



Digital, Data Analytics, and Automation: Value Creation Through Digital E&P

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Improving Scalability in Forecast Analysis for Oil Fields: A Transition from Excel to Reservoir Analysis Software

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Outline

- Introduction
- Problem statement
- Solution
- Challenges
- Conclusion

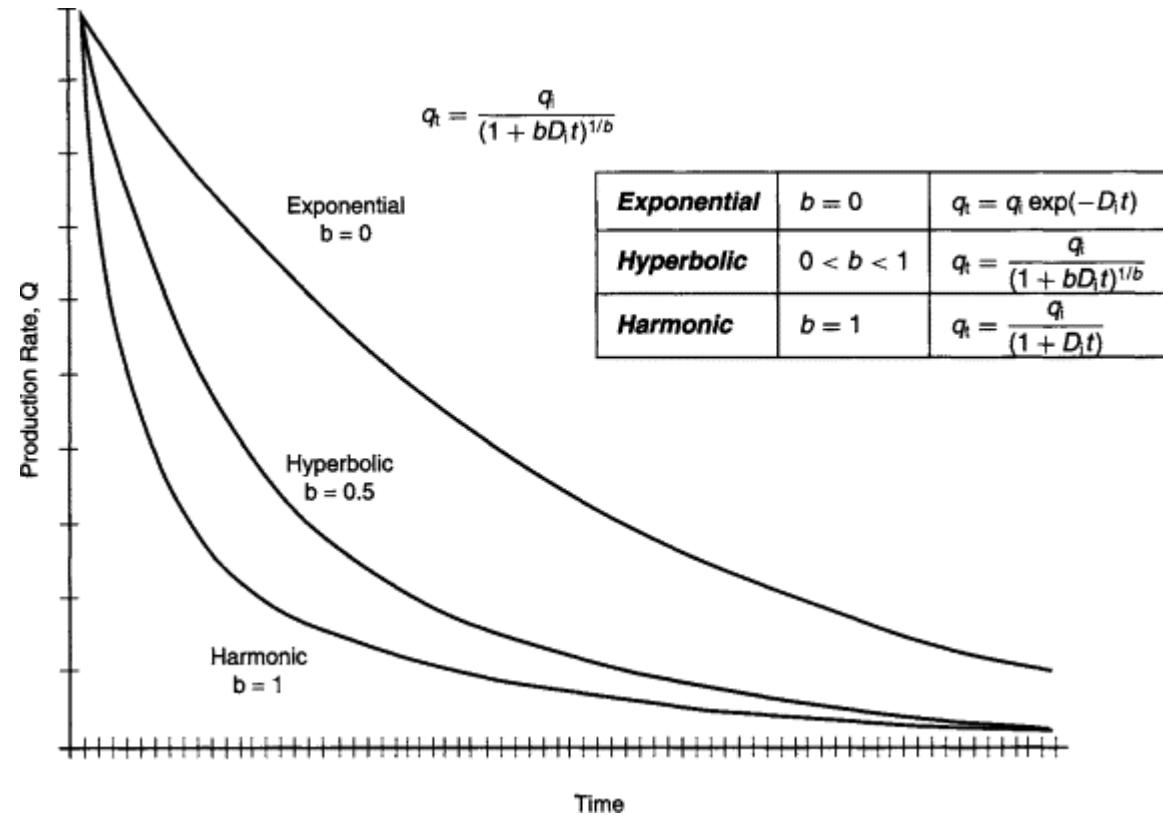
Oil Technical Potential (TP)

What is oil TP?

Max oil

How to forecast oil TP?

Decline Curve Analysis



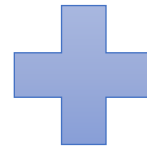
How to forecast oil production from oil TP?



Oil TP
Forecast



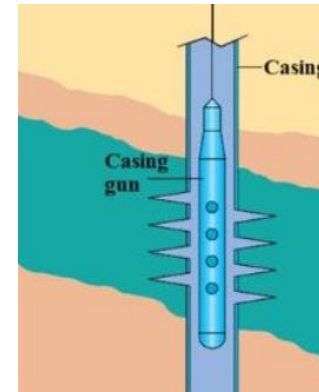
Shortfall from
Planned/Unplanned
Downtime



Gain from
Production
Enhancement (PE)
Job



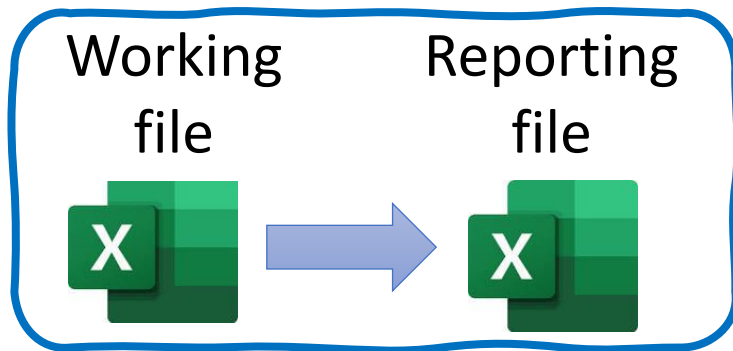
**Oil Production
Forecast**



Where do complexity start?

