Help game designers analyze data: How to develop an online Pivot Table Tool

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Part 0: About us

Overview

Part 1: What problems we are facing with?

- Data-Driven decision making: Train game designers to think through data

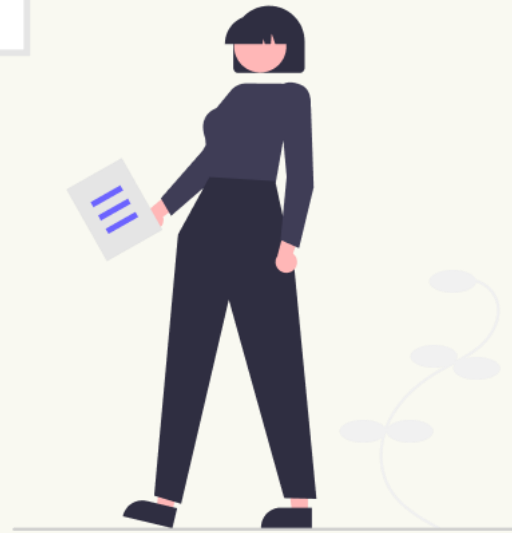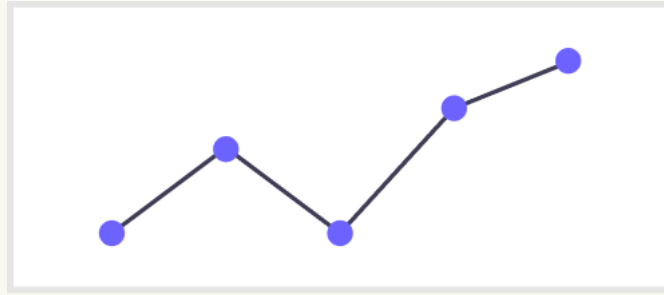- Say NO to high cost communication!

Part 2: What solutions we suggest?

- Design Pattern: 5W method? Ask designers to think about their plan.

- Engineering Pattern: A quick and low-cost way to PivotTable.

Part 3: How this works with our game databases?

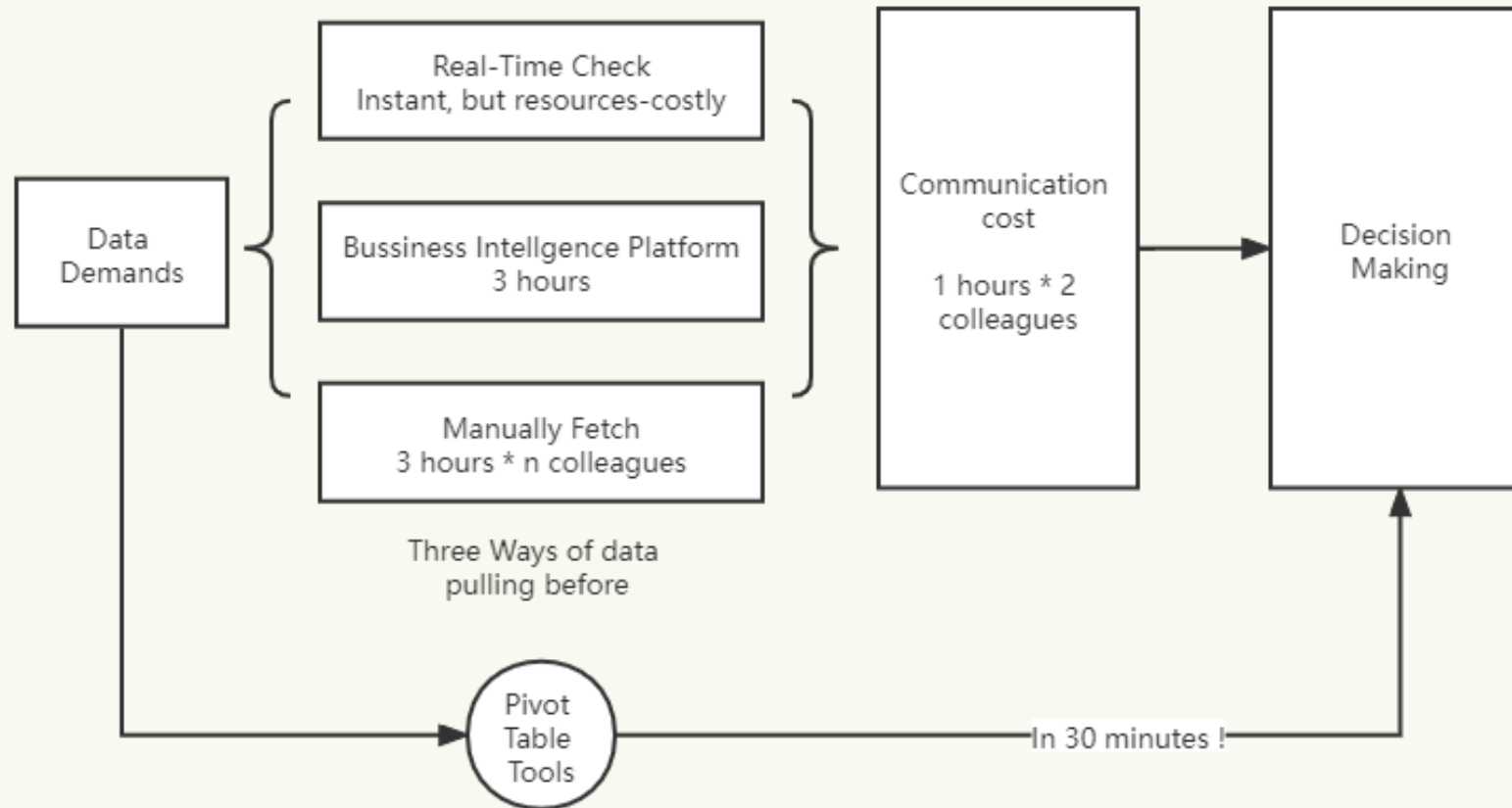**Part 4: What do you need to apply a PivotTable to your studio?**

