PROMISE
GRUPA APN PROMISE

APN
Forecaster

APN Forecaster - application for generating automatic forecasts

Response to the needs of companies related to the provision of reliable data for the processes of demand planning, production, budgeting, effective management of resources, stock of goods, cost optimization, etc.

Minimization of work related to the preparation of a number of analyses for the purpose of developing a model or a set of models and assessment of their forecasting quality. No need for accurate parameterization of models and tedious process of their development, which saves time and makes more efficient use of data analysts' working time.

Thanks to the application for automated forecasts, it is not necessary to have statistical knowledge to prepare a reliable model. What is more, the solution also makes it possible to reduce human error consisting in incorrect specification of the forecasting model. The user does not need to specify any parameters to obtain the optimal solution using the available data he wants to analyse.

Both in sales and manufacturing companies, knowledge about the future size of demand for a product or service offered by a company allows to effectively and efficiently manage ongoing processes in a company and to engage necessary resources in order to achieve the expected results of actions taken by the company.

Thanks to the application for automatic forecasts, it is possible to monitor on an ongoing basis the impact of decisions taken in the company, i.e. marketing activities, to observe their effectiveness and to ensure the necessary means and resources for their implementation, at the same time optimising the costs caused by ineffective allocation of resources. Thanks to the tool for automated forecasts you can also better understand the factors influencing and shaping certain values and, thanks to the knowledge gained in this way, better understand the business and be more effective in achieving the company's objectives.

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What do we do while implementing the product?
During the implementation, on the one hand we review the possibility of using the tool for automated forecasts in various areas of the customer's activity, and on the other hand we prepare a model allowing for the prediction of the size of the analysed phenomenon (e.g. sales, production costs) in future periods and present the target architecture of the solution using the created model for the needs of periodic analyses. Part of the analytical architecture will also be a report developed using the Power BI service presenting the results of the obtained analyses.

What is needed?
Historical data on the size of the phenomenon under study, e.g. sales volume, production, cost level.

APN Promise team
On the part of APN Promise, a team consisting of a cloud solution architect, data engineer, data scientist and data analyst will be involved.

The customer's team
On the part of the customer, the process will involve business people with substantive responsibility for a given area and an analyst or analysts responsible for data analysis processes in a given area.

How long does implementation take?
Depending on the scope of data, it will take 2-4 weeks to develop the target solution.

How much does implementation cost?
Depending on the scope and selected approach, the cost of services can range from EUR 6,650 to EUR 13,300 net.

Estimated cost of Azure services utilization
Depending on the scope of data, its volume and frequency of generating forecasts, the estimated cost of services utilization is 500 - 2 000 EUR net

Cases of use
- Forecasting sales volumes, production volumes, cost levels
- Identification of factors influencing the level of the analysed phenomenon
- Optimization of resource utilization (including inventory management)
- Optimization of the allocation of resources used in a given area of activity of the company
- Identification of irregularities in company functioning in the studied area

Technologies
The project will primarily use data warehouses (Azure Data Lake, Azure SQL Database), data processing and analysis services (Azure Databricks, Azure Machine Learning) and process orchestration service (Data Factory).