Calculations are performed in **two extensive Excels monthly** since day 1.

Challenges with Excel



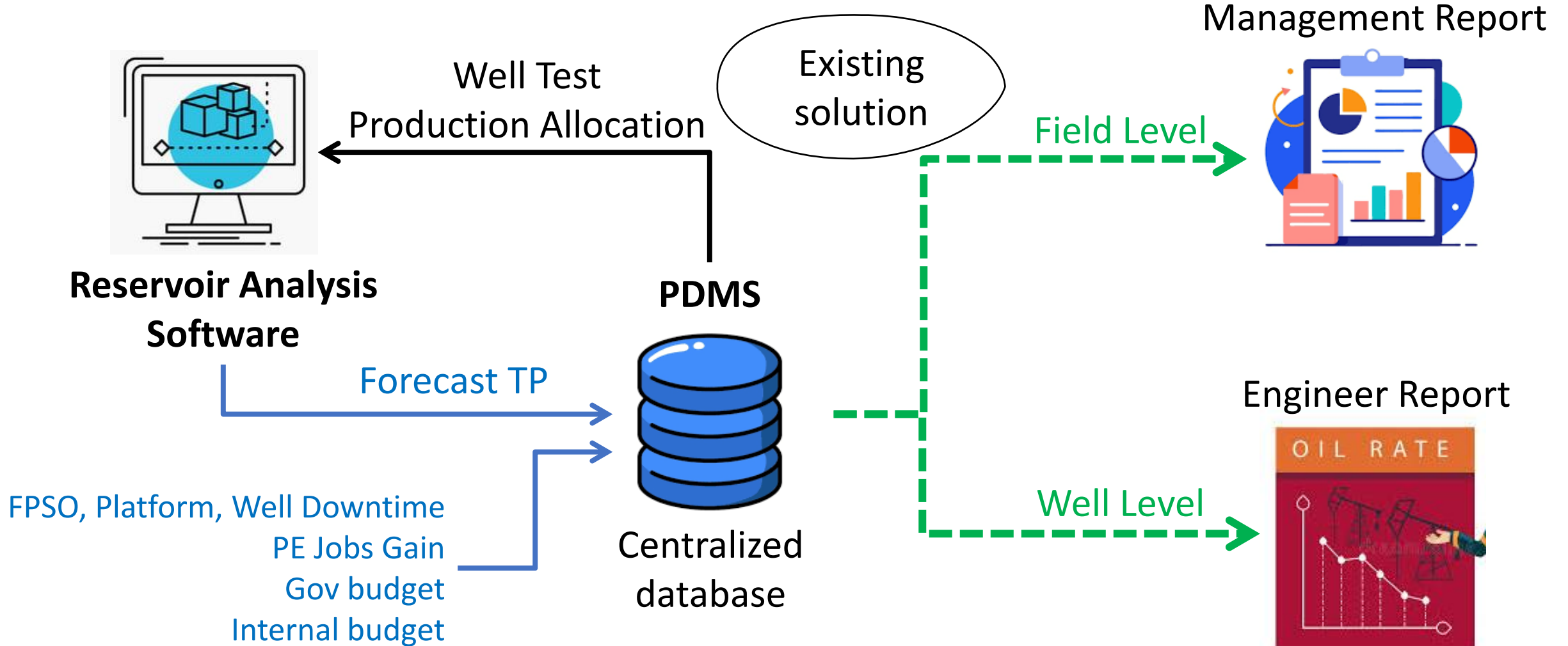
Error-Prone Processes



Data Management Problem

Scalability Issues

What did we propose to client?