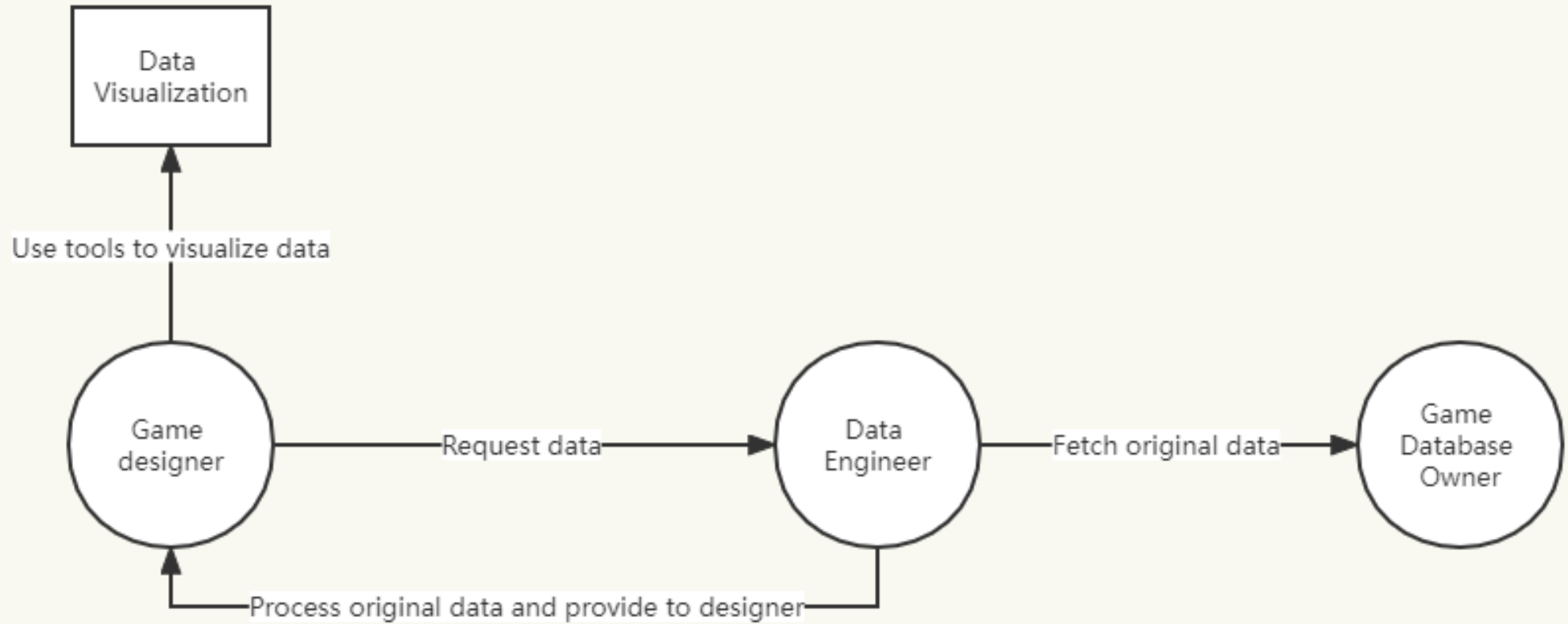# Part 1: What problems we are facing with?