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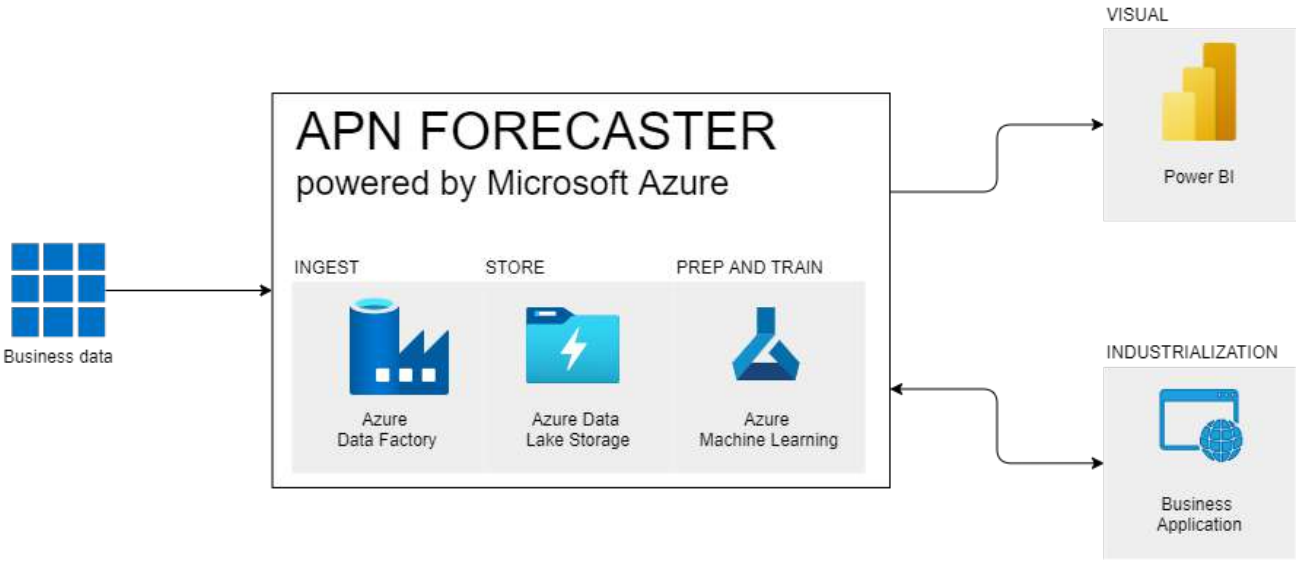
Solution architecture and screenshots



MAE							
ID	Model1	Model2	Model3	Model4	Model5	Benchmark	Best vs Bench
unit1	550 446	434 977	771 609	481 325	371 629	643 736	-272 107
unit2	9 642	7 686	20 260	12 616	6 240	11 719	-5 480
unit3	133 240	100 257	174 538	168 670	64 496	123 260	-58 764
unit4	16 001	14 065	32 548	15 845	8 664	23 436	-14 772
unit5	147 838	115 863	216 250	229 856	78 545	186 049	-107 503
unit6	2 875	2 951	3 309	3 516	23 806	6 928	-3 977
unit7	21	24	19	24	110	42	-24
Sum best	532 467					995 170	-462 703
						diff_All (%)	-46,5%

RMSE							
ID	Model1	Model2	Model3	Model4	Model5	Benchmark	Best vs Bench
unit1	766 423	619 514	1 042 031	747 436	503 525	820 642	-317 117
unit2	12 119	11 086	24 014	15 754	8 063	14 246	-6 183
unit3	172 466	152 825	224 930	224 116	73 074	151 006	-77 933
unit4	20 768	22 364	41 208	25 971	11 363	28 593	-17 230
unit5	168 387	161 306	304 316	299 217	137 628	240 399	-102 770
unit6	4 540	4 431	4 226	4 701	24 847	9 046	-4 820
unit7	32	34	26	31	113	51	-25
Sum best	738 218					1 263 983	-525 765
						diff_All (%)	-41,6%

MAPE %							
ID	Model1	Model2	Model3	Model4	Model5	Benchmark	Best vs Bench
unit1	1,73	1,37	2,44	1,52	1,16	2,00	-0,84
unit2	1,48	1,19	3,12	1,92	0,94	1,76	-0,83
unit3	2,25	1,74	2,92	2,79	1,07	2,03	-0,97
unit4	1,69	1,51	3,47	1,71	0,88	2,42	-1,54
unit5	1,61	1,29	2,37	2,51	0,87	2,05	-1,18
unit6	2,16	2,14	2,43	2,61	18,00	5,37	-3,22
unit7	4,49	5,09	4,01	5,13	24,34	9,07	-5,06
Avg best	1,58					3,53	-1,95p.p

RMSE %							
ID	Model1	Model2	Model3	Model4	Model5	Benchmark	Best vs Bench
unit1	2,46	1,97	3,35	2,42	1,57	2,55	-0,98
unit2	1,87	1,72	3,75	2,41	1,20	2,15	-0,95
unit3	2,99	2,70	3,80	3,66	1,21	2,49	-1,28
unit4	2,26	2,47	4,50	2,91	1,14	2,93	-1,79
unit5	1,84	1,82	3,41	3,30	1,51	2,65	-1,14
unit6	3,49	3,16	3,06	3,49	19,01	7,12	-4,06
unit7	6,38	7,12	5,26	6,42	25,29	10,67	-5,41
Avg best	2,15					4,37	-2,21p.p

