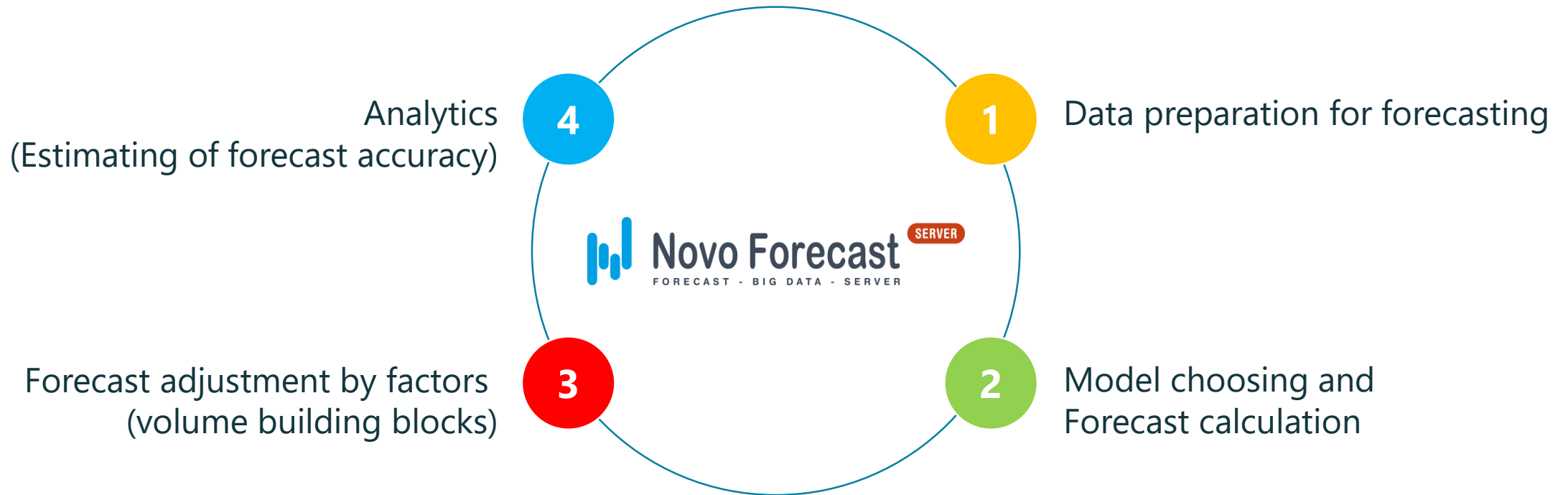


Forecast adjustment
with factors



Estimating of forecast
accuracy

The Cycle of Forecasting in





 +7 812 407 10 11

 199026, Russia, Saint-Petersburg, V.I. 26 line, 15-2A

nbi@novobi.ru
novoforecast.com
4analytics.ru
4promotion.ru

Saint-Petersburg

A light gray map of Russia is shown on the right side of the slide. A blue dot marks the location of Saint-Petersburg on the western coast. A dashed blue line extends from this dot towards the left, ending near the contact information.