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Data-Driven decision making

Say NO to high cost communication!

Data demands workflow of our studio
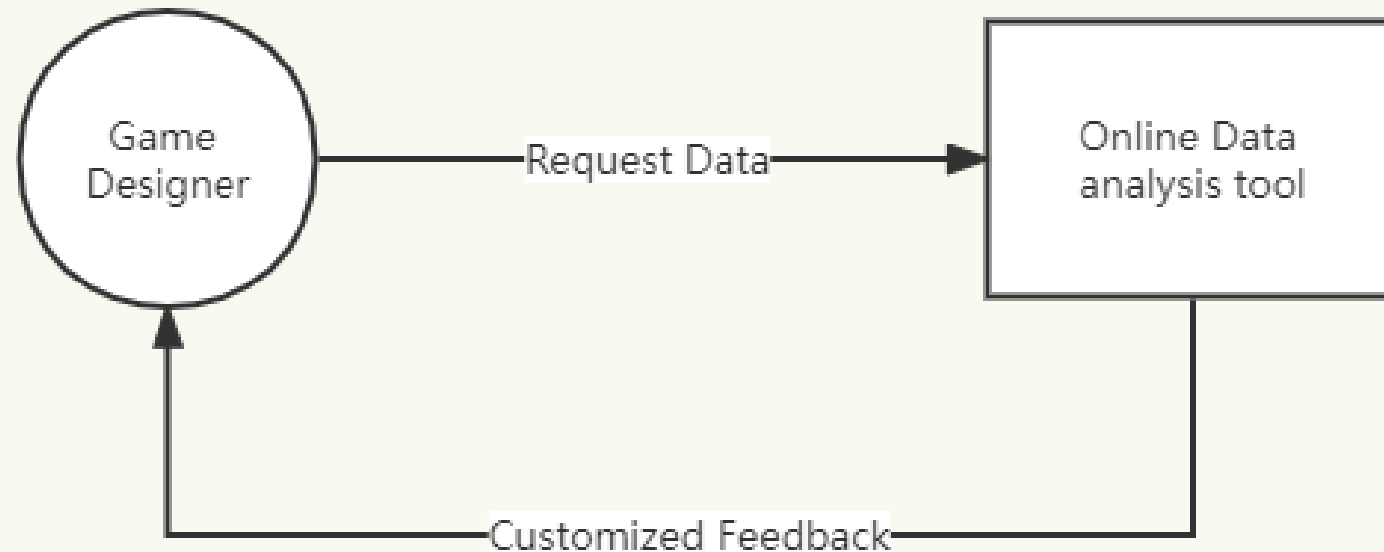
Say NO to high cost communication!

Say NO to high cost communication!

Refuse communication time!

Now:

Part 2: What solutions we suggest?

Progressive disassemble demands

Progressive disassemble demands

From an anonymous Data Product Manager:

"This demand is a total tragedy! A long Word document with ambiguous descriptions. Finally I found they even did not tell me which logs to search!"

Cost MUCH time to clarify with engineer

Progressive disassemble demands

With the help of expertise, data demands can be organized as a data form.