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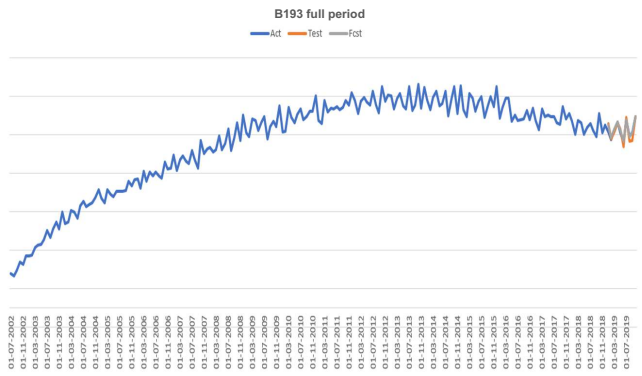
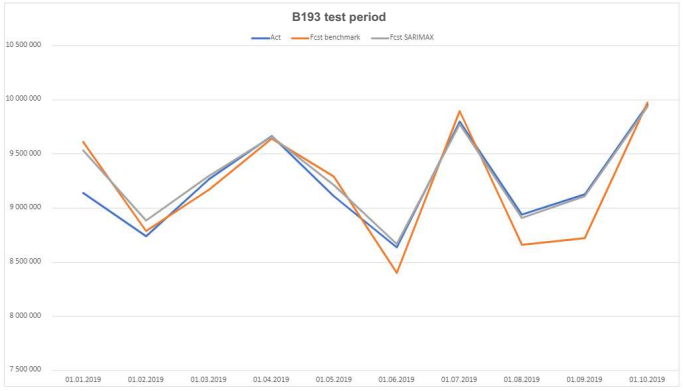
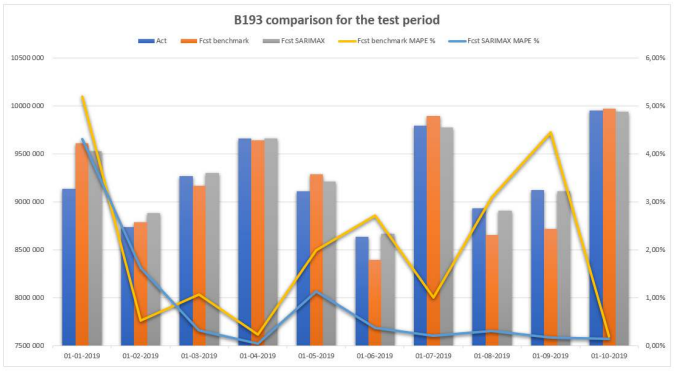




Date	Act	Fcst benchmark	Fcst SARIMAX	Fcst benchmark MAPE %	Fcst SARIMAX MAPE %	SARIMAX vs bench diff MAPE p.p
01-01-2019	9 135 873	9 610 935	9 529 468	5,20%	4,31%	-0,89%
01-02-2019	8 740 972	8 787 154	8 883 180	0,53%	1,63%	1,10%
01-03-2019	9 268 077	9 169 175	9 298 123	1,07%	0,32%	-0,75%
01-04-2019	9 663 673	9 640 863	9 659 317	0,24%	0,05%	-0,19%
01-05-2019	9 110 476	9 291 419	9 213 927	1,99%	1,14%	-0,85%
01-06-2019	8 634 232	8 399 239	8 667 332	2,72%	0,38%	-2,34%
01-07-2019	9 797 024	9 895 913	9 776 920	1,01%	0,21%	-0,80%
01-08-2019	8 936 073	8 658 745	8 908 446	3,10%	0,31%	-2,79%
01-09-2019	9 125 937	8 720 023	9 110 206	4,45%	0,17%	-4,28%
01-10-2019	9 952 874	9 972 338	9 937 671	0,20%	0,15%	-0,05%
			AVG	**2,05%**	**0,87%**	**-1,18%**



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