Database flow

Input



Analysis

Forecast TP



Manual entry

Downtime
PE Job Gain
Gov budget
Internal budget

Process

View

*To improve
script performance*

Table

Function

(@year, @month)

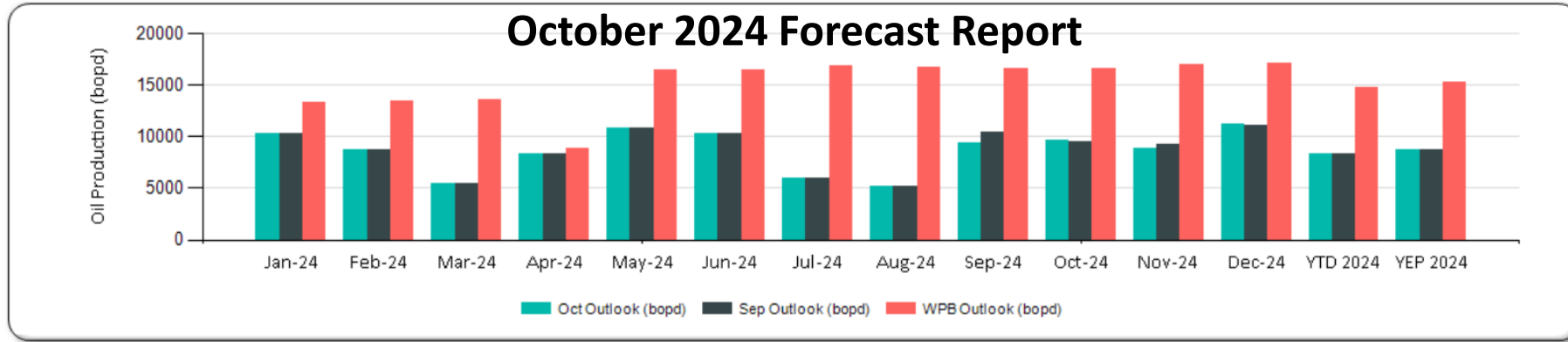
Stored Procedure

Output

Monthly
Management Report
Field Level

Monthly
Well Profile Report
Well Level

#1 Management Report (Field Level)



		Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	YTD 2024	YEP 2024
Oct	Base	10338	8688	5474	7537	9834	8973	4047	2884	9441	11023	10297	10776	7447	8265
	Well Works	0	0	0	726	1020	1302	1897	2341	2542	2914	3039	3250	1095	1591
	New Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Project Debottlenecking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Special Project	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oct Outlook (bopd)	10338	8688	5474	8263	10854	10275	5944	5225	11983	13937	13336	14026	8542	9856
	Delta Oct-Sep Outlook	0	0	0	0	0	0	0	0	-1375	112	106	104	-151	-86
Delta Oct-WPB Outlook	-2927	-4727	-8138	-632	-5636	-6118	-10837	-11500	-4614	-2573	-3631	-3114	-6161	-5392	

Actual Production

**Forecast Production
(TP – Shortfall + Actualized Gain)**

#1 Management Report (Field Level)