	A	B	C	D	E	F	G	H	I	J	K
1	**All data should be counted to 10.13, and it will not be counted after the log changed on 10.14**										
2	Yesterday's data will be used to determine the payment interval, no need to change										
3								gm_get_activity_times ｜ 活跃度变化日志			
4	**1. XXX 3.11 started in all servers**						字段名 role_id			注释 role_id	
5	Every Friday, Saturday Sunday						activity_id			活动id	
6	gm_trials_dungeon_reward_log						activity_times			次数	
7	Standard to join>=Lv.57						activity_points			活跃度变化值	
8							device_type			device_type	
9	Weekly participation rate = Weekly participating roles corresponding to the period of time and the payment interval/number of active roles of level 57 and above										
10	Average daily online time/activity of non-participating characters, calculated as the data of active characters of level 57 and above, for comparison										
11											
12											
13		Weeks	Payment Interval	Numbers of participation roles	Avg participation	Participation rate	Avg online time	Avg daily activity=**sum(activity_points)**	Avg online time for non-participants	Avg daily acitivity for non-participants	
14		3.11	xxx								
15		3.18	xxx								
16			xxx								
17			xxx								
18			xxx								
19			xxx								
20	Need data of every week from 3.11-10.13										

Less time in communication, but STILL need engineer to handle

Progressive disassemble demands

Advanced search

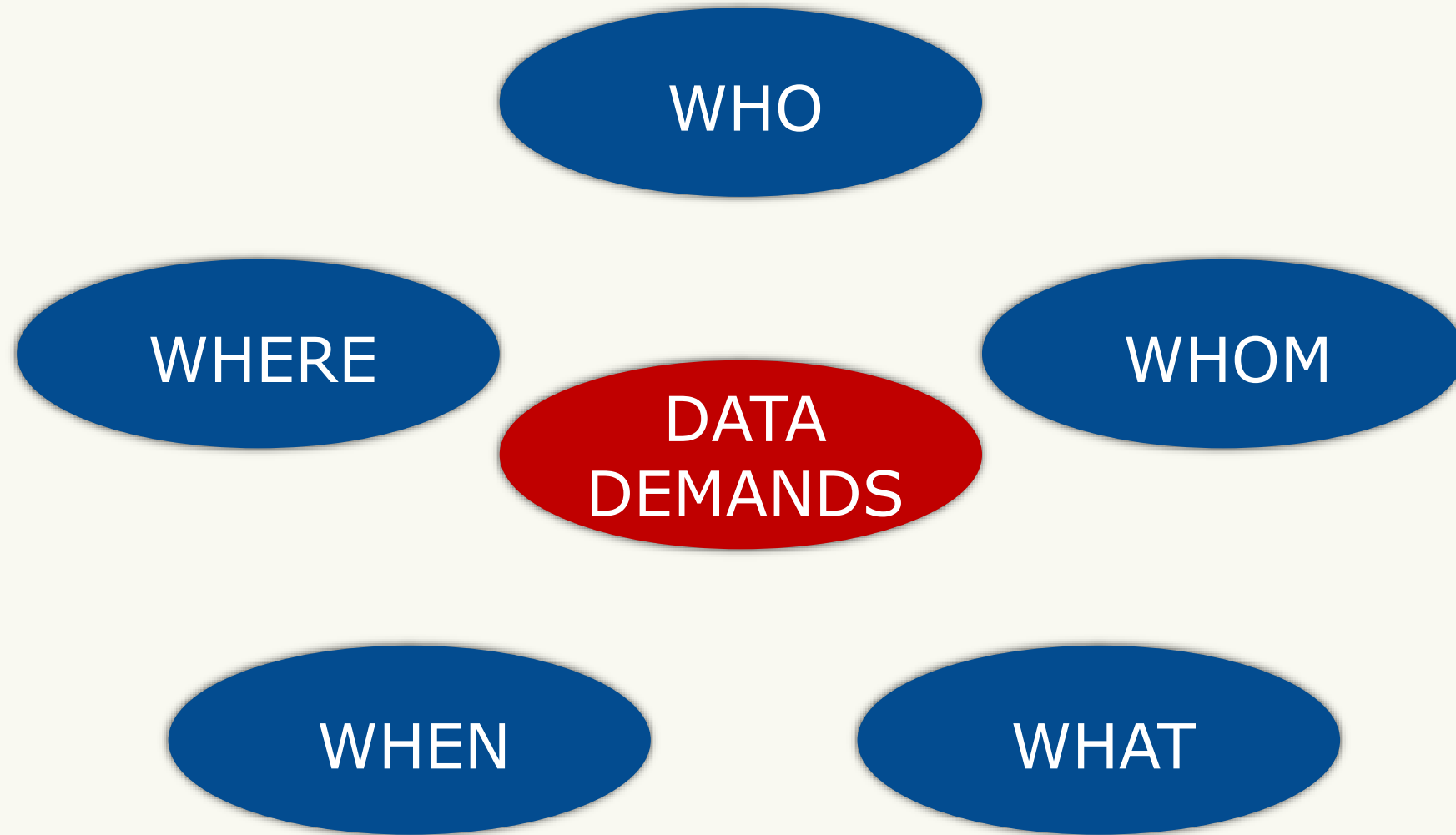- Powerful Functions

- Customizable Keys

- Hard to handle
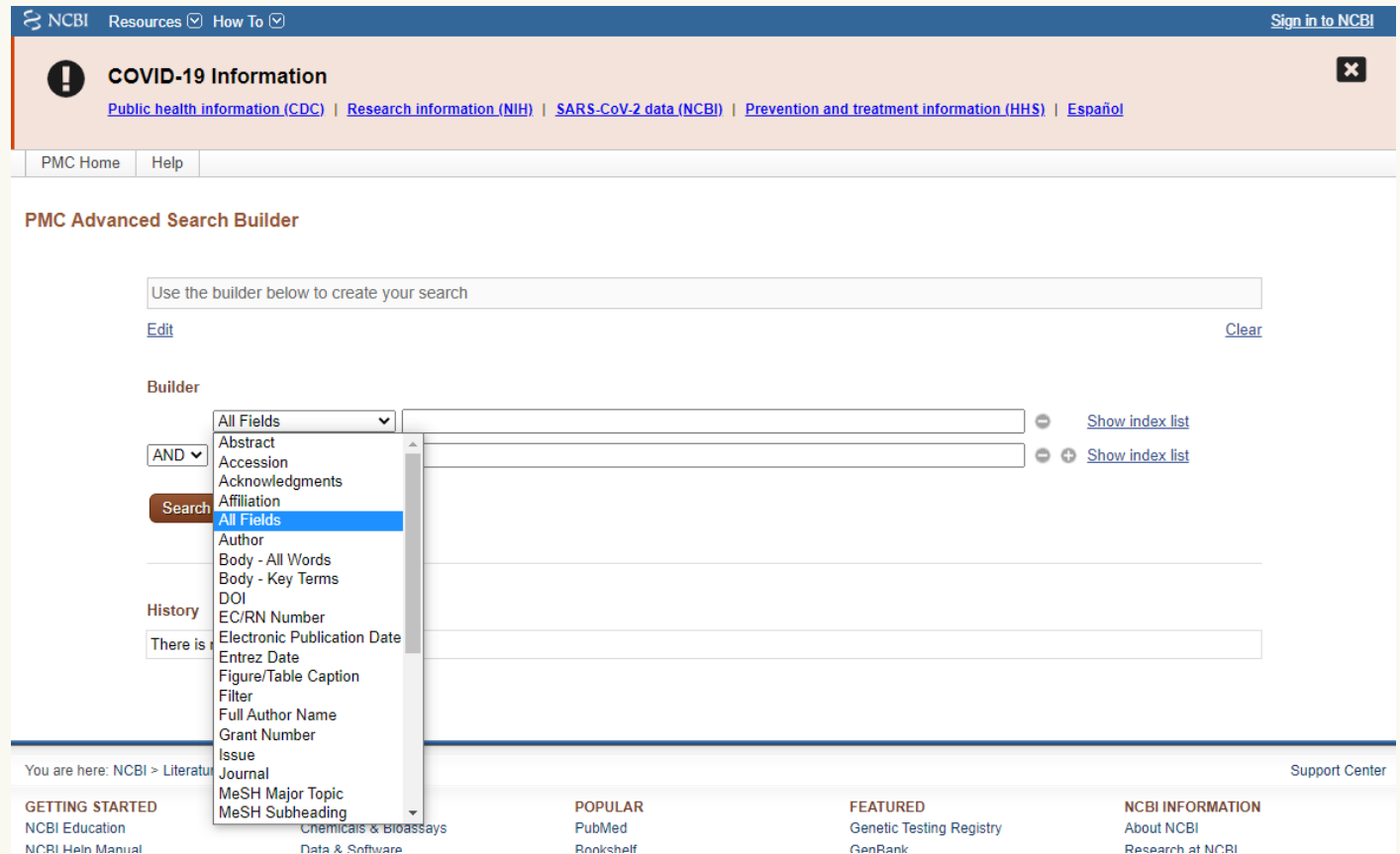
Free engineers, but need PLENTY time to learn for designer

Progressive disassemble demands

We decided to design a Q&A system to translate designers demands into SQL code!

5W method?

5W method?

Who	The primary key to this data query
Whom	Describe the details of the primary key
What	The purpose of this data query
When	The range of the query
Where	Servers range selected for this query.

5W method!

Data Analysis

Time for bringing the design into reality!

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A quick and low cost way to PivotTable

FrontEnd:

React + TypeScript + Redux + immer +Ant-Design
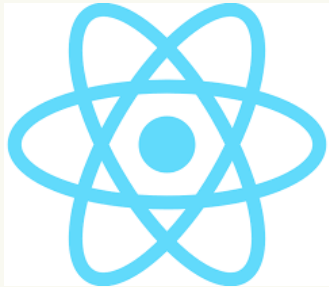
Technical research and selection

API Server: Python Django

- Easy to implement

- Efficient for development

Technical **research and selection**

Database: MySQL

Technical research and selection

PivotTable:

Lightweighted，Easy，Scalable

❌ Flexmonster
❌ dhtmlxPivot
❌ PivotTable.js(react-pivottable)
…

✅ Ant-Design Table

No silver bullet: Problems encountered

Backend:

- Performance of fetching data

- Optimization of SQL

Frontend:

- Fixed serial number

- Header and data processing

- Frozen column/row

- Cell width

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No silver bullet: Problems encountered

1. Fixed serial number

- Inside or out table?

- How to set serial number?

	A	B	
	角色ID	数据 记录数 2021-11-15	日期
1	13903638210018	1	
2	21771247010004	1	
3	14716387010018	1	
4	14768937410056	1	
5	20983554910001	1	
6	854064815006	1	
7	7590985910062	1	
8	1294525615060	1	

No silver bullet: Problems encountered

`<Table columns={columns} dataSource={data} />`

columns:

```
▼ 0:
    fixed: "left"
  ▶ render: (t, record, index) => index + 1        serial number
    title: ""
    width: 28
  ▶ [[Prototype]]: Object
▶ 1: {title: "A", children: Array(1)}
▶ 2: {title: "B", children: Array(1)}
▶ 3: {title: "C", align: "center", width: "128px", children: Array(1)}
```

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No silver bullet: Problems encountered

2. Header and Data Processing

No silver bullet: Problems encountered

Recursively setting children of columns:

No silver bullet: Problems encountered

columns:

```
(4) [{…}, {…}, {…}, {…}] ℹ️
▶ 0: {title: "", width: 28, fixed: "left", render: ƒ}
▼ 1:
  ▼ children: Array(1)
    ▶ 0: {title: "角色ID", dataIndex: "角色IDcolumn", align: "left", sorter: false, render: ƒ, …}
    length: 1
    ▶ [[Prototype]]: Array(0)
  title: "A"
  ▶ [[Prototype]]: Object
▼ 2:
  ▼ children: Array(1)
    ▶ 0: {title: "数据", colSpan: 1, align: "left", children: Array(1)}
    length: 1
    ▶ [[Prototype]]: Array(0)
  title: "B"
  ▶ [[Prototype]]: Object
▼ 3:
  align: "center"
  ▼ children: Array(1)
    ▶ 0: {title: "日期", rowSpan: 1, colSpan: 1}
    length: 1
    ▶ [[Prototype]]: Array(0)
  title: "C"
  width: "128px"
```