This month
forecast

Last month
forecast

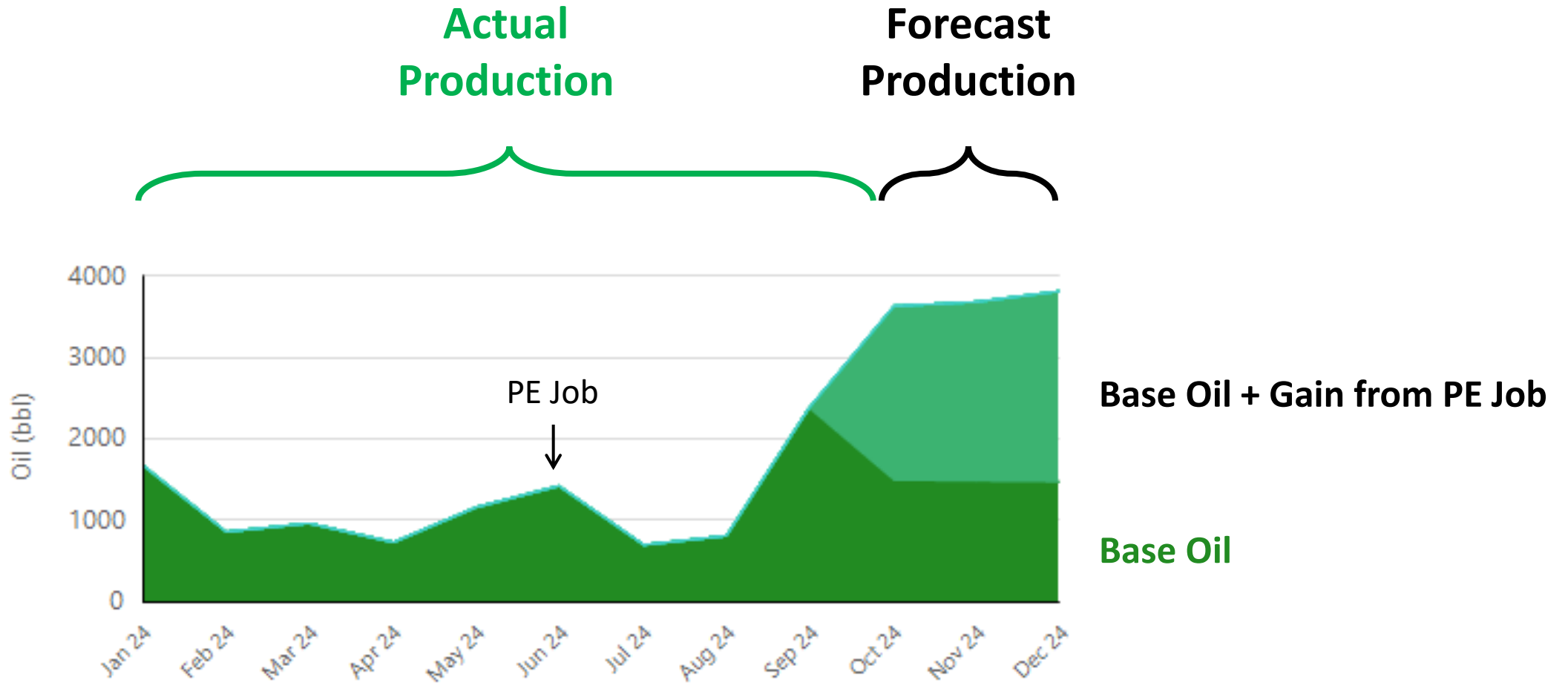
Gov budget

Internal Budget

		Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	YTD 2024	YEP 2024
Oct	Base	10338	8688	5474	8263	10854	8637	4623	4082	7399	7226	6144	7919	7582	7462
	Well Works	0	0	0	0	0	1638	1321	1143	2022	2361	2683	3324	680	1210
	New Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Project Debottlenecking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Special Project	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Oct Outlook (bopd)	10338	8688	5474	8263	10854	10275	5944	5225	9421	9587	8827	11243	8261	8673
	Delta Oct-Sep Outlook	0	0	0	0	0	0	0	0	-1032	35	-366	106	-113	-103
Delta Oct-WPB Outlook	-2927	-4727	-8138	-632	-5636	-6118	-10837	-11500	-7176	-6923	-8140	-5897	-6442	-6576	
Sep	Base	10338	8688	5474	8263	10854	8637	4623	4081	7461	6151	5946	7813	7589	7351
	Well Works	0	0	0	0	0	1638	1321	1144	2992	3401	3247	3324	786	1424
	New Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Project Debottlenecking	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Special Project	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Sep Outlook (bopd)	10338	8688	5474	8263	10854	10275	5944	5225	10453	9552	9193	11137	8374	8775
WPB	Base	13171	13086	12909	8041	12795	12754	12645	12628	12560	12532	12532	12486	12295	12350
	Well Works	94	329	526	743	1182	1135	1557	1526	1476	1427	1893	2121	955	1170
	New Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Project Debottlenecking	0	0	177	111	2513	2504	2579	2571	2561	2551	2542	2533	1454	1727
	Special Project	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	WPB Outlook (bopd)	13265	13415	13612	8895	16490	16393	16781	16725	16597	16510	16967	17140	14703	15248
MPR	Base	13660	13572	13389	8340	13270	13228	13115	13097	13027	12998	12998	12950	12751	12809
	Well Works	94	329	526	743	1182	1135	1557	1526	1476	1427	1893	2121	955	1170
	New Development	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Project Debottlenecking	0	0	177	111	2513	2504	2579	2571	2561	2551	2542	2533	1454	1727
	Special Project	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	MPR Outlook (bopd)	13754	13901	14092	9194	16965	16867	17251	17194	17064	16976	17433	17604	15160	15707

#2 Engineer Report – Well Level

Well X



Challenges

- Convert complex Excel calculation to database scripting.
- Ensure script performance is good.
- Build a solution architecture that is sustainable and user-friendly.
- Underestimation on the complexity of solution.

Conclusion

Challenges with Excel



Scalability Issues

Poor Data Management

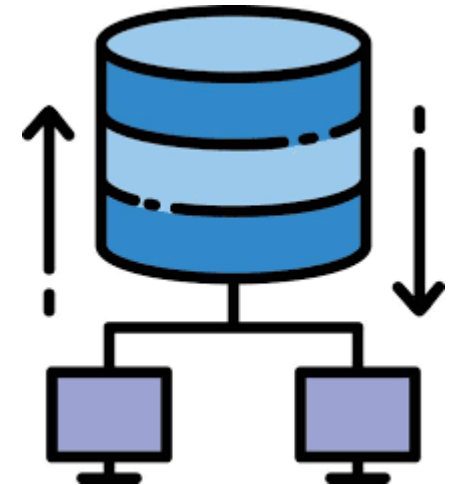
Error-Prone Processes

Benefits of centralized database solution

Sustainable

Organized workflow

Improve Data Integrity





Q & A