data:

```
▼Array(1001) ℹ️
  ▼[0 … 99]
    ▶ 0: {角色IDcolumn: "20562190910048", 记录数pivot_value: 1, key: "pivot-d-0"}
    ▶ 1: {角色IDcolumn: "21771247010004", 记录数pivot_value: 1, key: "pivot-d-1"}
    ▶ 2: {角色IDcolumn: "14716387010018", 记录数pivot_value: 1, key: "pivot-d-2"}
    ▶ 3: {角色IDcolumn: "854064815006", 记录数pivot_value: 1, key: "pivot-d-3"}
    ▶ 4: {角色IDcolumn: "7587926115008", 记录数pivot_value: 1, key: "pivot-d-4"}
    ▶ 5: {角色IDcolumn: "13851208310051", 记录数pivot_value: 1, key: "pivot-d-5"}
    ▶ 6: {角色IDcolumn: "1296234410002", 记录数pivot_value: 1, key: "pivot-d-6"}
    ▶ 7: {角色IDcolumn: "10078310016", 记录数pivot_value: 1, key: "pivot-d-7"}
    ▶ 8: {角色IDcolumn: "20172157910058", 记录数pivot_value: 1, key: "pivot-d-8"}
    ▶ 9: {角色IDcolumn: "20618192210003", 记录数pivot_value: 1, key: "pivot-d-9"}
    ▶ 10: {角色IDcolumn: "21482974010062", 记录数pivot_value: 1, key: "pivot-d-10"}
    ▶ 11: {角色IDcolumn: "20986544415062", 记录数pivot_value: 1, key: "pivot-d-11"}
    ▶ 12: {角色IDcolumn: "7192975710051", 记录数pivot_value: 1, key: "pivot-d-12"}
    ▶ 13: {角色IDcolumn: "1298096010062", 记录数pivot_value: 1, key: "pivot-d-13"}
    ▶ 14: {角色IDcolumn: "21720643416000", 记录数pivot_value: 1, key: "pivot-d-14"}
    ▶ 15: {角色IDcolumn: "379031011000", 记录数pivot_value: 1, key: "pivot-d-15"}
    ▶ 16: {角色IDcolumn: "13931880110002", 记录数pivot_value: 1, key: "pivot-d-16"}
    ▶ 17: {角色IDcolumn: "13876067310001", 记录数pivot_value: 1, key: "pivot-d-17"}
    ▶ 18: {角色IDcolumn: "872015210001", 记录数pivot_value: 1, key: "pivot-d-18"}
    ▶ 19: {角色IDcolumn: "8005475310051", 记录数pivot_value: 1, key: "pivot-d-19"}
    ▶ 20: {角色IDcolumn: "7641686510055", 记录数pivot_value: 1, key: "pivot-d-20"}
    ▶ 21: {角色IDcolumn: "7563422110060", 记录数pivot_value: 1, key: "pivot-d-21"}
    ▶ 22: {角色IDcolumn: "14690254911000", 记录数pivot_value: 1, key: "pivot-d-22"}
```

render result:

	A	B	C
	角色ID	数据	日期
		记录数	
		2021-11-25	
1	20562190910048	1	
2	21771247010004	1	
3	14716387010018	1	
4	854064815006	1	
5	7587926115008	1	

No silver bullet: Problems encountered

3. Frozen columns/rows

- Merged cells do not support frozen

- Serial numbers from left and above do not support for chosen

- Monitor click event on every cell to add chosen state and fixed effect class

Let's see how this works!

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Revelation Online:

- An MMO with strong sense of data-driven decision making to improve player's experience

- Generates a large part of data demands among all the games in our studio.

How designers obtain data with our tools:

Part 4: How to implement a PivotTable in your studio?

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Two suggestions for your studio

1. Cultivate data-driven culture among your designers, use data to improve user experience

Two suggestions for your studio

2. Keep eye on open-source resources and the quickest and lowest-cost way to the build a tool, our development stack is here for referring!

Takeaways:

- **A direct tool is a bridge between designers and data.**

- **5W can help designers to regularize their data demands and cultivate data-driven thinking.**

- **A scalable and low-cost tool that developers can refer, especially for individual developers.**

Thank you for your attendance!

Any questions?

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